

Equity-Based Insurance Guarantees Conference

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Risk Managed Funds

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Risk Managed Funds

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Index returns do not reflect transaction costs, fees and expenses that would reduce performance in an actual account. It is not possible to invest in an index. Leverage risk is created when an investment exposes the portfolio to a level of risk that exceeds the amount invested. Changes in the value of such an investment magnify the risk of loss and potential for gain.

Agenda

- Risk Managed Fund Terminology
- Risk Managed Fund Timeline
- Review of Risk Management Strategies
 - Volatility Control
 - Risk Parity
- Recent Developments

Risk Managed Fund Terminology

- Managed Volatility, Target Volatility, Volatility Control, Risk Managed and Risk Control are often used interchangeably for a similar type of investment process for stabilizing volatility
- Risk Managed and Risk Control have a broader meaning
- Numerous types of approaches and terms in the marketplace
 - **Allocation based:** dynamic allocation, multi-strategy, multi-asset, risk parity, risk balancing
 - **Option based:** constant proportional portfolio insurance (CPPI), capital protection, collar, floor-leverage
 - **Other managed strategy concepts:** sector rotation, low volatility, momentum, high dividend, etc.

Risk Managed Fund Concept

- Most risk managed funds employ some form of dynamic allocation between risky and less risky assets employing techniques including:
 - Forecasting risk as the basis for reducing equity exposure
 - Using fund performance to determine equity allocation
 - Relying on rebalancing asset classes within ranges
 - Using option contracts (e.g. put contracts)

Risk Managed Fund Timeline

- 1976: Portfolio Insurance developed
- 1986: Constant Proportional Portfolio Insurance (CPPI) developed
- 1987: Market crash discredits Portfolio Insurance because of futures market dislocation
- 1996: Risk Parity developed
- 1999: Principal protected funds launched
- 2009: Principal protected, target-date, managed payout funds discredited by both the tech bubble and financial crisis
Volatility Control indices launched (e.g. S&P 500 Daily Risk Control 10% Index)
- 2011: Volatility Control experiences poor performance
- 2013: Risk Parity experiences poor performance
- 2015: Volatility Control experience poor performance again
- 2017: Volatility Control AUM approaches \$300b+
Good performance year for volatility control
- 2018: Smart Beta + Volatility Control strategies/indices developed

Volatility Control Basics

- Seeks to achieve a target volatility
- Determine volatility forecast
 - Ex: Maximum of 60 and 90 day exponential moving average with 2-day lag
- Scale equity allocation based on the volatility forecast
 - Equity Allocation = $\frac{\text{Target Volatility}}{\text{Forecasted Volatility}}$
 - Ex: If Target Volatility = 10% and Forecasted Volatility = 20%
then Equity Allocation = $\frac{10\%}{20\%} = 50\%$
- Remainder invested in cash for S&P 500 Daily Risk Control Index
 - Variations can use other fixed income assets instead of cash
- Equity allocation typically capped
 - Cap = 150% for S&P 500 Daily Risk Control 10% Index

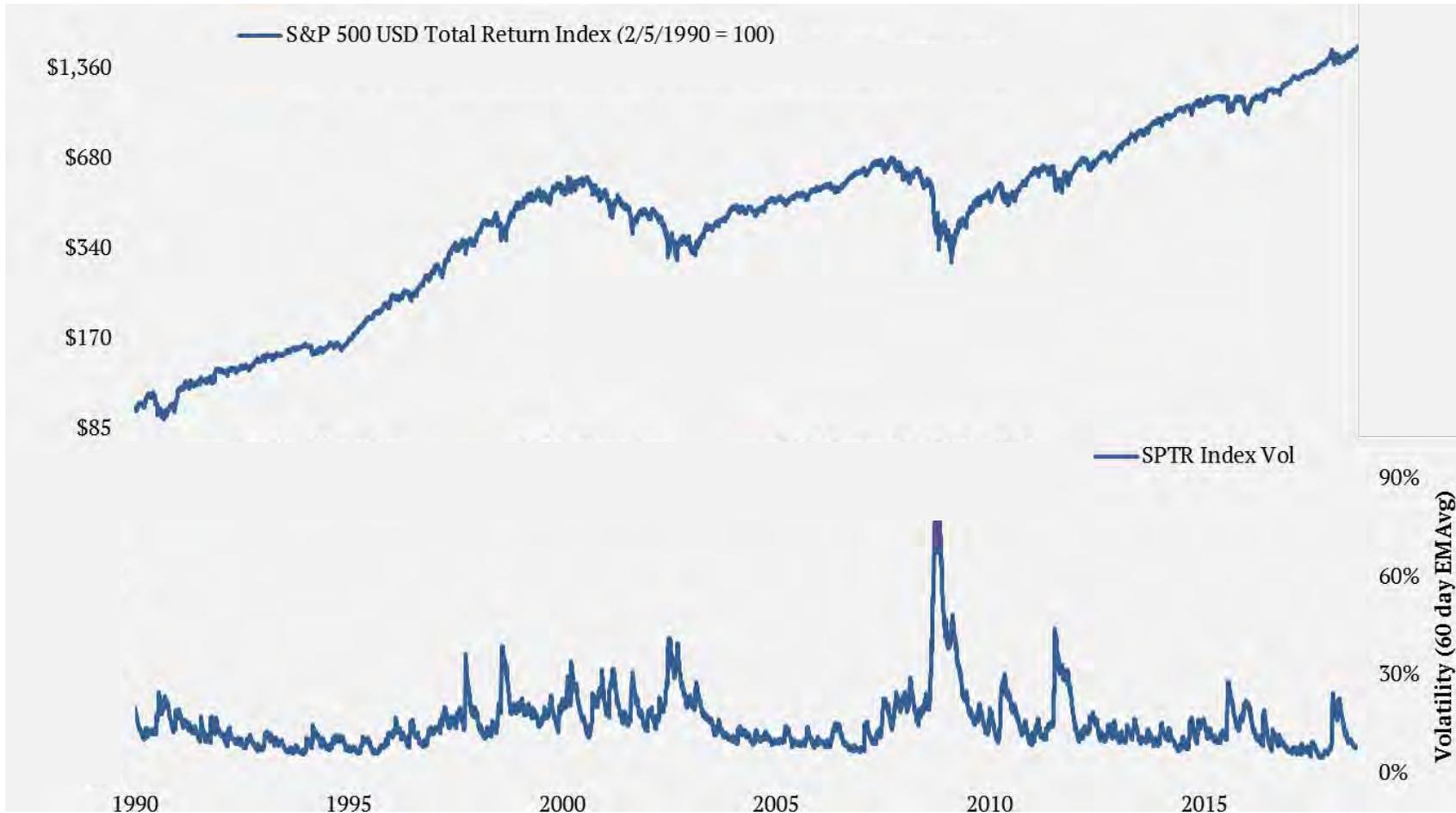
Volatility Control Basics

- Helps stabilize hedging costs of variable annuity guarantees by stabilizing the volatility of the variable annuity subaccounts
- If forecasted volatility could be perfectly predicted, a S&P 500 daily risk control portfolio with a 10% target volatility could have outperformed the S&P by approximately 4% per annum
- But perfect volatility forecasting is impossible and the approach has produced an associated cost and negative alpha on average
- Investors have been disappointed with actual volatility control performance
 - 2011 – Sudden market drop
 - 2015 – V markets

Source: Morningstar, AnchorPath

Volatility Control Basics

S&P 500 Index and realized volatility



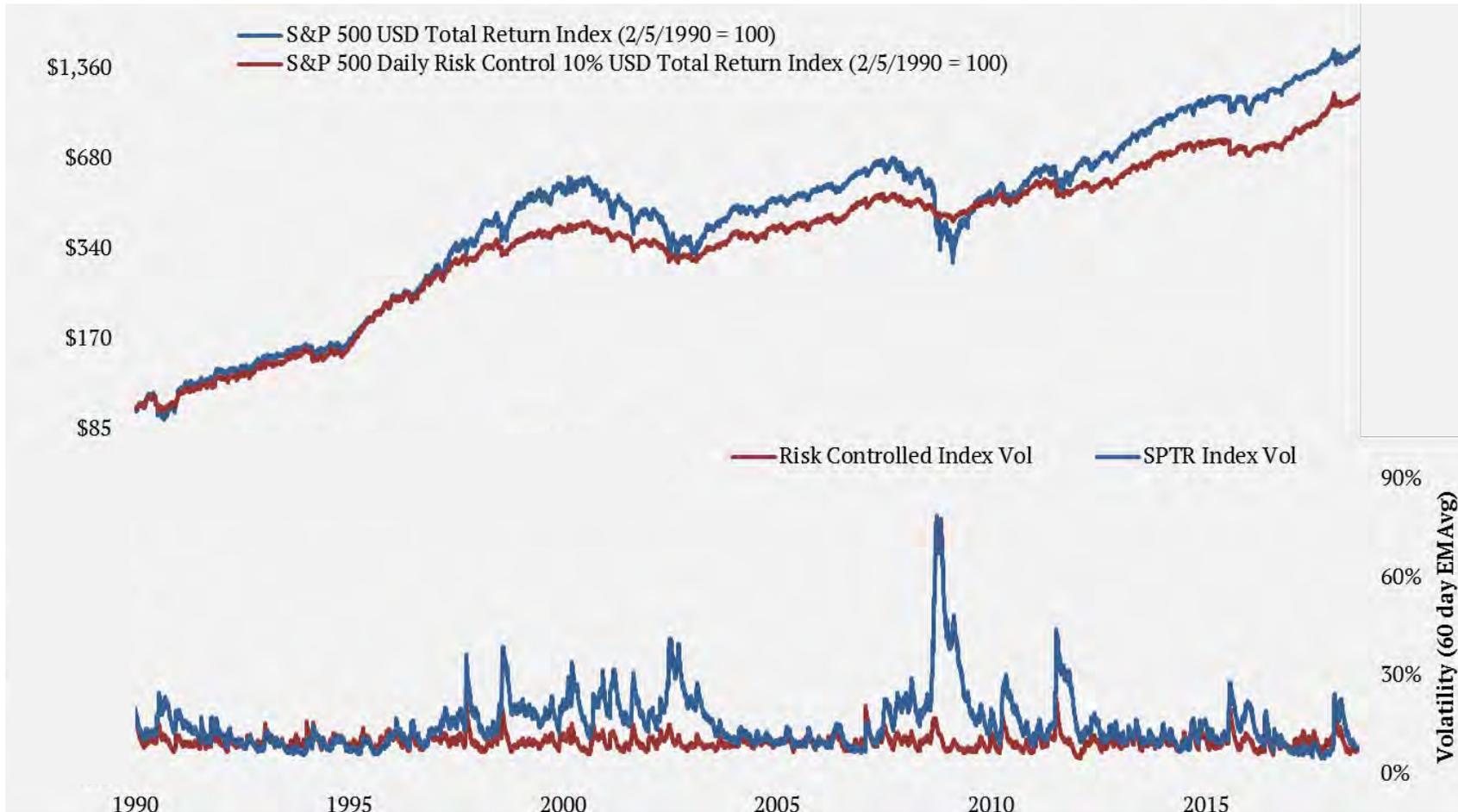
Financial crisis and summer 2011 are recent notable periods with significant equity drawdowns and escalated volatility levels

Equity volatility itself is volatile

Source: Morningstar, AnchorPath From 2/5/1990 to 9/30/2018

Volatility Control Basics

Volatility Control stabilized volatility but protection has been inconsistent

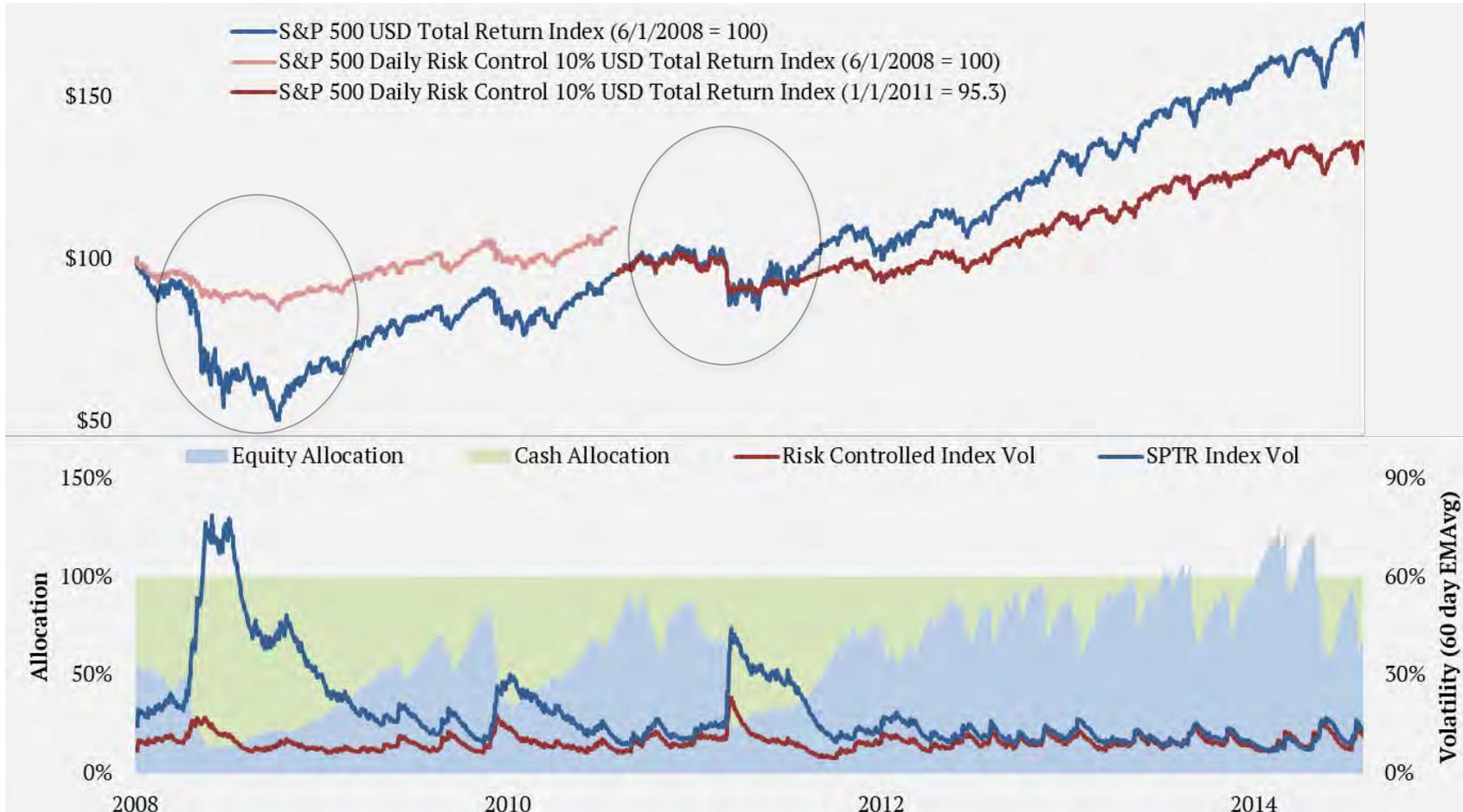


Realized volatility of the risk control index has been relatively stable with much less volatility variation than the S&P 500 Index

Source: Morningstar, AnchorPath From 2/5/1990 to 9/30/2018

Volatility Control Basics

Volatility Control benefit is highly dependent on entry point



In 2008, the risk control index avoided the large drawdown

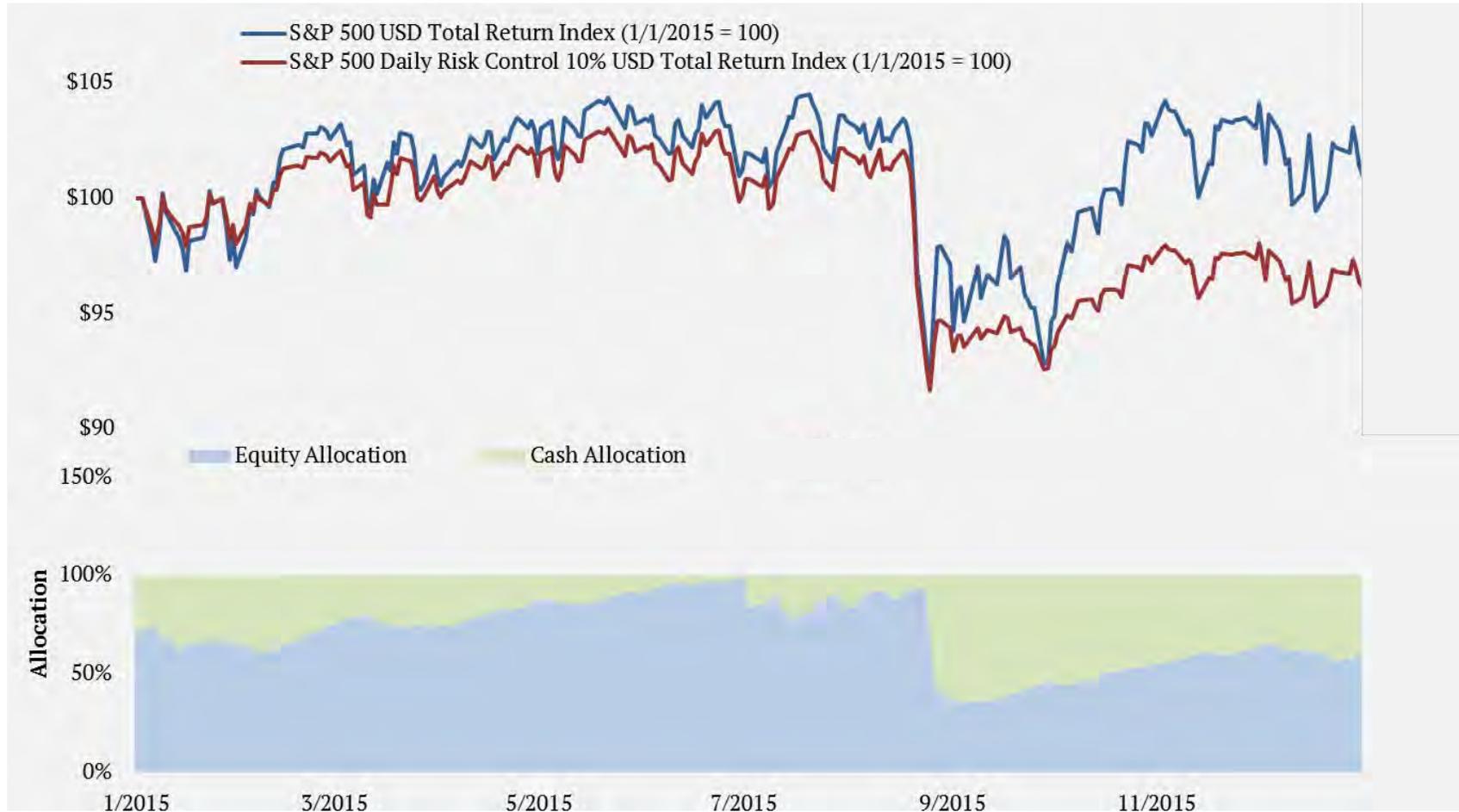
In 2011, the risk control index significantly declined as volatility increased abruptly

Since 2011 the risk control index has significantly lagged the S&P 500

Source: Morningstar, AnchorPath From 6/1/2008 to 12/31/2014

2015 Volatility Control Experience

S&P 500 Daily Risk Control Index 10% significantly underperformed



The risk control index underperformed the S&P 500 by 5.0%

Experienced a drag from V markets

Did not protect the sudden drop in August 2015

Lagged the S&P 500 as the market recovered

Source: Morningstar, AnchorPath

2017 Volatility Control Experience

S&P 500 Daily Risk Control Index outperformed the S&P Index



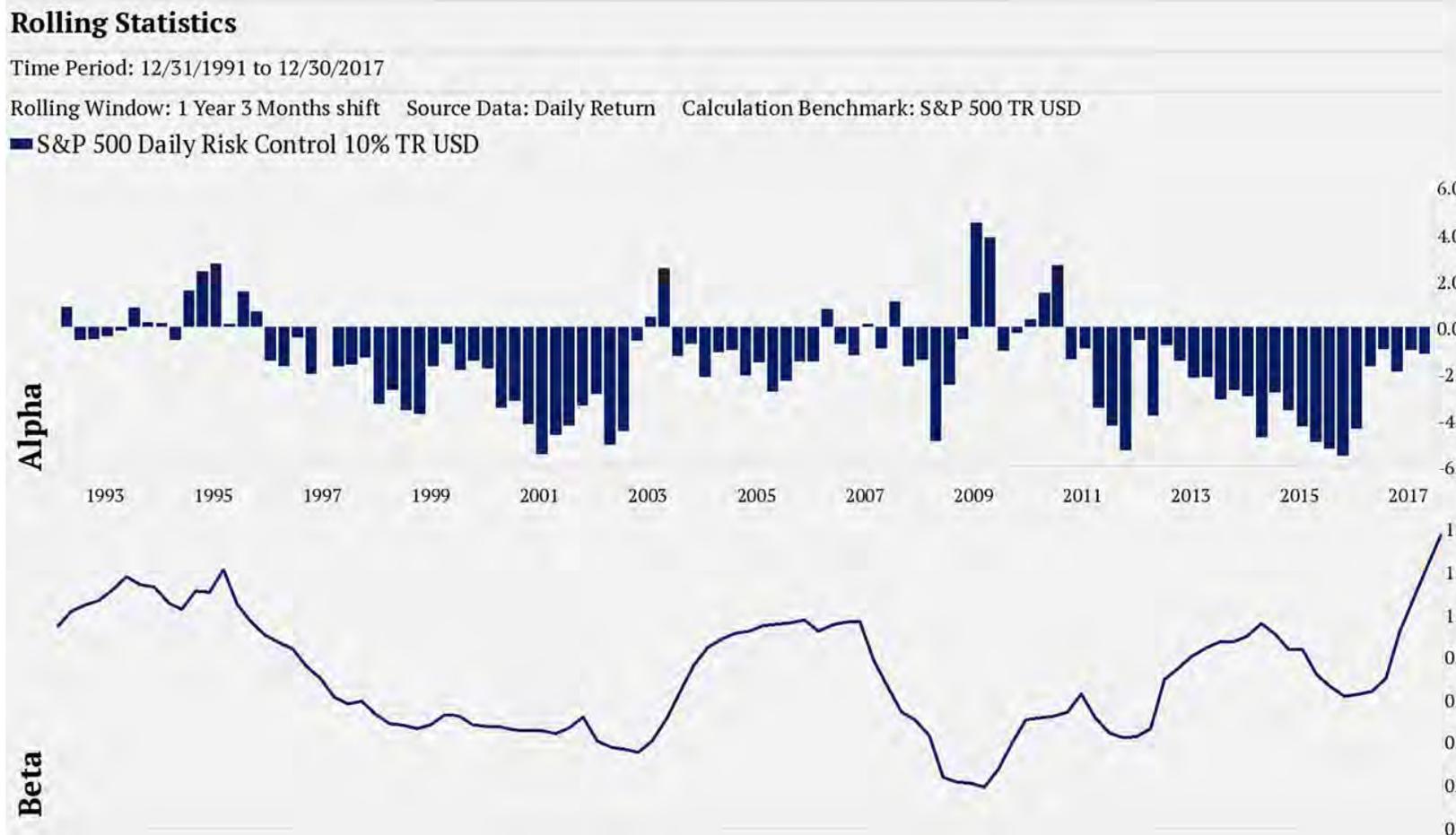
The risk control index had 100%+ exposure to the S&P 500 throughout the year and outperformed by 7.2%

However, when regressed against the S&P 500, it had negative alpha of approximately -1.0%

Source: Morningstar, AnchorPath

Volatility Control can be expensive

S&P 500 Daily Risk Control 10% Index produced negative alpha on average*



Volatility Control strategies can experience persistent negative alpha

* Based on rolling regressions against the S&P 500 from 1992-2017 with a 1-year window, the risk control index had an average alpha of approximately -1.6% annualized

Source: Morningstar, AnchorPath

Volatility Control Summary

- Pros
 - Relatively simple to implement
 - Can potentially reduce/stabilize costs of hedging
 - Has the potential to reduce drawdowns
- Cons
 - Can have challenging environments
 - Sudden market drops
 - V markets
 - Low volatility declining markets
 - High volatility rising markets
 - Can have a significant cost/drag associated with the strategy
 - Investors seek good performance, not necessarily stable volatility
 - No explicit downside protection

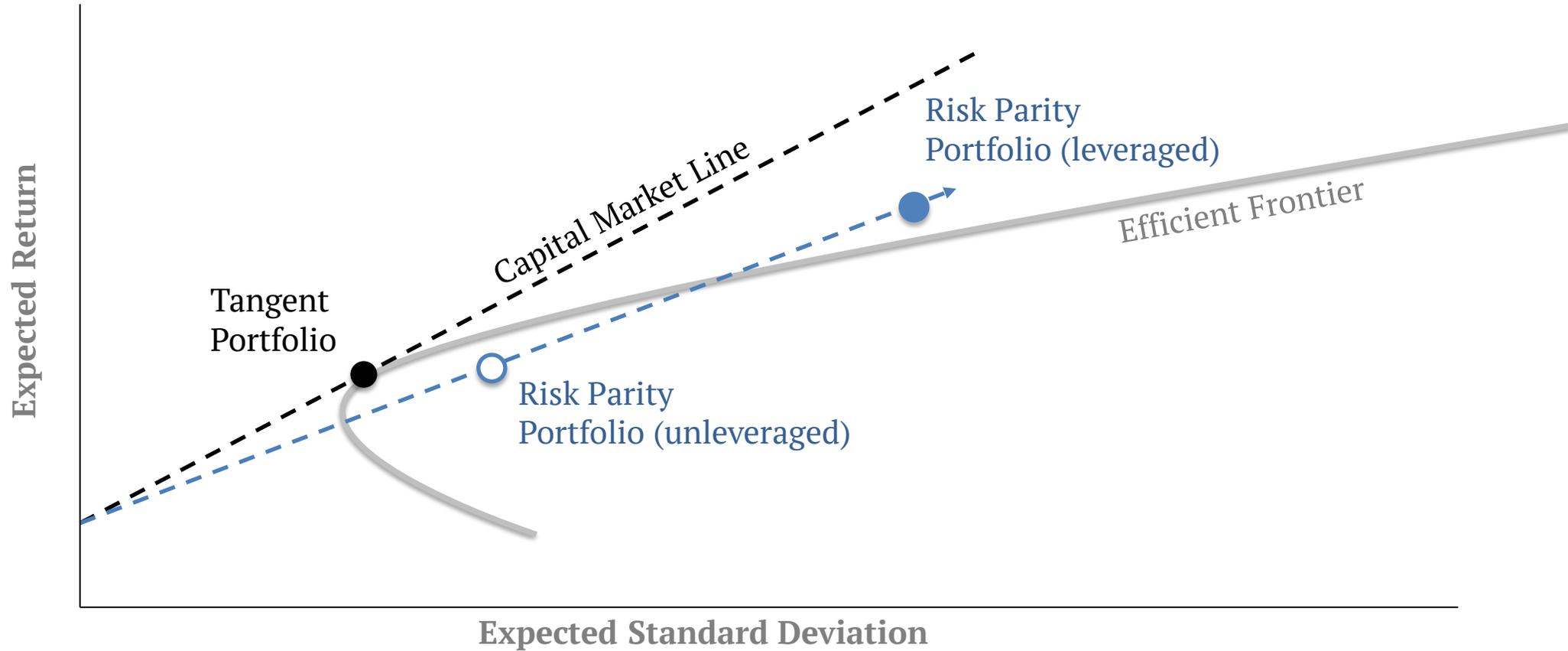
Risk Parity Basics

- Diversify risk and return by equalizing asset class volatility
- Allocation to real assets/commodities for potential diversification and rising inflation scenarios
- Leverage resulting portfolio to desired level of risk
- A volatility control variation

Two asset class example:

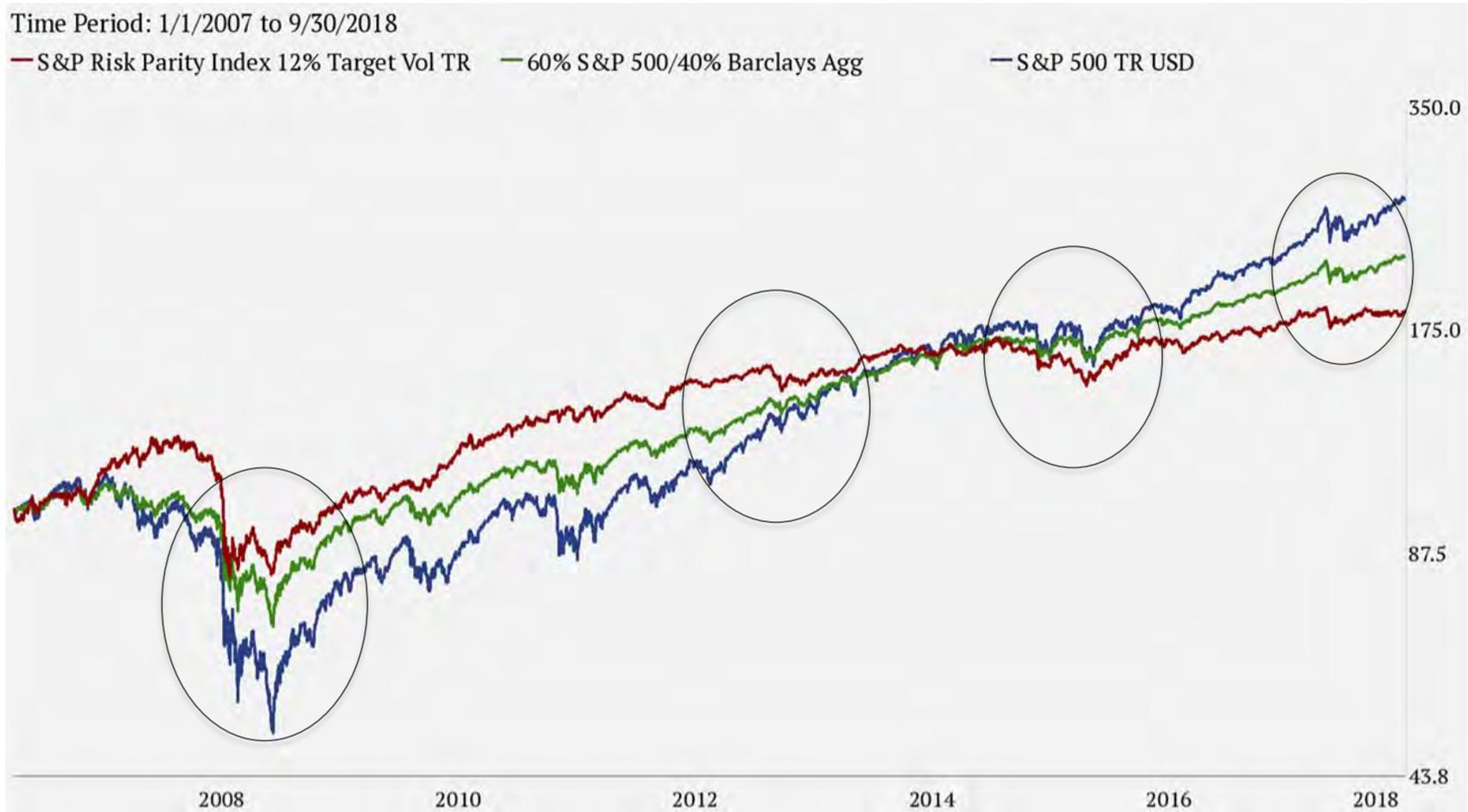
	Volatility	Correlation	Portfolio		
			Traditional	Equal Risk	Equal Risk 2x Leverage
Equity	15%		60%	25%	50%
Bond	5%	-0.35	40%	75%	150%
Total Exposure			100%	100%	200%
Expected Volatility			8.5%	4.25%	8.5%

Risk Parity Basics



Risk Parity Performance

Cumulative Performance from 1/1/2007 to 9/30/2018



Risk Parity performance diverges from traditional benchmarks

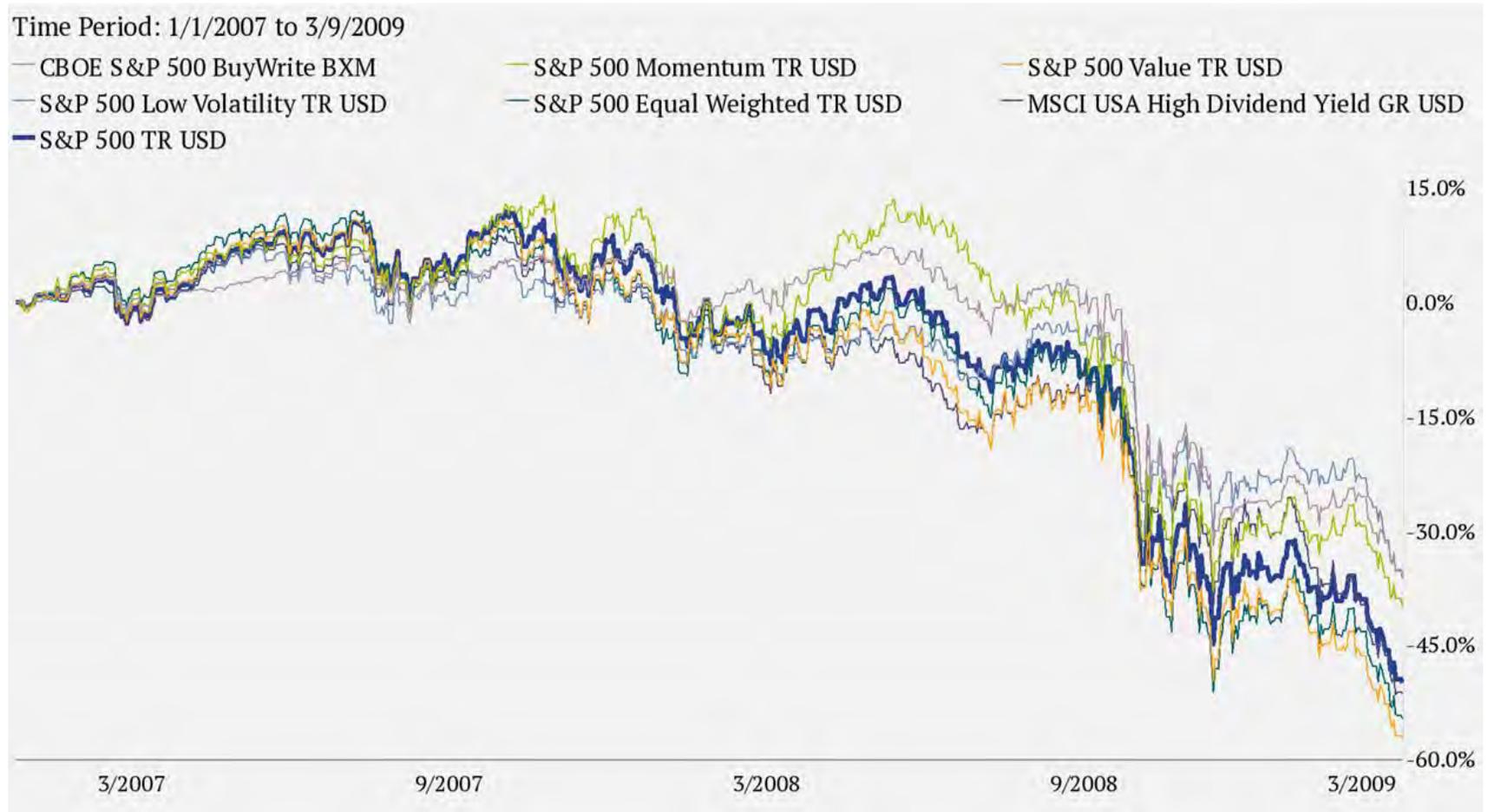
Source: Morningstar

Risk Parity Summary

- Pros
 - Worked well in many historical market cycles
 - Relatively easy to implement
 - Emphasis on real assets/commodities for potential diversification and rising inflation scenarios
- Cons
 - Poor short term performance in quickly rising interest rate scenario
 - Will not protect against systemic rotation from all risky assets to cash
 - No explicit downside protection

Smart Beta Strategies

Cumulative Performance from 1/1/2007 to 3/9/2009



Smart Beta strategies can have large drawdown risk

Source: Morningstar

Multi-asset diversification is only a starting point



1.3x leveraged diversified portfolio had similar returns to the S&P 500 with lower risk

S&P 500 Peak	S&P 500 Trough	S&P 500 Index	Leveraged 60/40	Improvement in Drawdown
12/31/1976	02/28/1978	-14.3%	-12.0%	2.2%
11/30/1980	07/31/1982	-16.5%	-12.0%	4.5%
08/31/1987	11/30/1987	-29.6%	-23.3%	6.3%
01/02/1990	01/30/1990	-10.0%	-9.0%	1.0%
07/16/1990	10/11/1990	-19.2%	-16.1%	3.1%
10/07/1997	10/27/1997	-10.8%	-8.5%	2.2%
07/17/1998	08/31/1998	-19.2%	-14.9%	4.3%
07/16/1999	10/15/1999	-11.8%	-10.1%	1.7%
03/24/2000	04/14/2000	-11.1%	-8.4%	2.8%
09/01/2000	10/09/2002	-47.4%	-34.0%	13.5%
10/09/2007	03/09/2009	-55.2%	-44.9%	10.4%
07/20/2015	02/11/2016	-13.0%	-8.9%	4.1%
01/26/2018	02/08/2018	-10.1%	-8.6%	1.5%

Since 1977, a 60/40 portfolio with 1.3x leverage (or exposure of 80% equities and 53% bonds) would have achieved a similar return as the S&P with lower risk

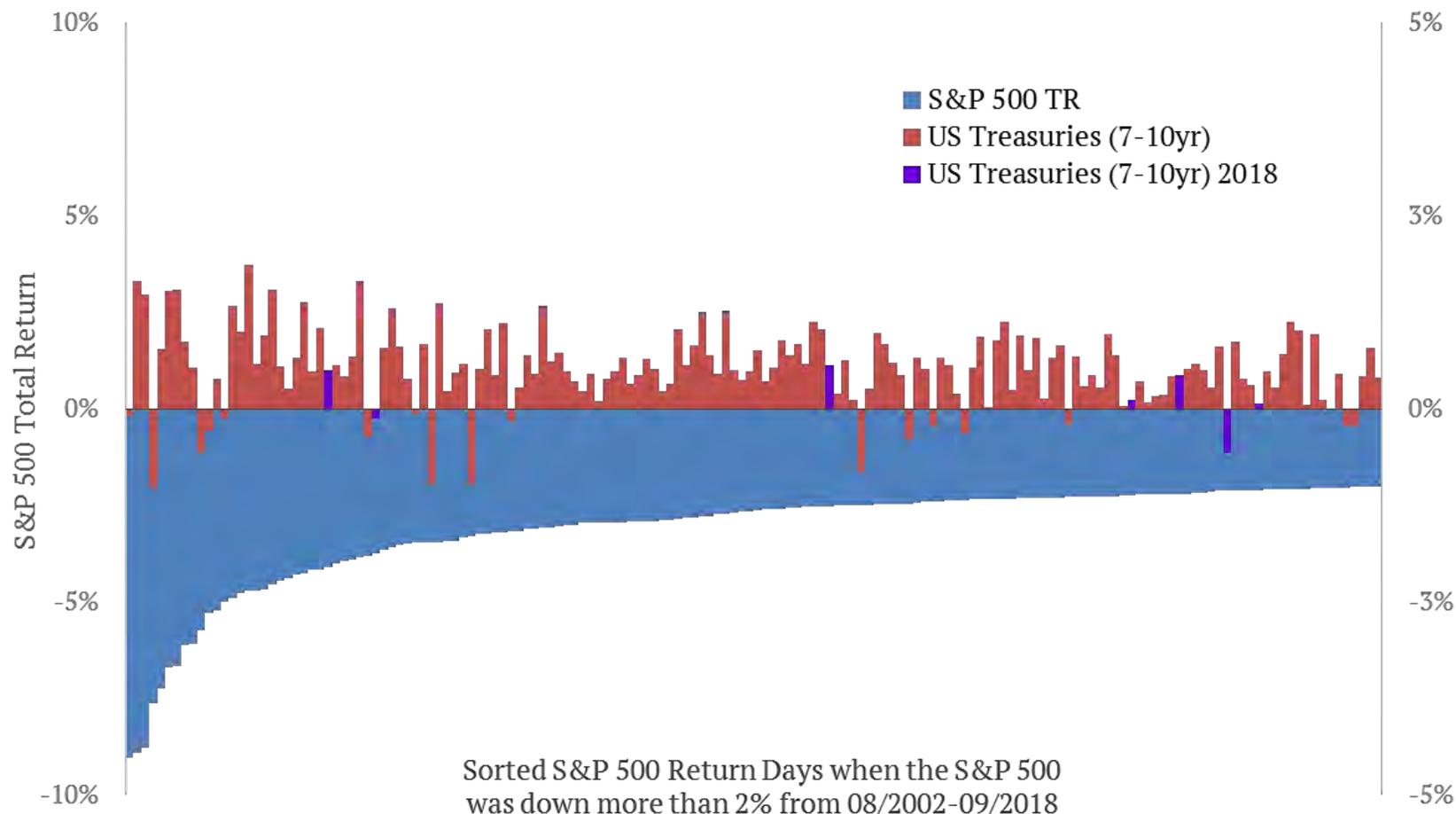
In every S&P 500 drawdown greater than 10%, the leveraged 60/40 portfolio reduced the drawdown

Past performance is not a guarantee of future results

Source: Bloomberg, AnchorPath. The 60/40 portfolio is represented by 60% S&P 500 Total Return Index and 40% Bloomberg Barclays US Aggregate Bond TR Index. From 1977 to 7/31/2018 with monthly observations prior to 1989

Treasuries can hedge equities

US Treasury Notes vs largest S&P 500 down days

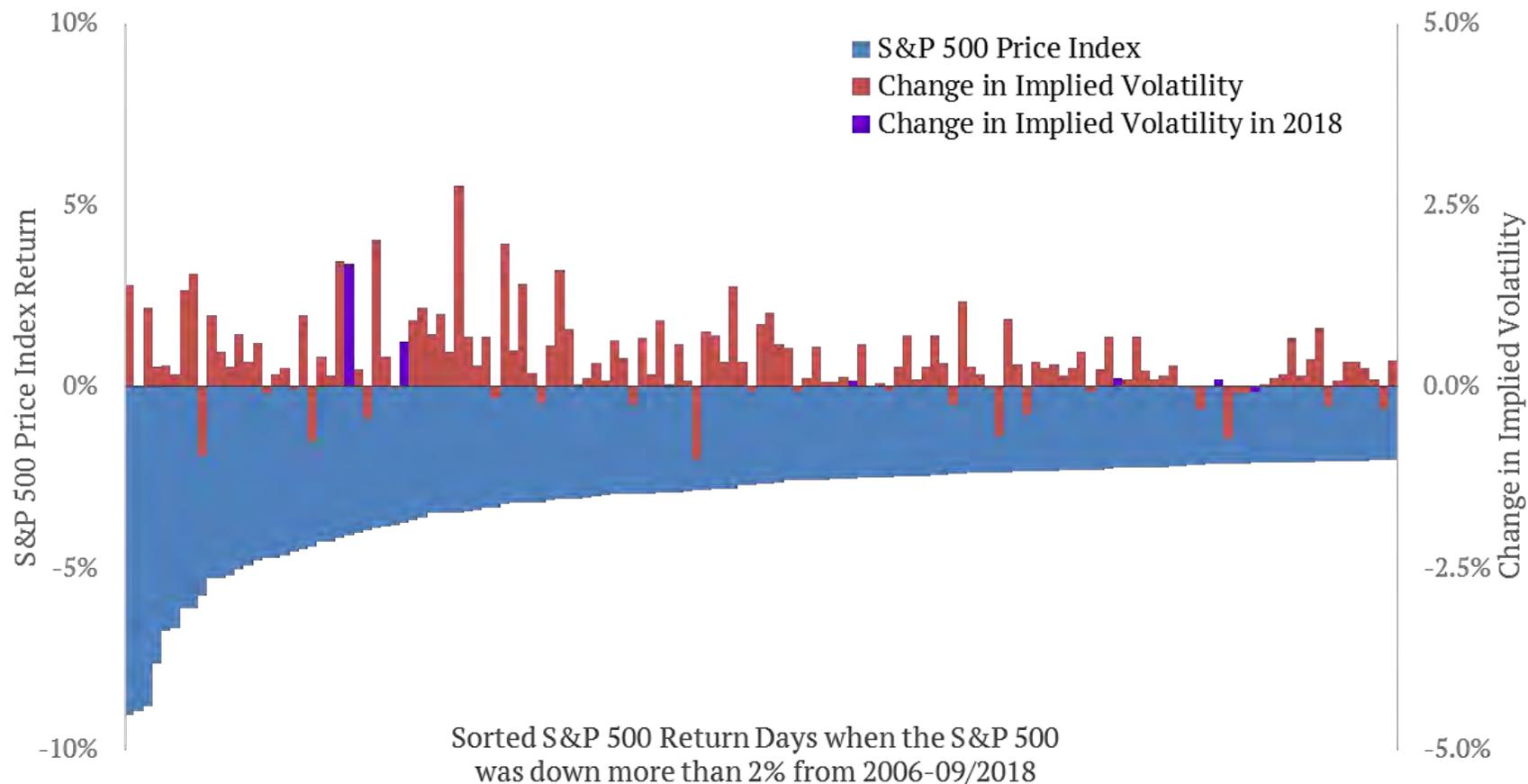


Past performance is not a guarantee of future results

Source: Bloomberg The US Treasury Note (7-10yr) Total Returns are represented Bloomberg Barclays US Treasury 7-10 Year TR Index

Long volatility exposure can hedge equities

Implied volatility vs largest S&P 500 down days



Past performance is not a guarantee of future results

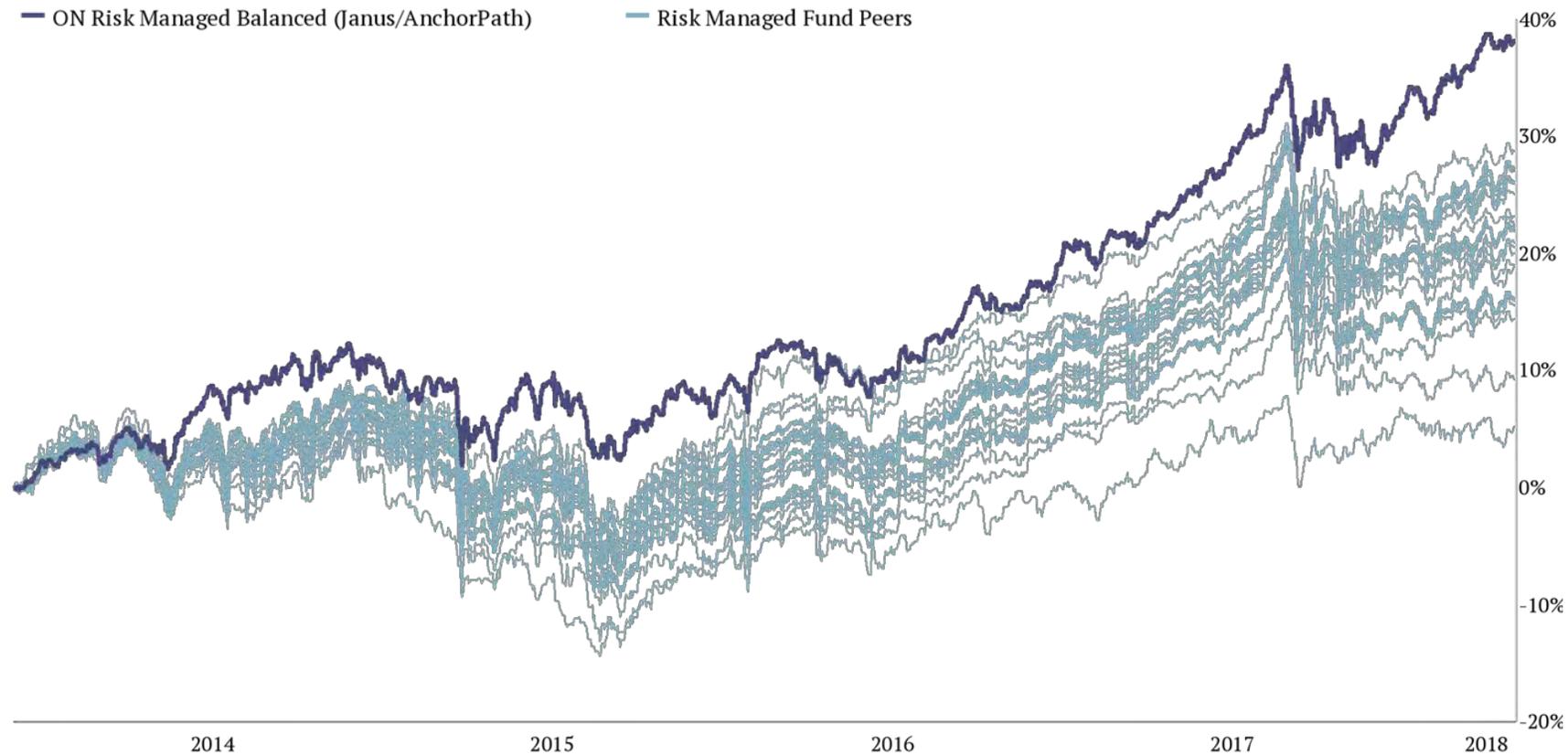
Source: Bloomberg, Anchorpath. The change in implied volatility is an approximation that reflects the change of the implied volatility of a 2-year, at-the-money, S&P 500 Index option

Integrated risk management in practice



Cumulative Performance (Since Inception)

Time Period: 5/1/2014 to 9/30/2018



Ohio National (ON) Risk Managed Balanced Portfolio is managed in two components

Balanced Component is managed by Janus Henderson

Risk Management Component is managed by AnchorPath

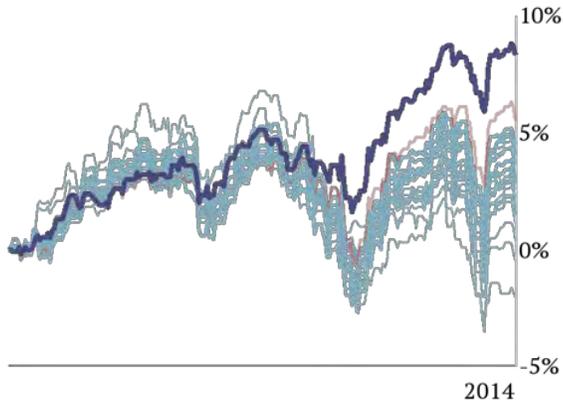
Past performance is not a guarantee of future results

Source: Morningstar Risk Managed Fund Peers are 20 large risk managed variable annuity funds reported by Morningstar in a moderate, flexible, or allocation category and inceptions prior to 5/1/2014, the start date of the ON Risk Managed Balanced Portfolio

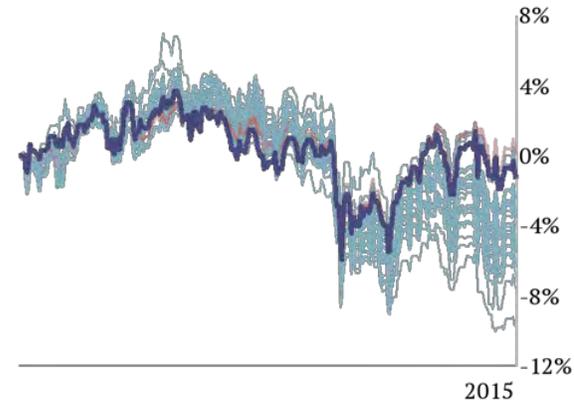
Year-by-Year Performance



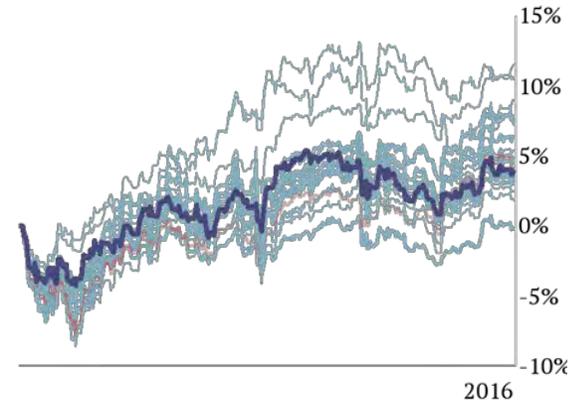
Time Period: 5/1/2014 to 12/31/2014



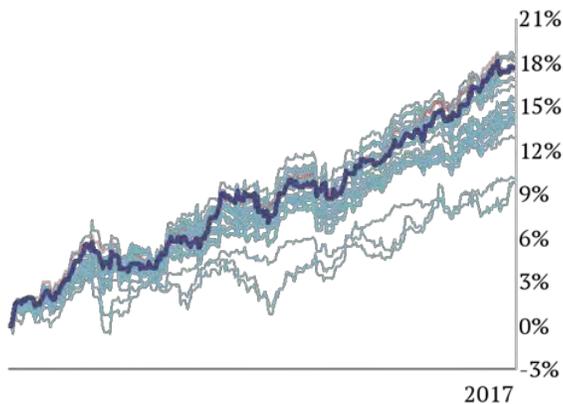
Time Period: 1/1/2015 to 12/31/2015



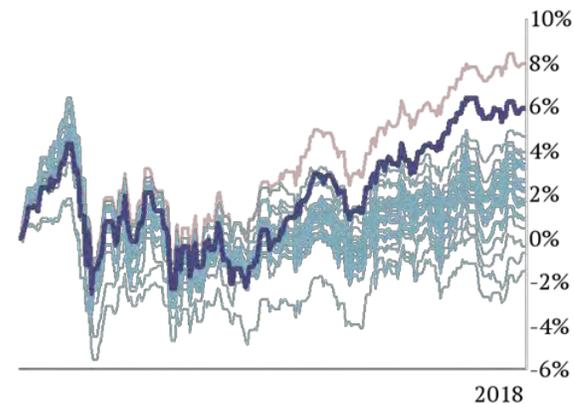
Time Period: 1/1/2016 to 12/31/2016



Time Period: 1/1/2017 to 12/31/2017



Time Period: 1/1/2018 to 9/30/2018



- ON Risk Managed Balanced (Janus/AnchorPath)
- Risk Managed Fund Peers
- Janus Henderson (RMBP Balanced Component)

Past performance is not a guarantee of future results

Source: Morningstar, AnchorPath

Seek diversification among risk managed strategies



Correlation Matrix (Excess Return) - Calculation Benchmark: 55% S&P 500/ 45% Barclays Agg

Time Period: 5/1/2014 to 9/30/2018

Source Data: Total, Daily Return

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		
1 ON Risk Managed Balanced (Janus/AnchorPath)	1.00																						
2 Risk Managed Fund Peer	-0.22	1.00																					
3 Risk Managed Fund Peer	-0.34	0.37	1.00																				
4 Risk Managed Fund Peer	0.21	0.00	0.15	1.00																			
5 Risk Managed Fund Peer	-0.10	0.45	0.34	-0.10	1.00																		
6 Risk Managed Fund Peer	0.01	0.02	0.24	0.80	-0.13	1.00																	
7 Risk Managed Fund Peer	-0.17	0.49	0.28	-0.23	0.43	-0.06	1.00																
8 Risk Managed Fund Peer	-0.05	0.37	0.52	0.40	0.24	0.53	0.38	1.00															
9 Risk Managed Fund Peer	-0.07	0.57	0.25	-0.01	0.63	0.05	0.64	0.66	1.00														
10 Risk Managed Fund Peer	-0.01	0.49	0.24	0.06	0.57	0.11	0.57	0.59	0.75	1.00													
11 Risk Managed Fund Peer	-0.09	0.55	0.38	0.17	0.48	0.27	0.57	0.76	0.81	0.70	1.00												
12 Risk Managed Fund Peer	-0.17	0.42	0.48	0.30	0.28	0.44	0.47	0.74	0.62	0.51	0.76	1.00											
13 Risk Managed Fund Peer	-0.12	0.54	0.40	0.08	0.56	0.17	0.63	0.69	0.87	0.75	0.88	0.74	1.00										
14 Risk Managed Fund Peer	-0.11	0.47	0.41	0.29	0.41	0.41	0.52	0.84	0.77	0.70	0.88	0.80	0.92	1.00									
15 Risk Managed Fund Peer	-0.03	0.40	0.41	0.28	0.42	0.37	0.47	0.75	0.74	0.66	0.79	0.77	0.86	0.89	1.00								
16 Risk Managed Fund Peer	-0.14	0.40	0.52	0.20	0.48	0.37	0.48	0.58	0.57	0.54	0.62	0.64	0.65	0.65	0.64	1.00							
17 Risk Managed Fund Peer	-0.09	0.44	0.28	0.11	0.47	0.15	0.39	0.57	0.64	0.64	0.59	0.52	0.65	0.67	0.62	0.46	1.00						
18 Risk Managed Fund Peer	-0.16	0.55	0.42	0.14	0.51	0.18	0.55	0.66	0.79	0.75	0.74	0.65	0.84	0.79	0.77	0.61	0.69	1.00					
19 Risk Managed Fund Peer	-0.04	0.47	0.27	-0.15	0.54	-0.11	0.60	0.38	0.75	0.61	0.63	0.46	0.72	0.54	0.59	0.42	0.41	0.68	1.00				
20 Risk Managed Fund Peer	-0.08	0.48	0.34	-0.15	0.58	-0.08	0.70	0.40	0.77	0.62	0.67	0.55	0.79	0.61	0.61	0.61	0.46	0.68	0.78	1.00			
21 Risk Managed Fund Peer	-0.04	0.37	0.38	0.26	0.31	0.40	0.54	0.76	0.65	0.56	0.73	0.77	0.75	0.82	0.76	0.69	0.55	0.65	0.48	0.69	1.00		

■ Positively Correlated

■ Negatively Correlated

Excess return correlation isolates the correlation of the fund's embedded risk control approach

Seek strategies that provide low correlations and diversification among Risk Managed Fund offerings

Past performance is not a guarantee of future results

Source: Morningstar

Integrate multiple strategies

- Invest in (or be long) volatility
- Decrease overreliance on fixed income diversification compared to risk parity funds
- Pursue more robust investor objectives than simple principal protection
 - Income oriented protection objectives

Concluding Remarks

- Risk managed funds can provide value to investors, policyholders and insurers
- Diversity of risk managed fund strategy component should be sought
- Seek strategies with explicit downside protection
- Seek strategies with a good balance between protection and anticipated costs of risk control
- Risk managed funds should be utilized more broadly including 401k, pensions, etc.

Thank You

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