

Performance Analysis of Option-Based Equity Mutual Funds, CEFs, and ETFs: An Update

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Keith Black, Ph.D., CAIA, CFA

Keith Black has over twenty-five years of financial market experience, serving approximately half of that time as an academic and half as a trader and consultant to institutional investors. He currently serves as Managing Director of Curriculum and Exams for the CAIA Association. During his most recent role at Ennis Knupp + Associates, Keith advised foundations, endowments and pension funds on their asset allocation and manager selection strategies in hedge funds, commodities and managed futures. Prior experience includes commodities derivatives trading at First Chicago Capital Markets, stock Option research and Cboe market-making for Hull Trading Company, and building quantitative stock selection models for mutual funds and hedge funds for Chicago Investment Analytics. Dr. Black previously served as an assistant professor and senior lecturer at the Illinois Institute of Technology's Stuart school, where he taught courses in both traditional and alternative investments.

He contributes regularly to The CFA Digest, and has published in a number of journals, including The Journal of Trading, and The Journal of Alternative Investments. He is the author of the book "Managing a Hedge Fund," as well as a contributor to the second and third editions of the CAIA Level I and Level II textbooks. Dr. Black was named to Institutional Investor magazine's list of "Rising Stars of Hedge Funds" in 2010.

Dr. Black earned a BA from Whittier College, an MBA from Carnegie Mellon University, and a PhD from the Illinois Institute of Technology. He has earned the Chartered Financial Analyst (CFA) designation and was a member of the inaugural class of the Chartered Alternative Investment Analyst (CAIA) candidates.

Edward Szado, Ph.D., CFA

Edward Szado is Assistant Professor of Finance, Providence College. He is also the Director of Research at the Institute for Global Asset and Risk Management and received his Ph.D. in Finance from the Isenberg School of Management, University of Massachusetts, Amherst. He has taught Risk Management at the Boston University School of Management, Derivatives at Clark University and a range of finance courses at the University of Massachusetts Amherst. He is a former Option trader and his experience includes product development in the areas of volatility based investments and structured investment products. He is also a Chartered Financial Analyst and has consulted for the Option Industry Council, the Cboe, the Chartered Alternative Investment Analyst Association and the Commodity Futures Trading Commission.

Methodology

- In November 2017, we undertook a comprehensive search for SEC-Registered Option-Based Funds and exchange-traded products (ETPs), building on data sourced through Bloomberg and Morningstar. The sample for the study consists of active, liquidated, and merged funds, which should eliminate issues of survivorship bias.
- **Performance analysis of 105 Option-Based Funds.** Our performance analysis is conducted on SEC-Registered Option-Based Funds that focus on broad-based US equities. This sample of equity funds includes 74 open-end mutual funds (MF), 20 closed-end funds (CEF), and 11 exchange-traded products (ETFs/ETNs). These funds have a current AUM of \$38.1 billion. Exchange-traded notes are not funds. The performance analysis in exhibits 3 through 13 are based on this list of funds.
- **52 Other Funds That Are Not Analyzed for Performance.** In addition, we identified 52 funds with objectives other than broad-based US equities, such as fixed income, currencies, commodities, international and global equity, narrow sector funds (such as master limited partnerships), and futures-based products. Performance analysis of funds benchmarked to indexes beyond diversified US equities is not conducted in this study. Including both the diversified equity funds and the funds benchmarked to other objectives brings the total AUM to \$54.2 billion. In this paper, the 52 funds are included in exhibits 1 and 2, but are not used in the subsequent exhibits on performance.

Largest and Oldest Option-Based Funds

(December 31, 2017)

Funds Greater than \$1 Billion

<u>Fund Name</u>	<u>Ticker</u>	<u>AUM (\$mill)</u>
Gateway	GATEX	\$8,524
Swan Defined Risk I	SDRIX	\$3,183
BlackRock Enhanced Equity Div	BDJ	\$1,868
EV Tax-Managed Div Equity Income	ETY	\$1,846
JPMorgan Hedged Equity I	JHEQX	\$1,572
Nuveen S&P 500 Buy-Write Income	BXMX	\$1,486
AllianzGI NFJ Div Interest & Prem	NFJ	\$1,397
Catalyst Hedged Futures Strategy I	HFXIX	\$1,233

Funds with a 10-Year Track Record

<u>Name</u>	<u>Ticker</u>	<u>Earliest Inception Date</u>	<u>Name</u>	<u>Ticker</u>	<u>Earliest Inception Date</u>
Gateway	GATEX	Dec-77	Nuveen Dow 30 Dynamic Overwrite	DIAX	Apr-05
Touchstone Dynamic Equity Instl	TDELX	Jun-78	EV Tax-Managed Buy-Write Inc	ETB	Apr-05
Virtus Rampart Enhanced Core Equity I	PXII	Sep-97	EV Tax-Managed Buy-Write Opps	ETV	Jun-05
Hussman Strategic Growth	HSGFX	Jul-00	Guggenheim Enhanced Equity Inc	GPM	Aug-05
Bridgeway Managed Volatility	BRBPX	Jun-01	BlackRock Enhanced Equity Div	BDJ	Aug-05
ICON Risk-Managed Balanced A	IOCA	Sep-02	Nuveen S&P 500 Dynamic Overwrite	SPXX	Nov-05
BlackRock Enhanced Cap & Inc	CII	Apr-04	Catalyst Hedged Futures Strategy I	HFXIX	Dec-05
Madison Covered Call & Equity Strategy	MCN	Jul-04	EV Tax-Managed Div Equity Income	ETY	Nov-06
First Trust Enhanced Equity Income	FFA	Aug-04	Nuveen NASDAQ 100 Dynamic Overwrite	QQQX	Jan-07
EV Enhanced Equity Income	EOI	Oct-04	Nuveen Core Equity Alpha	JCE	Mar-07
Nuveen S&P 500 Buy-Write Income	BXMX	Oct-04	iPath® CBOE S&P 500 BuyWrite ETN	BWV	May-07
EV Enhanced Equity Income II	EOS	Jan-05	Nuveen Tax-Adv Div Growth	JTD	Jun-07
AllianzGI NFJ Div Interest & Prem	NFJ	Feb-05	EV Risk-Mgd Divers Equity Inc	ETJ	Jul-07
Centaur Total Return	TILD	Mar-05	PowerShares S&P 500 BuyWrite ETF	PBP	Dec-07
Madison Strategic Sector Prem	MSP	Apr-05			

Exhibit 1: Number of Option-Based Funds in Sample

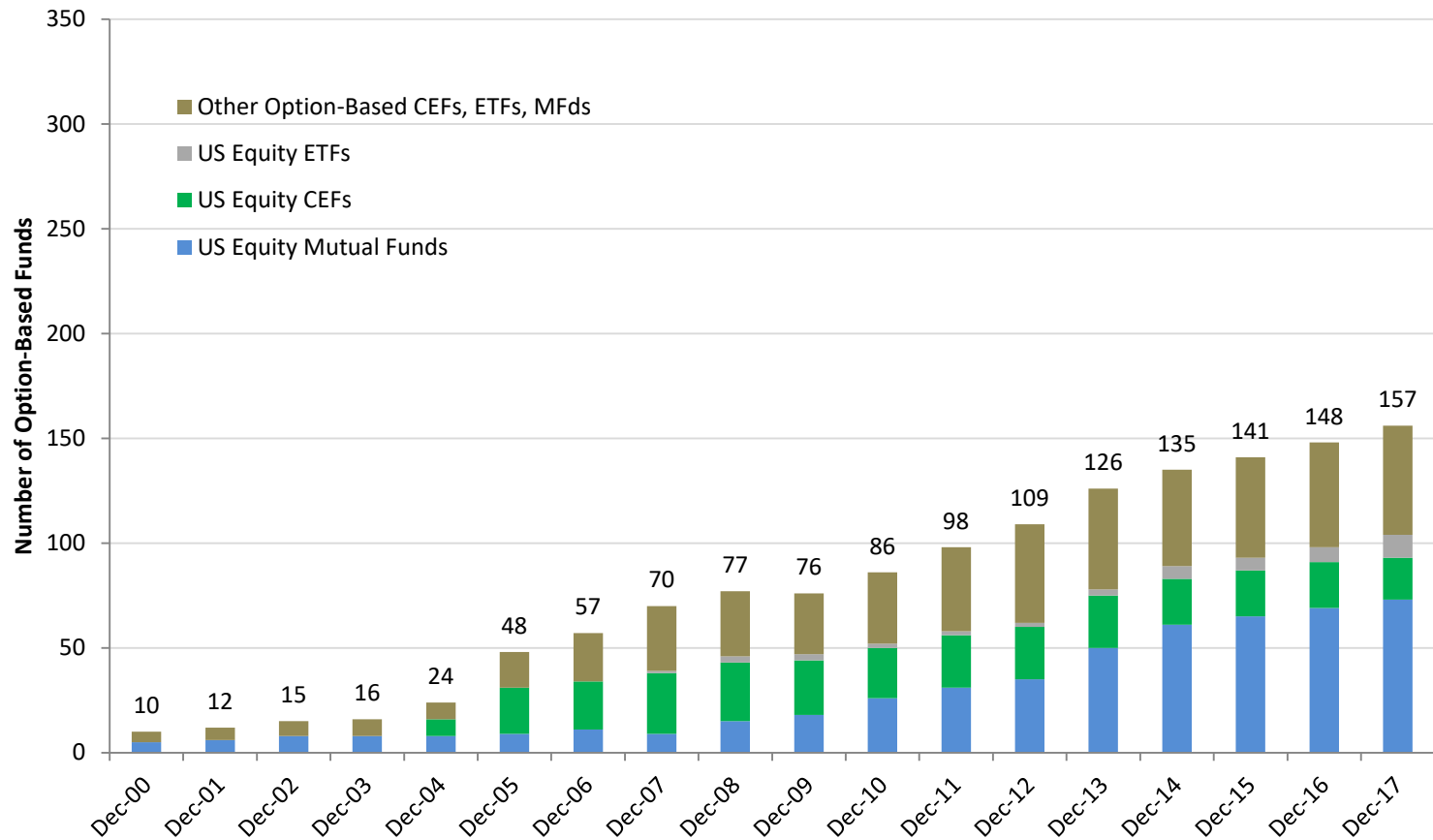


Exhibit 1: Growth in the number of option-based equity funds in our sample.

Exhibit 2: Assets Under Management in Option-Based Funds (\$Million)

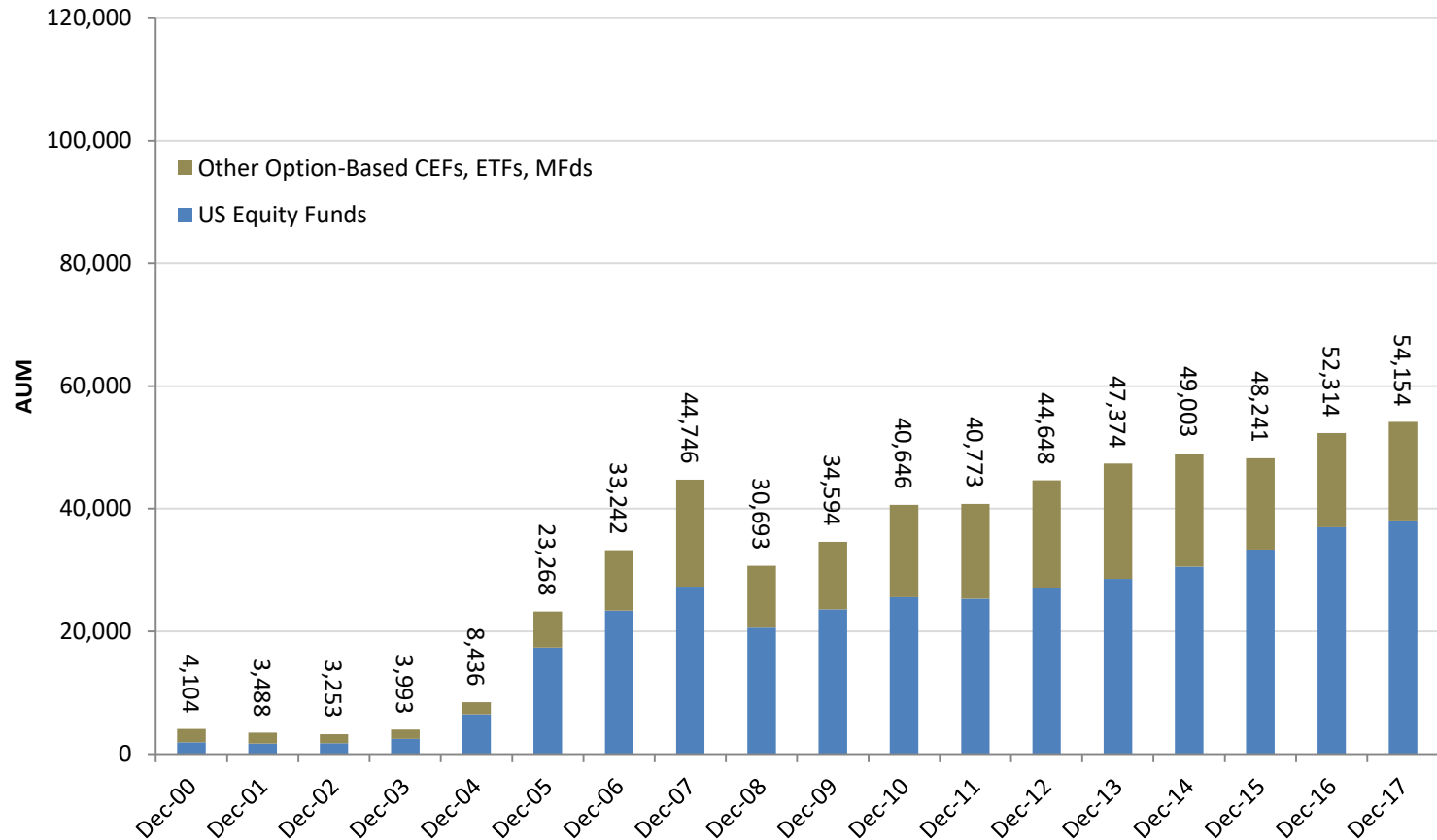


Exhibit 2: Assets under management continue to grow, rising from \$8 billion in 2004 to over \$54.1 billion in 2017.

Exhibit 3: Option-Based Funds and Indices - Cumulative Growth of \$100 (Dec. 31, 1999-Dec. 29, 2017)

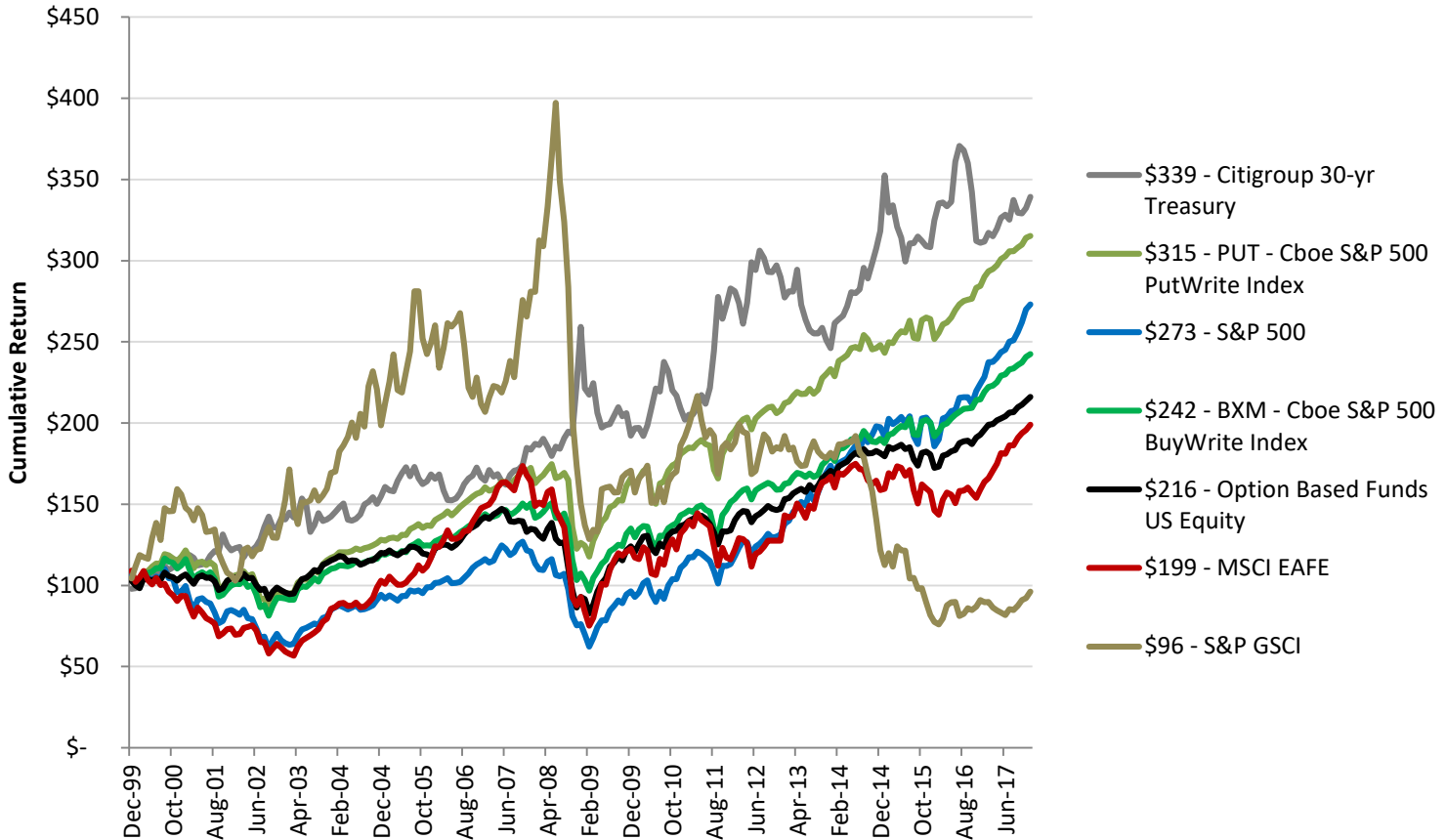


Exhibit 3: Cumulative return since December 1999 for option based funds, the BXM and PUT indexes and various traditional indices. The Option-Based Fund Portfolio returns are calculated by averaging the returns across all constituents in the sample available each month. The number of funds included in the calculation grows monthly as new funds enter the sample.

Exhibit 4: Option-Based Funds and Indices - Cumulative Growth of \$100

(Dec. 31, 1999-Dec. 29, 2017)

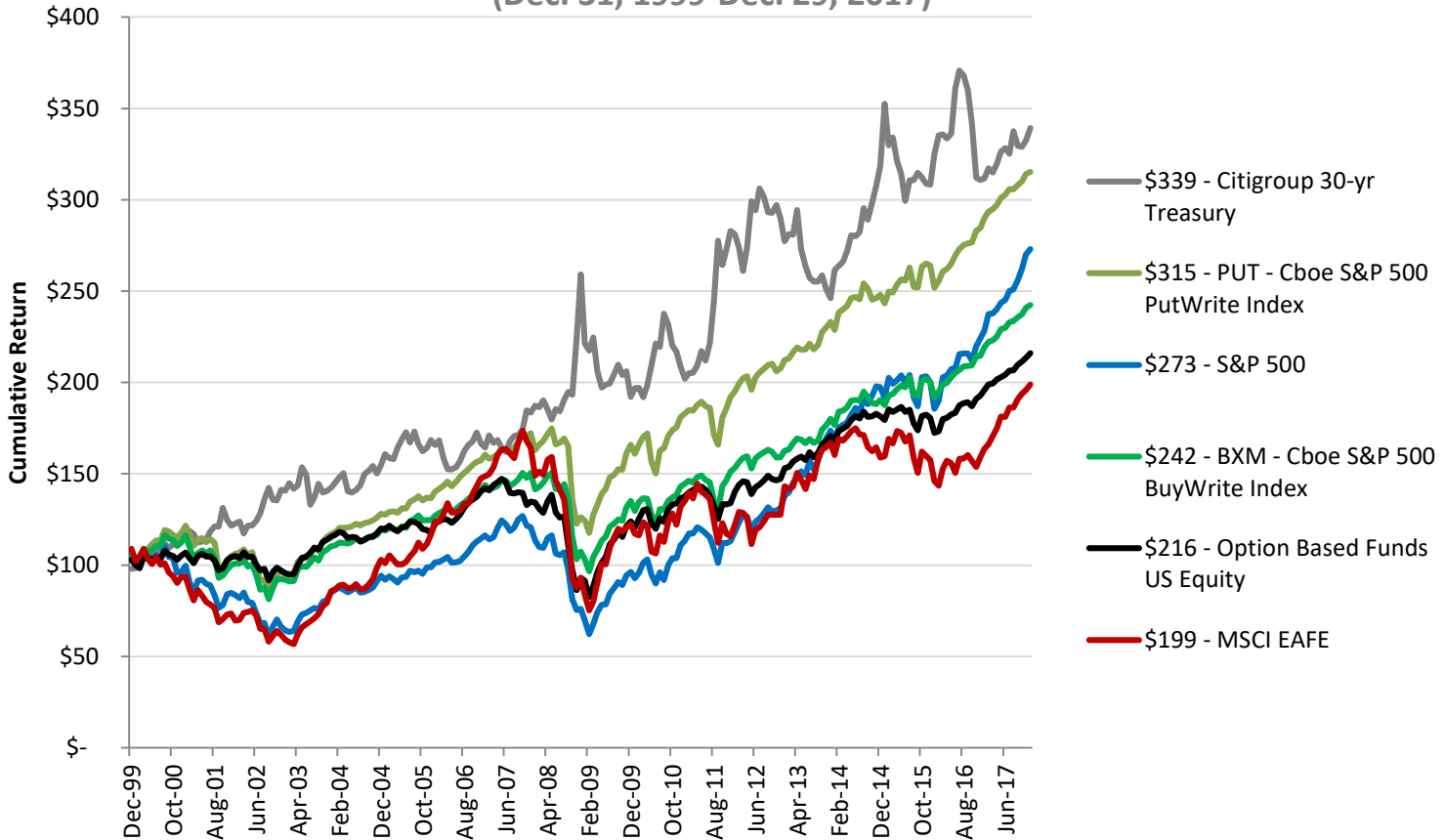


Exhibit 4: Cumulative return since December 1999 for option based funds, the BXM and PUT indexes and various traditional indexes. The Option-Based Fund Portfolio returns are calculated by averaging the returns across all constituents in the sample available each month. The number of funds included in the calculation grows monthly as new funds enter the sample.

This exhibit is identical to exhibit 3 except that the returns to the GSCI have been removed.

Exhibit 5: Annualized Total Returns – Option Based Funds and Benchmark Indices

(Dec. 31, 1999-Dec. 29, 2017)

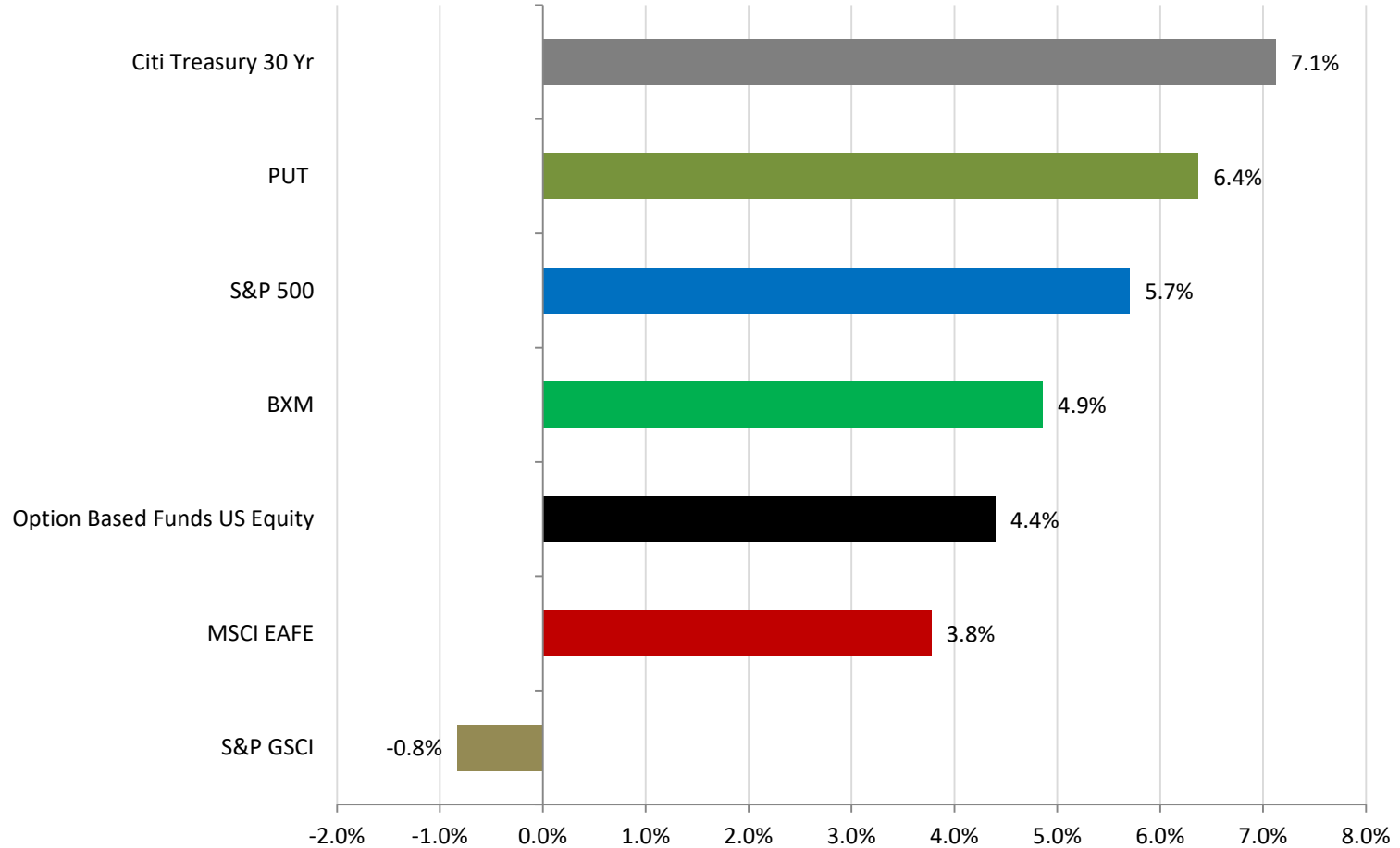


Exhibit 6: Annualized Standard Deviation – Option Based Funds and Benchmark Indices

(Dec. 31, 1999-Dec. 29, 2017)

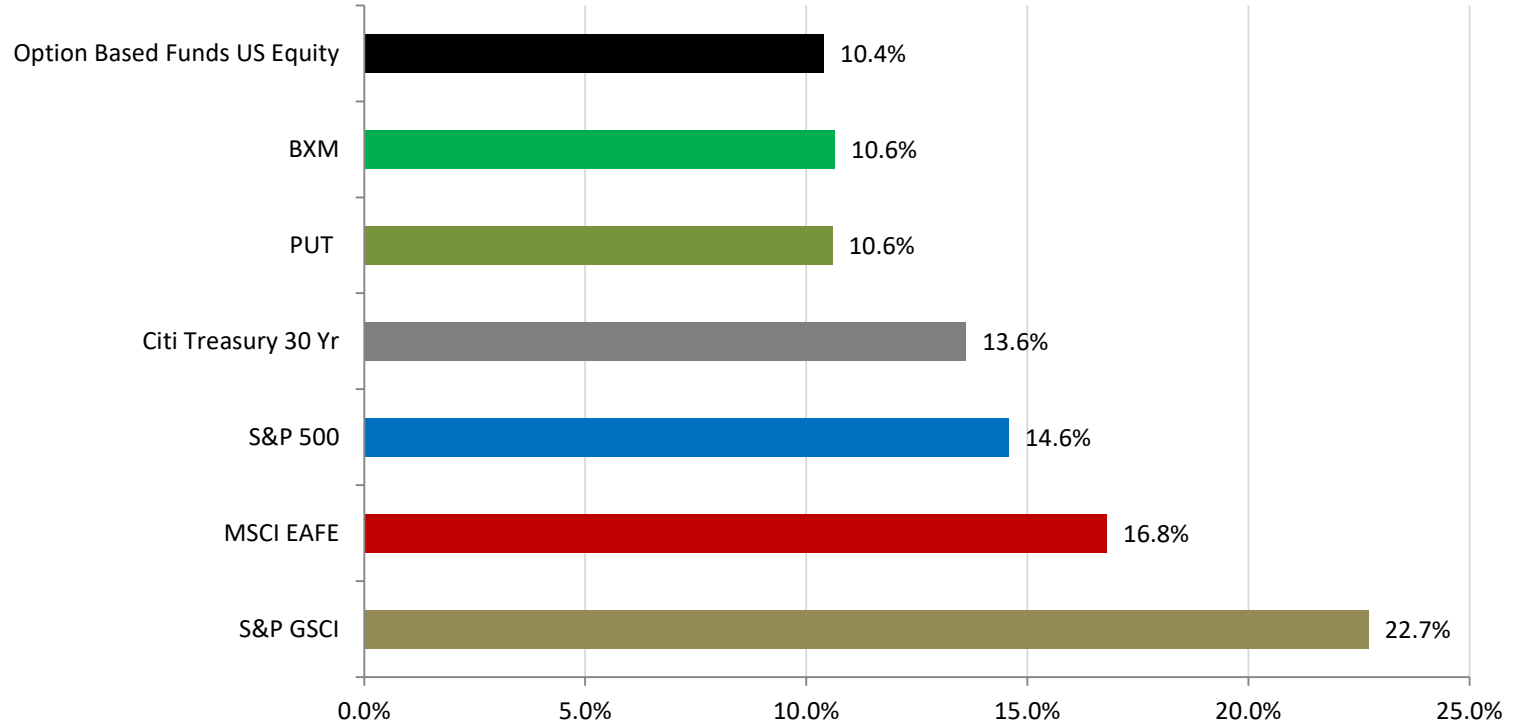


Exhibit 6: Option-Based Funds had a lower standard deviation than the S&P 500 Index and risk similar to BXM and PUT

Exhibit 7: Maximum Drawdown – Option Based Funds and Benchmark Indices

(Dec. 31, 1999-Dec. 29, 2017)

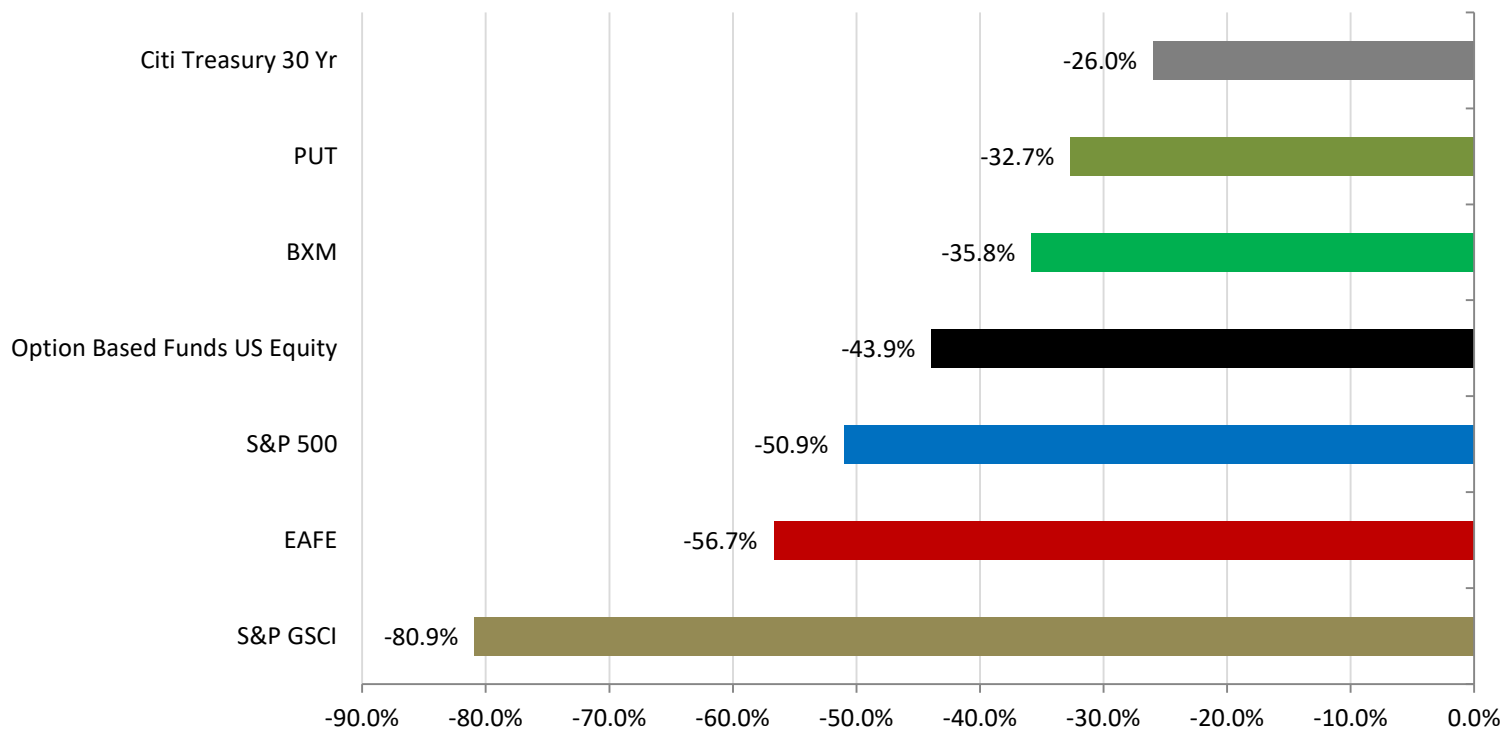


Exhibit 7: Option-Based Funds had lower drawdown risk than the S&P 500 Index

Exhibit 8: Average Fees for Live Funds (bps) (2017)

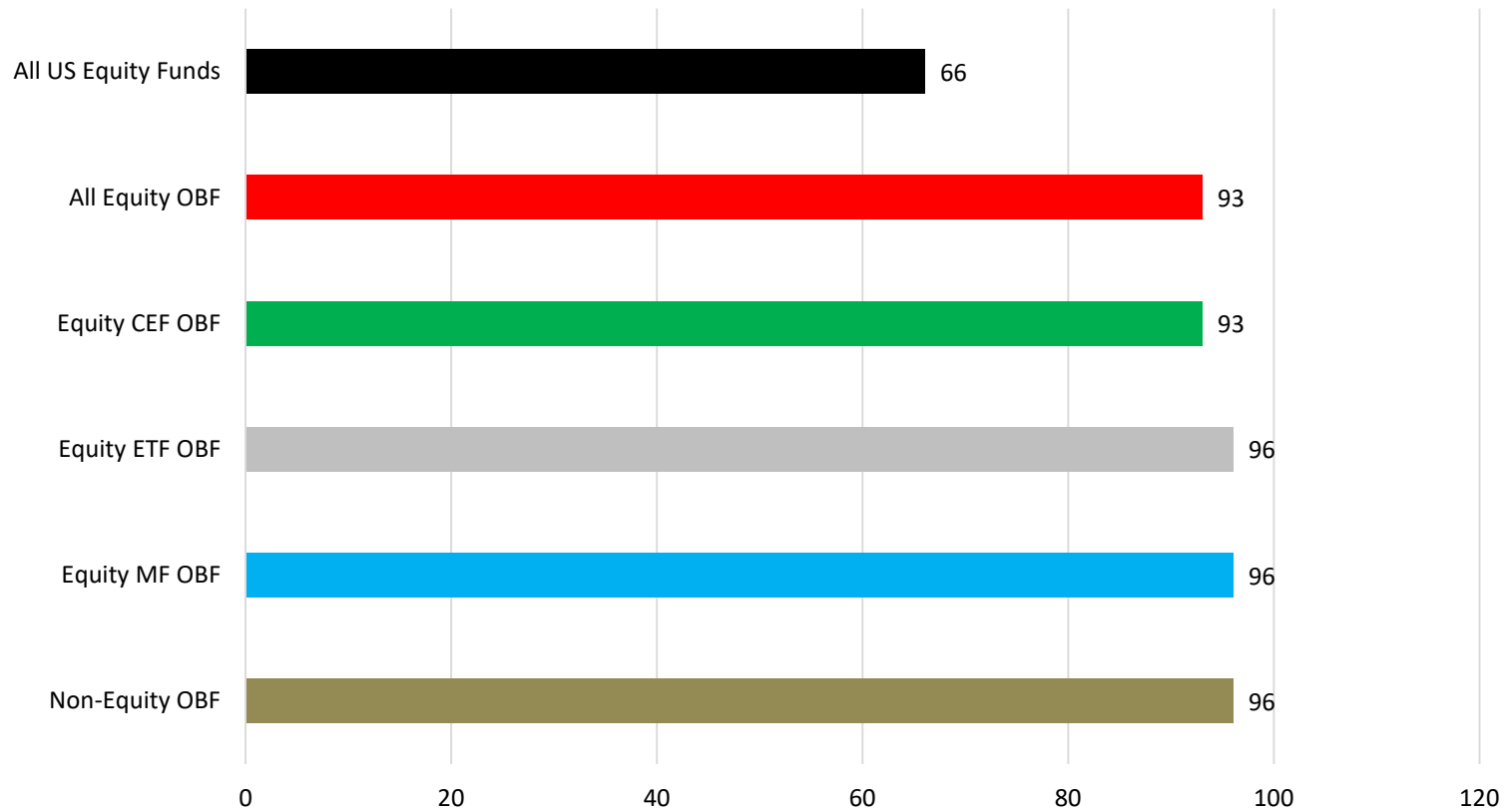


Exhibit 8: Source: Morningstar and ICI

Exhibit 9: S&P 500 and Option-Based Funds Performance over Rolling Three-Year Periods (Dec. 31, 1999-Dec. 29, 2017)

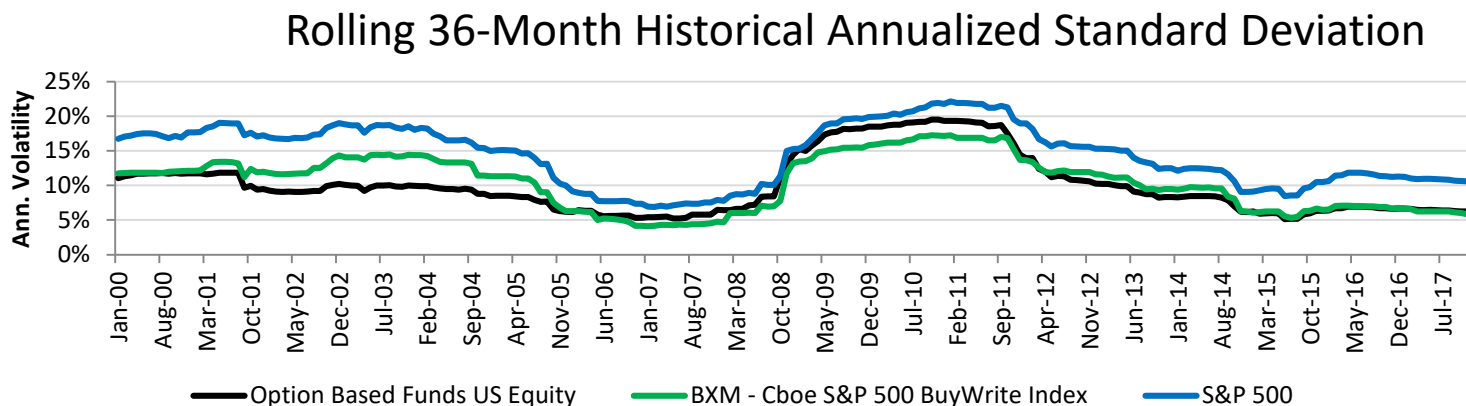
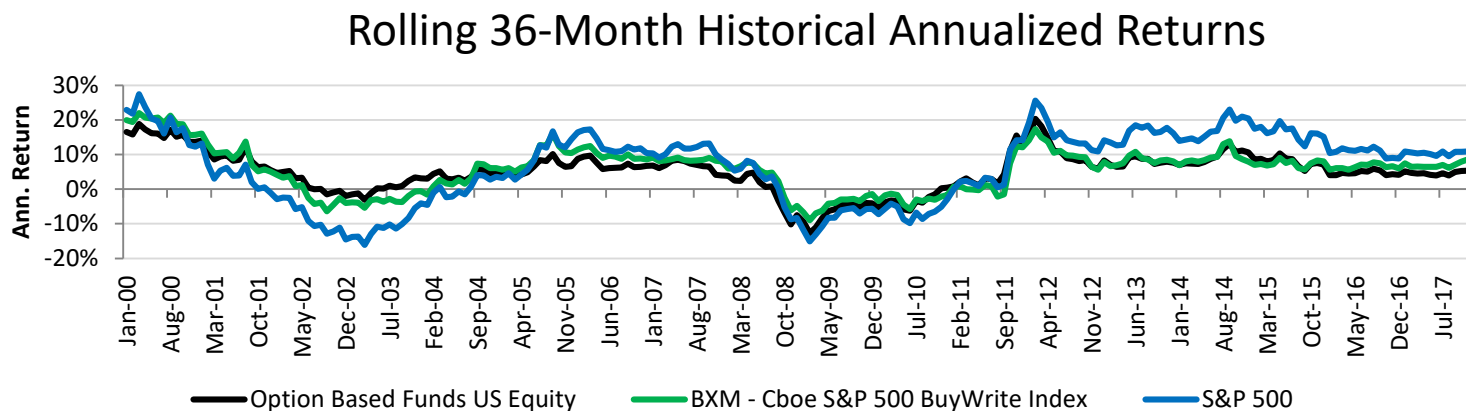


Exhibit 9: Option-Based Funds typically have lower risk than the S&P 500 Index. Note the close tracking of return and risk between the BXM Index and the Option-Based Funds.

Exhibit 10: Return-to-Risk Ratios – Option-Based Funds and Benchmark Indices

(Dec. 31, 1999-Dec. 29, 2017)

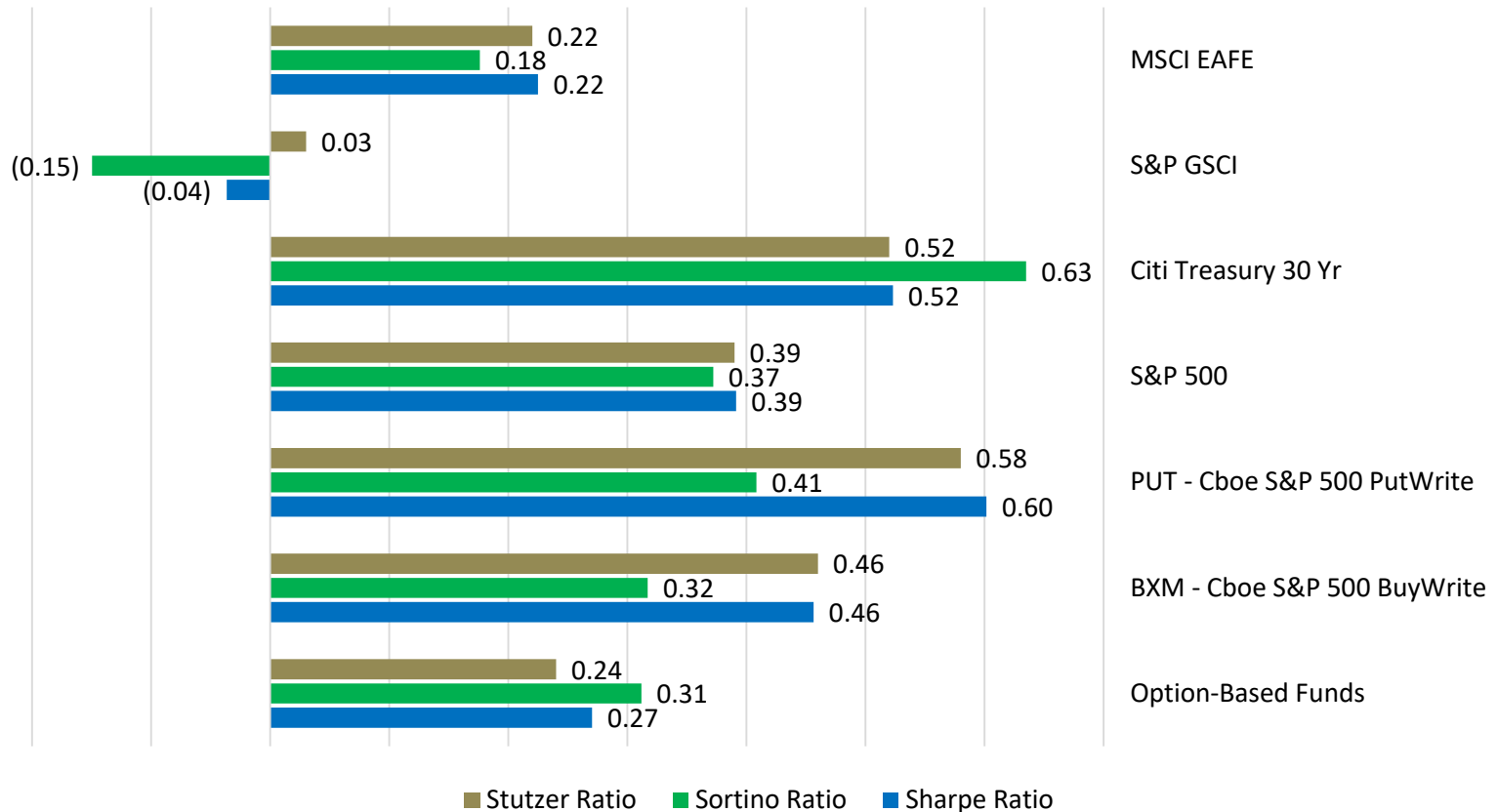
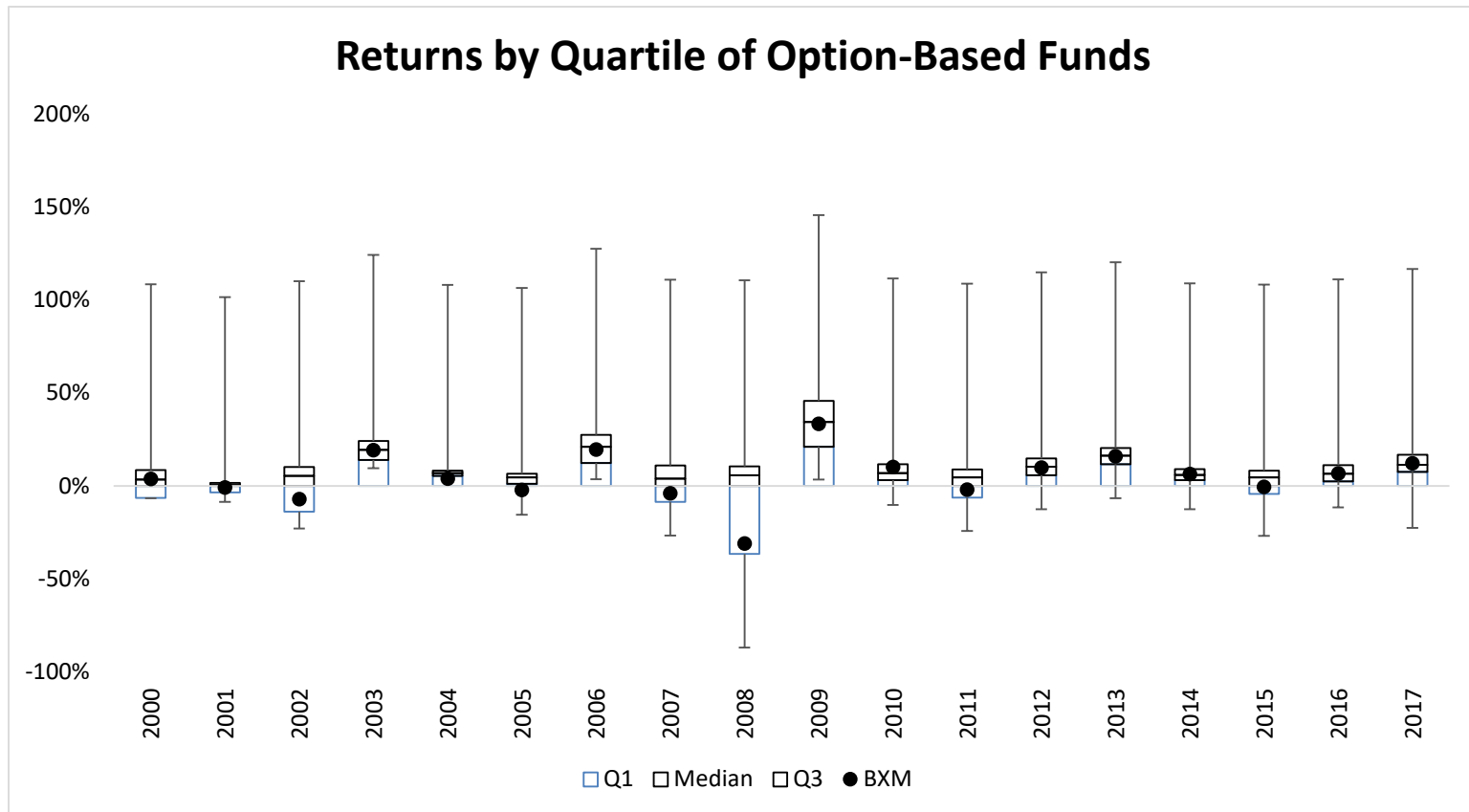


Exhibit 10: The Sortino ratio compares downside risk, while the Stutzer Index accounts for skewness and kurtosis in the risk measures. Data from December 31, 1999 – December 29, 2017

Exhibit 11: Analysis of Yearly Performance – Managers in Quartiles, and vs BXM Benchmark Index (Dec. 31, 1999-Dec. 29, 2017)



- Exhibit 11:** In many years, the median return to Option-based funds matches or exceeds the return on the BXM Index. In most years, there is a large spread between the highest and lowest returning Option-Based Funds. For example, the 2013 return to the median options-based fund was 16.6% while the return to the BXM was 15.9%.

Exhibit 12: Summary Statistics: Indexes and Option-Based Funds (Dec. 31, 1999-Dec. 29, 2017)

Jan 2000 to Dec 2017	Option- Based Funds	BXM - Cboe S&P 500 BuyWrite Index	PUT - Cboe S&P 500 PutWrite Index	S&P 500 -	Citigroup 30-yr Treasury	S&P GSCI	MSCI EAFE
Annualized Return	4.2%	4.9%	6.4%	5.7%	7.1%	-0.8%	3.8%
Standard Deviation	10.7%	10.6%	10.6%	14.6%	13.6%	22.7%	16.8%
Semi-Standard Deviation	9.0%	10.3%	11.7%	11.1%	8.7%	16.2%	12.4%
Jensen's Alpha	-0.15%	0.61%	2.27%	0.00%	6.66%	-4.27%	-1.91%
Beta to S&P 500	0.67	0.65	0.61	1.00	-0.27	0.45	0.99
Skewness	-0.91	-1.21	-1.86	-0.59	0.27	-0.42	-0.57
Kurtosis	3.33	4.55	8.41	1.22	2.84	1.24	1.50
Sharpe Ratio	0.24	0.46	0.60	0.39	0.52	-0.04	0.22
Sortino Ratio	0.29	0.32	0.41	0.37	0.63	-0.15	0.18
Treynor Ratio	0.04	0.08	0.10	0.06	-0.26	-0.02	0.04
Stutzer Index	0.24	0.46	0.58	0.39	0.52	0.03	0.22
Autocorrelation	0.15	0.11	0.14	0.10	0.04	0.18	0.15
Correlation to S&P 500	0.91	0.89	0.84	1.00	-0.29	0.29	0.86
Correlation to BXM	0.87	1.00	0.97	0.89	-0.26	0.34	0.78
Maximum Drawdown	-44.0%	-35.8%	-32.7%	-50.9%	-26.0%	-80.9%	-56.7%
M-Squared	5.1%	6.1%	8.2%	5.7%	7.5%	0.0%	3.5%

Exhibit 12: The risk of Option-Based Funds compare favorably to long-only equity indexes. The Stutzer Index is an alternatives to the Sharpe Ratio that compensates for non-Normal return distributions.

Exhibit 13: Annual Returns to Indexes and Option-Based Funds (Dec. 31, 1999-Dec. 29, 2017)

	Options- Based Funds	BXM - CBOE S&P 500 BuyWrite Index	CBOE S&P 500 PutWrite Index	BXMD -CBOE S&P 500 30-Delta BuyWrite Index	PPUT - CBOE S&P 500 5% Put Protection Index	S&P 500	30-yr Treasury Bond Index (Citi)	SP GSCI	MSCI EAFE
2000	-1.5%	7.4%	13.1%	0.1%	-14.2%	-9.1%	20.0%	49.7%	-14.2%
2001	-0.5%	-10.9%	-10.6%	-8.9%	-2.1%	-11.9%	3.4%	-31.9%	-21.4%
2002	-7.3%	-7.6%	-8.6%	-13.2%	-17.6%	-22.1%	16.2%	32.1%	-15.9%
2003	19.1%	19.4%	21.8%	25.9%	19.3%	28.7%	0.8%	20.7%	38.6%
2004	7.2%	8.3%	9.5%	10.4%	6.0%	10.9%	8.7%	17.3%	20.2%
2005	2.8%	4.2%	6.7%	5.0%	2.3%	4.9%	8.8%	25.6%	13.5%
2006	20.3%	13.3%	15.2%	17.8%	12.3%	15.8%	-1.1%	-15.1%	26.3%
2007	-3.8%	6.6%	9.5%	6.2%	-0.5%	5.5%	10.2%	32.7%	11.2%
2008	-31.6%	-28.7%	-26.8%	-31.3%	-20.1%	-37.0%	41.3%	-46.5%	-43.4%
2009	34.0%	25.9%	31.5%	32.1%	8.7%	26.5%	-25.9%	13.5%	31.8%
2010	7.5%	5.9%	9.0%	11.2%	11.7%	15.1%	8.7%	9.0%	7.8%
2011	-2.1%	5.7%	6.2%	7.3%	-1.4%	2.5%	35.4%	-1.2%	-12.1%
2012	10.0%	5.2%	8.1%	11.0%	10.0%	15.5%	2.4%	0.1%	17.3%
2013	16.6%	13.3%	12.3%	19.1%	27.1%	32.4%	-15.0%	-1.2%	22.8%
2014	6.3%	5.6%	6.4%	6.2%	11.2%	13.7%	29.3%	-33.1%	-4.9%
2015	-0.4%	5.2%	6.4%	4.0%	-5.1%	1.4%	-3.1%	-32.9%	-0.8%
2016	7.4%	7.1%	7.8%	8.4%	8.3%	12.0%	0.8%	11.4%	1.0%
2017	12.9%	13.0%	10.8%	16.1%	18.6%	21.8%	9.1%	5.8%	25.0%

Exhibit 13: Annual returns to Indexes and Options-Based Funds

Exhibit 14: Indices and Option-Based Funds Performance

(Dec. 31, 1999-Dec. 29, 2017)

Risk-Return Tradeoff

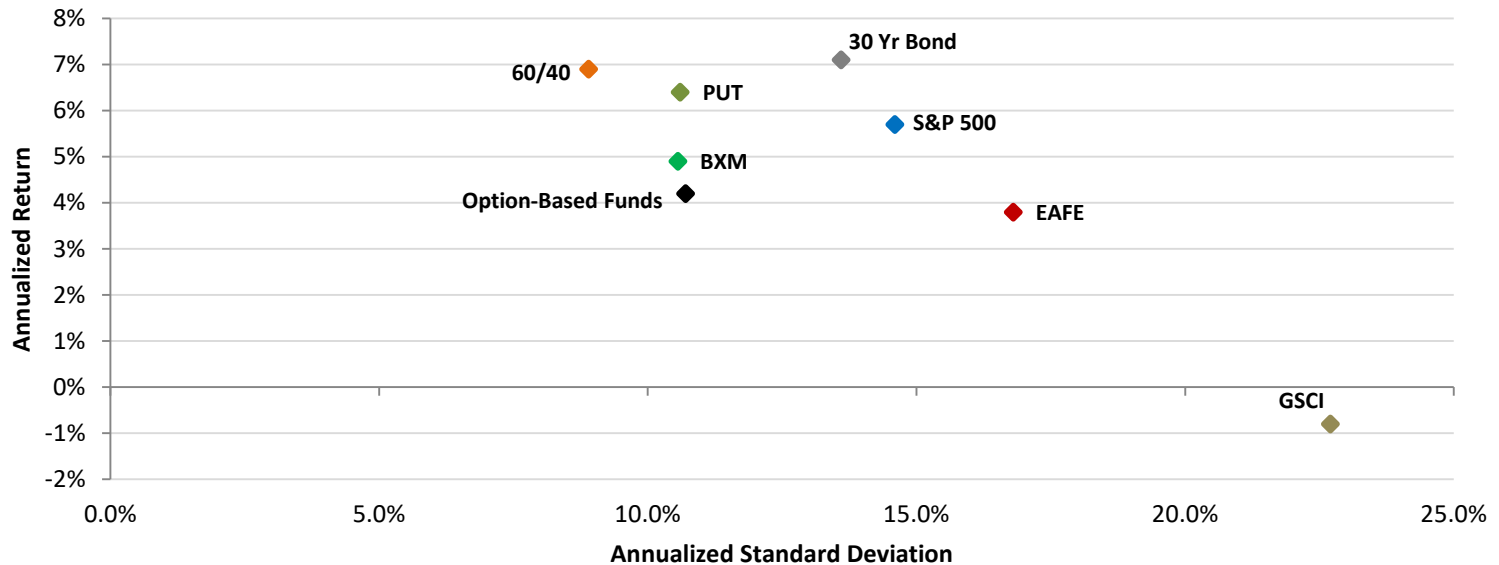


Exhibit 14: Option-Based Funds have risk and return more similar to a 60% stock, 40% bond portfolio rather than a long-only equity investment.

Institutionally Focused Option-Based Strategies

	Company	Strategy
1	1492 Capital Management, LLC	Small Cap Dynamic Hedge
2	Allianz Global Investors	AllianzGI Structured Alpha Equity 250
3	Allianz Global Investors	AllianzGI Structured Alpha Equity 500
4	Analytic Investors, LLC	Covered Call and Put-write
5	Chartwell Investment Partners	Chartwell Covered Call Strategy
6	DGV Solutions	DGV Enhanced U.S. Equity Fund, LLC
7	First Quadrant L.P	Protected Equity Plus
8	Flippin, Bruce & Porter, Inc.	FBP Equity and Dividend Plus
9	Gateway Investment Advisers, LLC	Gateway Active Index Option Overwrite Composite
10	Gateway Investment Advisers, LLC	Gateway Buy-Write Replication Composite
11	Gateway Investment Advisers, LLC	Gateway Index/RA (Risk Adjusted)
12	Gateway Investment Advisors	Gateway Active Index PutWrite Composite
13	Geode Capital Management, LLC	Geode OPT-Premia Spread
14	Glenmede Investment Management LP	Secured Options
15	Harvest Volatility Advisors	Long Short Replication Equity Hedge
16	Iron Financial LLC	IRON S&P 500 Equity Plus Strategy
17	M.D. Sass Investors Services and Associates	M.D. Sass Equity Income Plus
18	MAI Capital Management, LLC	MAI Managed Volatility Strategy
19	Morgan Stanley Investment Management	Global Balanced Income
20	Neuberger Berman	S&P 500 PutWrite (OTM)
21	Parametric Portfolio Associates	Parametric Liquid Alternative
22	Parametric Portfolio Associates, LLC	Parametric Defensive Equity
23	Putnam Investments	Putnam Strategic Volatility Equity
24	Putnam Investments	Putnam U.S. Low Volatility Equity
25	Ross, Jeffrey & Antle	RJA PutWrite Select
26	Schafer Cullen Capital Management	Enhanced Equity Income
27	Shelton Capital Management	Equity Income Strategy
28	Sterling Capital Management LLC	Sterling Enhanced Equity SMA
29	The Pelican Bay Group	Yield Plus Covered Calls
30	Van Hulzen Asset Management	Van Hulzen Covered Call Strategy
31	Willingdon Wealth Management	Willingdon Covered Call Portfolio
32	Ziegler Capital Management LLC	FAMCO Covered Call

This list is not exhaustive and is not meant to serve as a solicitation for or endorsement of the strategies shown above.

Exhibit 15 – Index Cumulative Growth Since Mid-1986

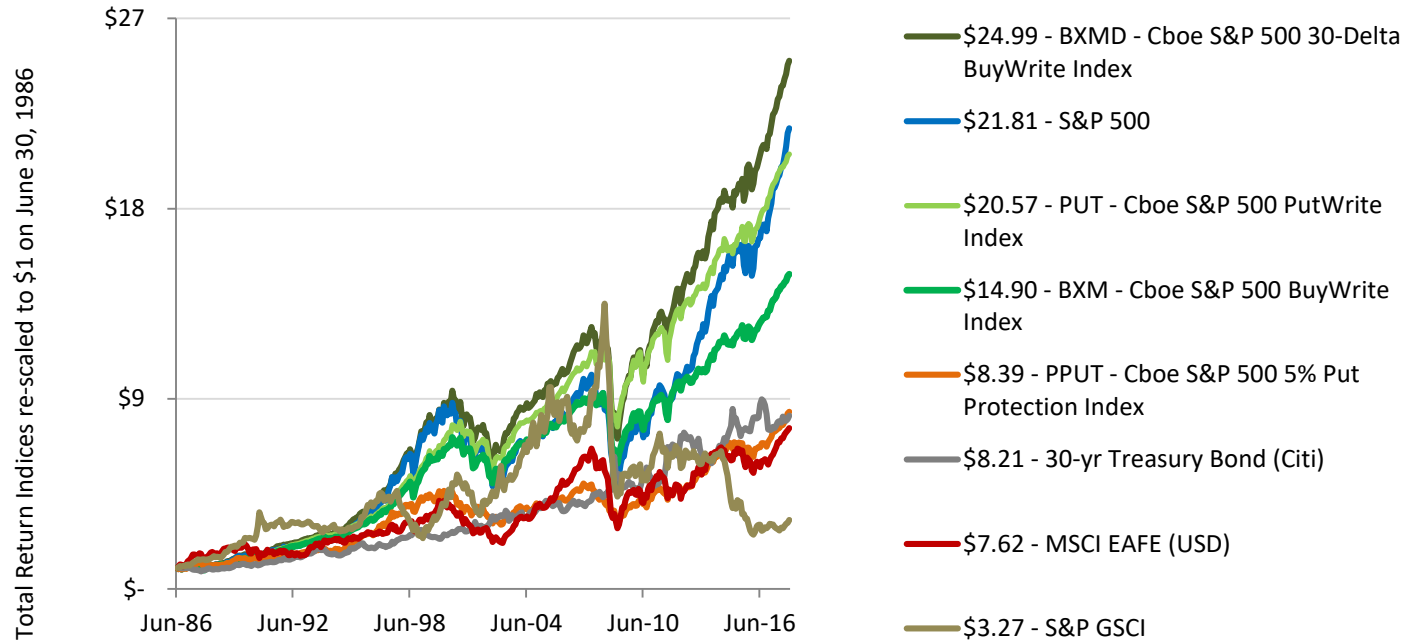


Exhibit 15: Cumulative monthly total return since June 30, 1986 for Option-based indexes and various traditional indexes. Performance is re-scaled to represent a starting value of \$1 on June 30, 1986 for all indexes
 Sources: Bloomberg and Cboe Options Exchange. Data From June 30, 1986 – Dec. 29, 2017. Total return indexes (pre-tax).
 Past performance is not predictive of future returns

Exhibit 16 – Annualized Returns Since Mid-1986

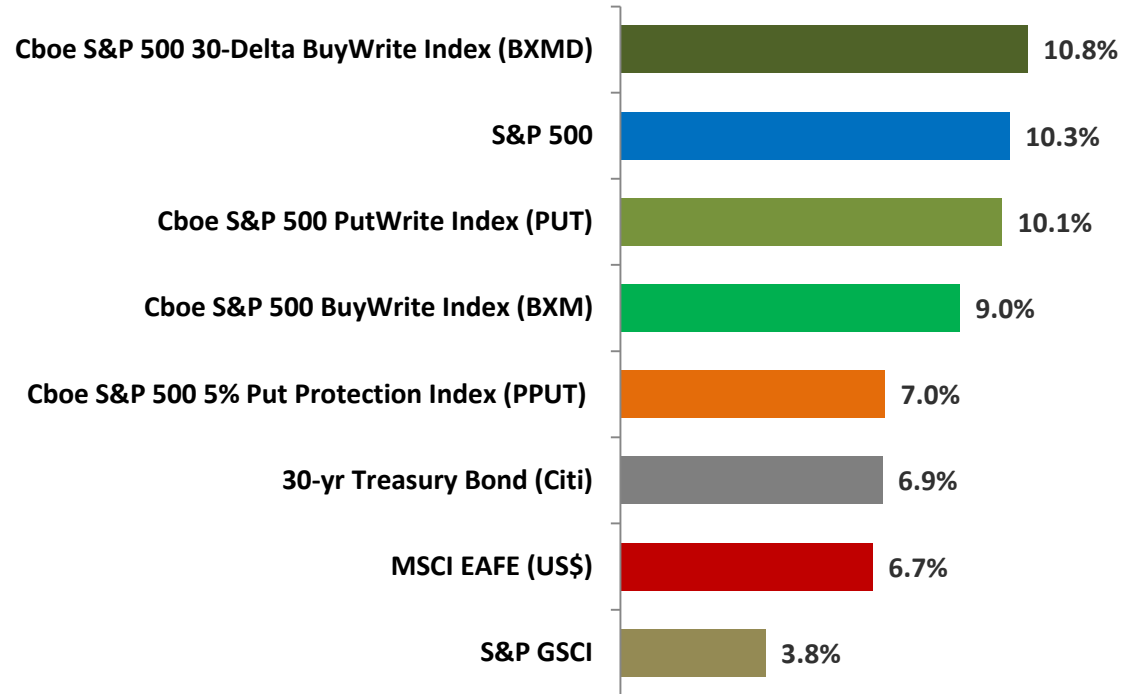


Exhibit 16: Option-Based Strategy indexes had a longer track record than most single funds. Over 25 years, BXMD a higher total return than the S&P 500. It is worth noting that BXM and PUT were introduced in 2006 and 2007, respectively, and earlier data has been backfilled.

Sources: Bloomberg and Cboe Options Exchange. Data From June 30, 1986 – Dec. 29, 2017. Total return indexes (pre-tax). Past performance is not predictive of future returns.

Exhibit 17 – Annualized Standard Deviations Since Mid-1986

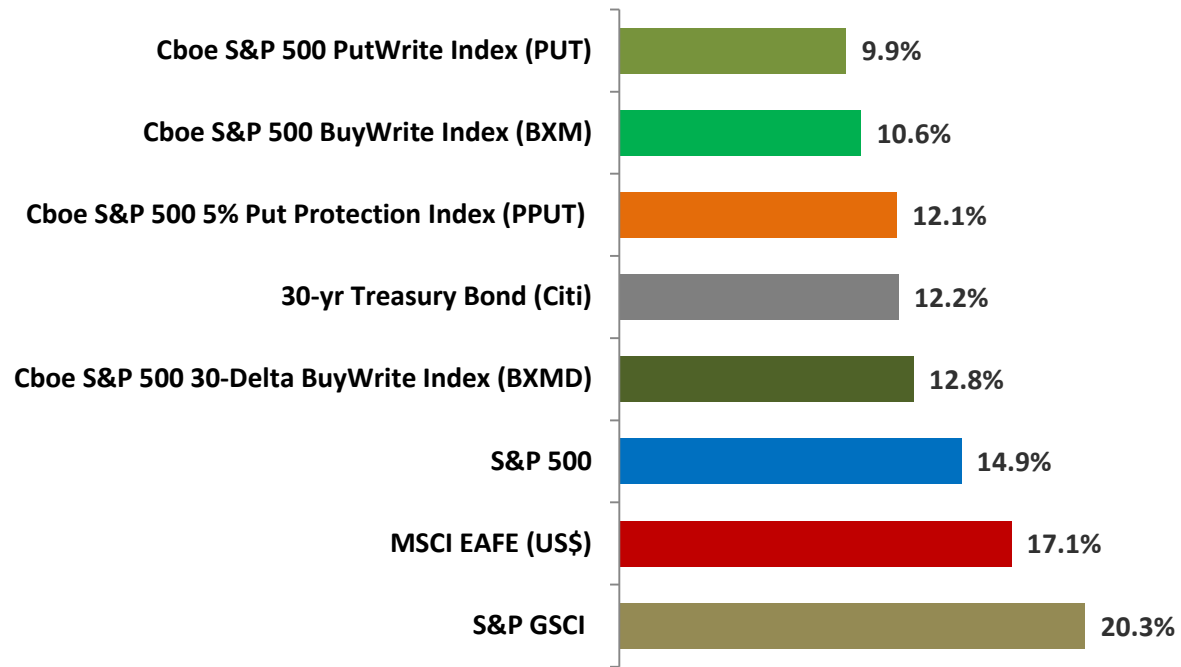


Exhibit 17: While BXMD had a higher total return than the S&P 500 since mid-1986, the BXMD also had a lower standard deviation.

Sources: Bloomberg and Cboe Options Exchange. Data From June 30, 1986 – Dec. 29, 2017. Total return indexes (pre-tax). Past performance is not predictive of future returns.

Exhibit 18 – Returns and Volatility Since Mid-1986

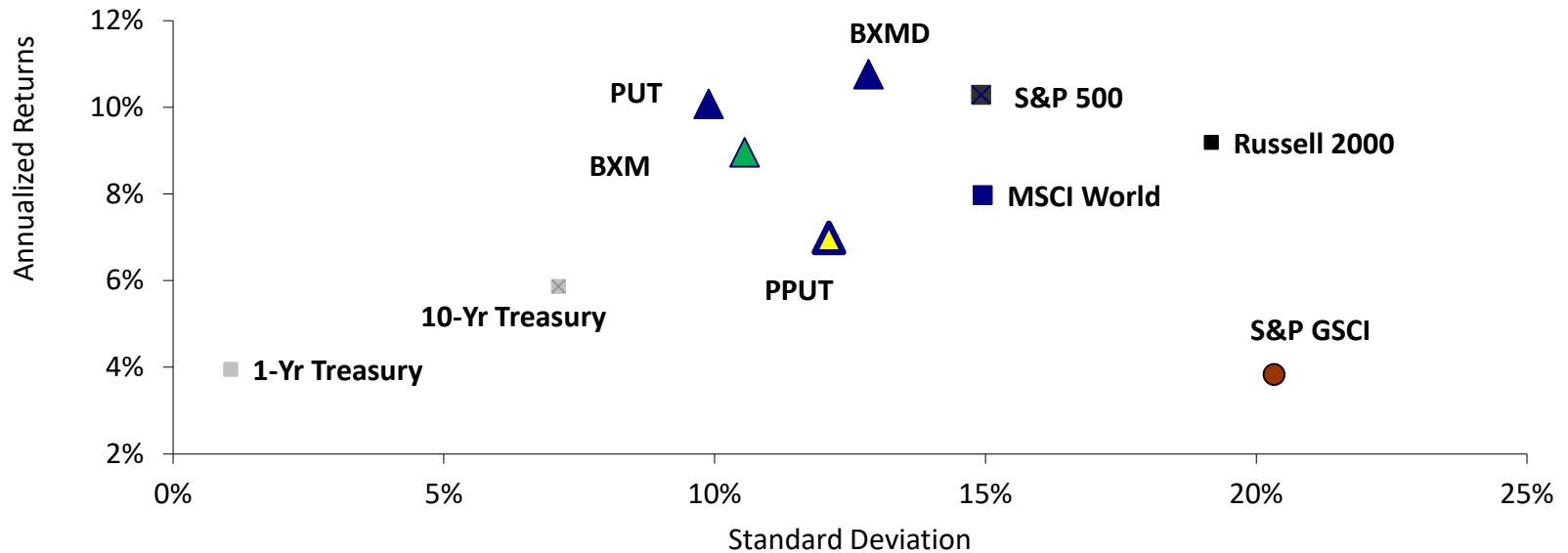


Exhibit 18: Option-Based Strategy indexes can build more efficient portfolios, with similar return and lower risk than the S&P 500 Index.

Sources: Cboe Options Exchange and Bloomberg Data as of June 30, 1986 – Dec. 29, 2017. Total Return (pre-tax) indexes.

Exhibit 19 – Summary Statistics since Mid-1986

	BXM - Cboe S&P 500 BuyWrite Index	PUT - Cboe S&P 500 PutWrite Index	BXMD - Cboe S&P 500 30- Delta BuyWrite Index	PPUT - Cboe S&P 500 5% Put Protection Index	S&P 500	30-yr Treasury Bond (Citi)	S&P GSCI	MSCI EAFE (US\$)
Annualized Return	9.0%	10.1%	10.8%	7.0%	10.3%	6.9%	3.8%	6.7%
Standard Deviation	10.6%	9.9%	12.7%	12.1%	14.9%	12.2%	20.3%	17.2%
Semi-Standard Deviation	10.8%	11.7%	11.3%	8.0%	11.7%	7.7%	14.2%	12.0%
Jensen's Alpha	1.58%	3.27%	1.96%	-1.29%	0.00%	5.02%	-0.46%	-2.12%
Beta to S&P 500	0.63	0.55	0.81	0.74	1.00	-0.08	0.23	0.81
Skewness	-1.58	-2.14	-1.15	-0.28	-0.82	0.25	-0.20	-0.39
Kurtosis	6.67	10.28	4.17	0.59	2.64	2.77	2.04	1.03
Sharpe Ratio	0.61	0.77	0.65	0.37	0.52	0.36	0.07	0.24
Sortino Ratio	0.60	0.65	0.73	0.56	0.66	0.57	0.09	0.35
Treynor Ratio	0.10	0.14	0.10	0.06	0.08	-0.58	0.06	0.05
Autocorrelation	0.09	0.13	0.05	-0.04	0.04	0.07	0.18	0.07
Correlation to S&P 500	0.89	0.84	0.95	0.92	1.00	-0.09	0.17	0.70
Correlation to BXM	1.00	0.97	0.97	0.69	0.89	-0.10	0.22	0.61
Maximum Drawdown	-35.8%	-32.7%	-42.6%	-38.9%	-50.9%	-26.0%	-80.9%	-56.7%
M-Squared	11.6%	13.9%	12.2%	8.0%	10.3%	7.9%	3.5%	6.1%

Exhibit 19: BXM, PUT, and BXMD have a lower standard deviation of returns than the S&P 500 Index.

Exhibit 20 – Monthly Gross Premiums Received by BXM Index

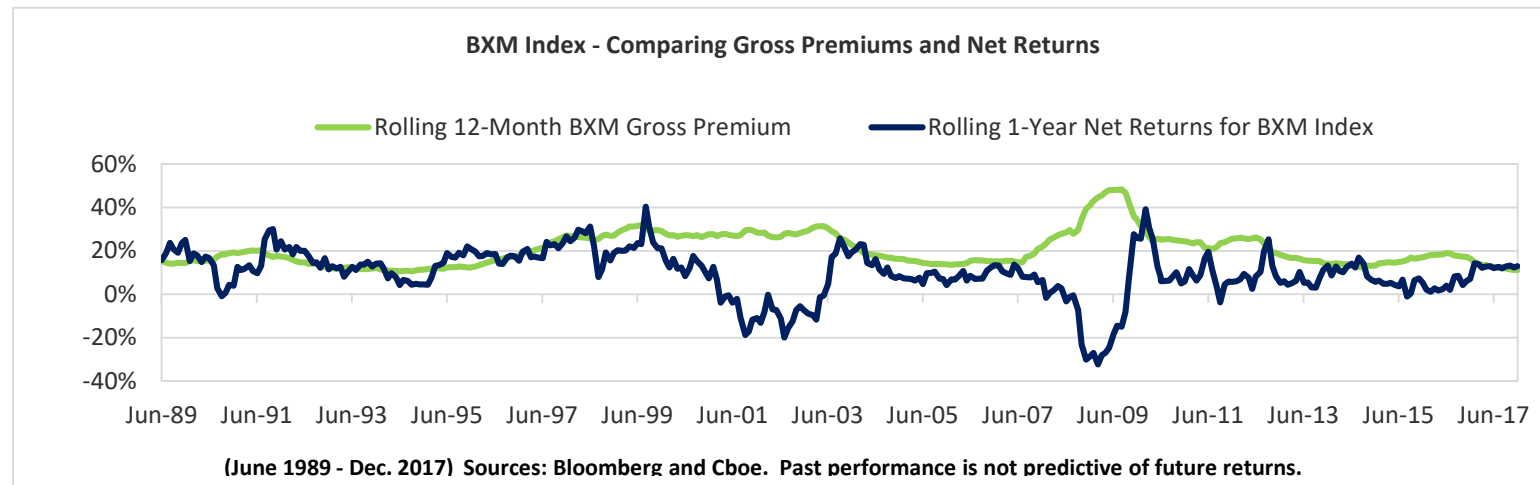
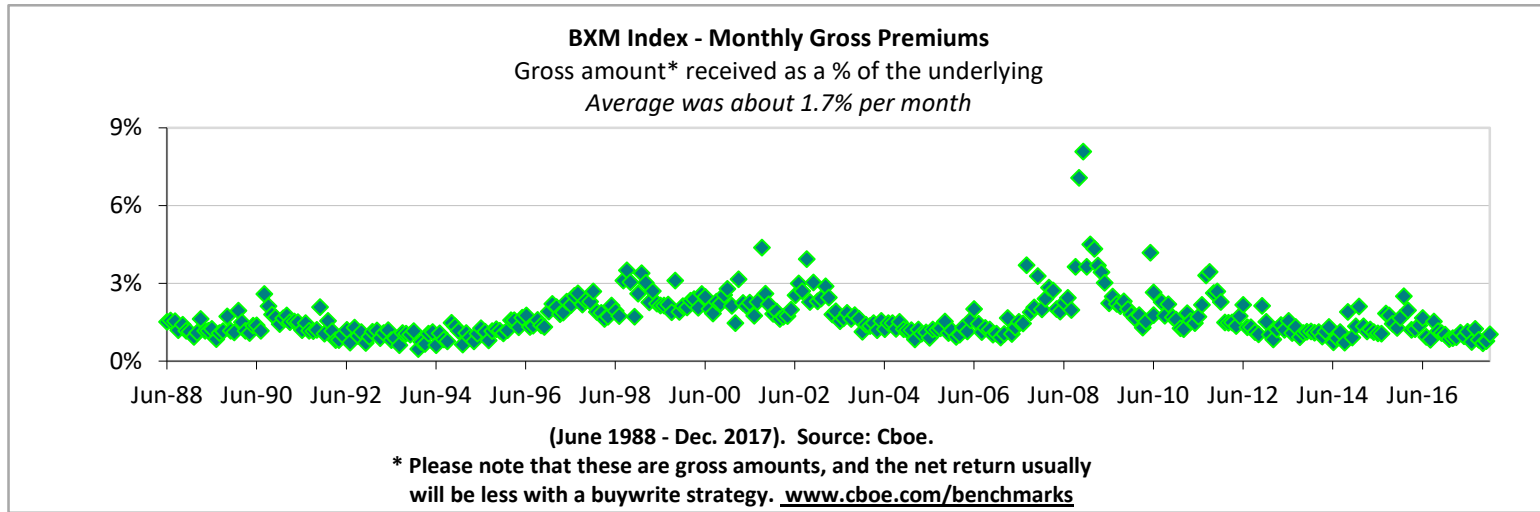


Exhibit 20: The BXM and PUT strategies regularly sell S&P 500 Index Option. The premium earned varies over time, but has averaged 1.7% per month for BXM. Premiums earned can support a high income yield for Option-Based Funds. Since mid-1988 the SPX call Option monthly premium received per the hypothetical BXM strategy averaged 1.7% of the value of the stock position held. * Please note that while these gross amounts are positive values, a buy-write strategy can have negative net returns if the value of the stocks held declines. Source: www.Cboe.com/buywrite.

"Performance Analysis of Option-Based Equity Mutual Funds, CEFs, and ETFs: An Update"
(January 2018) Please see the last slide for important disclosures.

Exhibit 21 – Quarterly Average Richness of S&P 500 Option

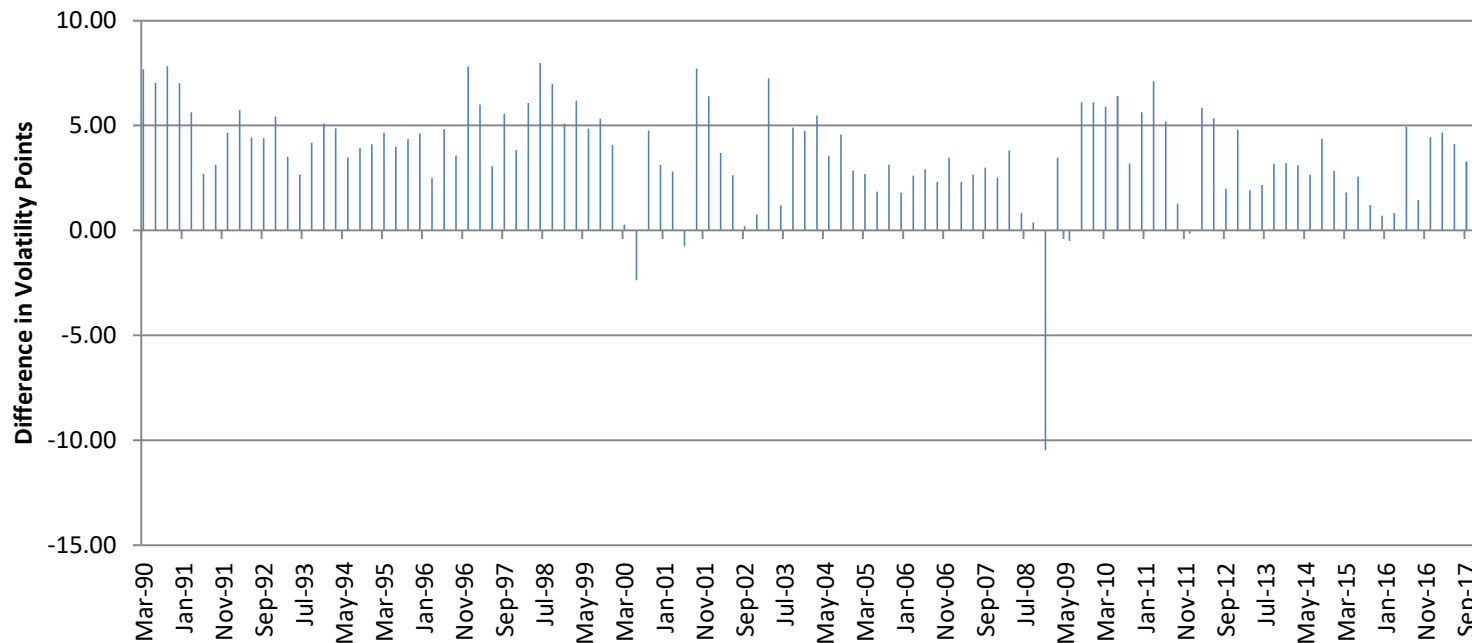


Exhibit 21: Richness is calculated as the level of the VIX Index at the start of a 30-day period minus the annualized standard deviation of returns of the S&P500 that is actually realized in that 30-day period. Since the VIX Index is a forward looking measure, each VIX Index level corresponds with the same 30-day period as the forward looking annualized standard deviation calculation. When implied volatility is higher than realized volatility, options are rich, which allows option sellers to earn additional returns. Exhibit 16 shows that indexes selling options (BXMD, PUT, and BXM) had higher annualized returns than the index that buys options (PPUT).

Exhibit 22 – Capacity and Notional Volume

Notional Value of Avg. Daily Volume for SPX Option at Cboe (in \$billions)

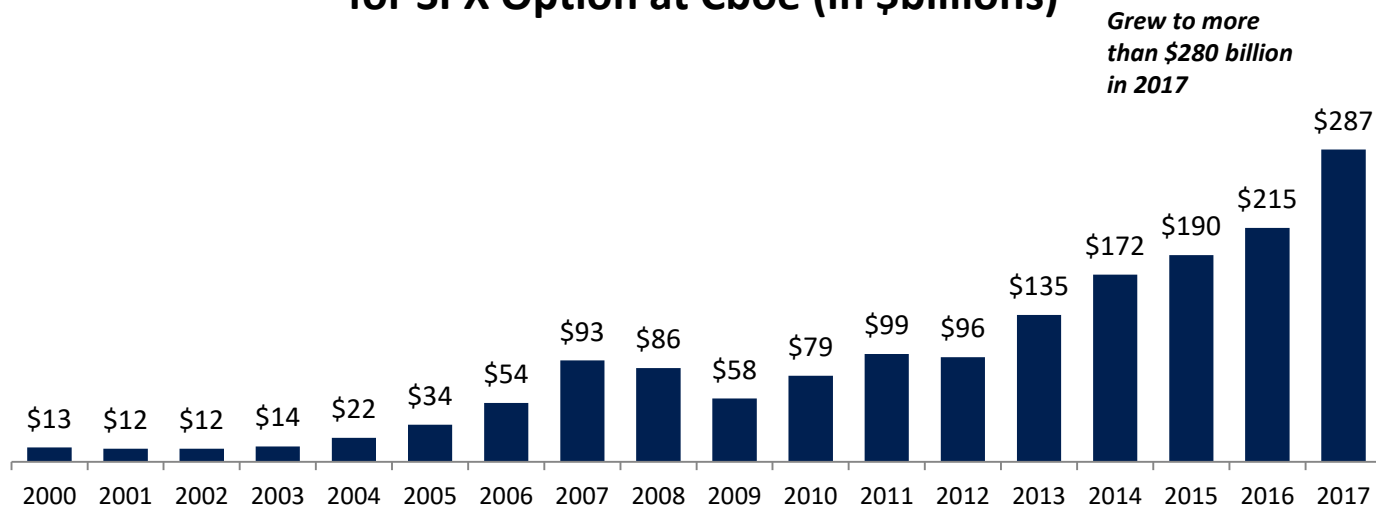


Exhibit 22: Fund managers examine trading liquidity and capacity when considering investment vehicles. The approximate daily notional value of trading in SPX Option can be estimated by multiplying the average daily volume times the value of the S&P 500 Index times the \$100 Option contract multiplier, for a value of more than \$280 billion per day. Some investors use a delta-weighting multiplier to develop a more conservative estimate for notional value of Option trading.

Sources: Rough estimates of notional volume (in \$billions) by Cboe Option Exchange. Some analysts use a delta-weighting multiplier to develop more conservative estimates. Figures include SPX weeklys. www.cboe.com/SPX

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