Analyzing Russell 2000 Options-Based Benchmark Indexes Designed to Provide Enhanced Yields and Risk-Adjusted Returns

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- Over 25 yrs experience in the futures markets and alternative investments
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    - Research of markets & trading strategies
    - Due diligence of managers
    - Business development of alternative investments
    - Educational workshops

Introduction & Summary

This study compared the performances of six options-based strategy indexes to traditional investment indexes. The six options-based strategies, which all write options on the Russell 2000® (RUT) Index, are as follows:

1) BXR – CBOE Russell 2000 BuyWrite Index; 2) CLLR - CBOE Russell 2000 Zero-Cost Put Spread Collar Index; 3) BXRC - CBOE Russell 2000 Conditional BuyWrite Index; 4) BXRD - CBOE Russell 2000 30-Delta BuyWrite Index; 5) PUTR - CBOE Russell 2000 PutWrite Index; 6) WPTR - CBOE Russell 2000 One-Week PutWrite Index.

The following items highlight key results of the study (all analyses were done through the end of 2015)

- **Growth of Options Volume:** The average daily contract volume of the Russell 2000® index options traded at the CBOE grew more than 2000% from 2004 to 2015. (Exhibit 1)
- **Risk-adjusted Returns:** Since 2001 the CBOE Russell 2000 PutWrite Index (PUTR) had higher returns, lower volatility and higher Sharpe Ratio than both the Russell 2000 Index and Citigroup 30-Year Treasury Bond Index. (Exhibits 5, 6, 7, and 13)
- **Options Premium Income**: In 2015 the aggregate gross premium (as a percentage of the underlying) was **41.4%** for the CBOE Russell 2000 One-Week PutWrite Index (WPTR), **22.2%** for the CBOE Russell 2000 PutWrite Index (PUTR), **19.5%** for the CBOE Russell 2000 BuyWrite Index (BXR), and **9.2%** for the CBOE Russell 2000 30-Delta BuyWrite Index (BXRD). (Exhibit 19)
- **Lower Volatility:** Since 2001 the PUTR, BXR, CLLR & BXRD indexes had a lower annualized standard deviation than the Russell 2000 Index. The reduction ranged from 14% to 28% lower. The options-based indexes also had lower betas (ranging from 0.59 to 0.82) than the Russell 2000 Index. (Exhibits 7 & 13)
- **Less Maximum Drawdown:** Since 2001 the maximum drawdowns for the PUTR, BXR, CLLR & BXRD indexes averaged 21% less than the Russell 2000 Index. (Exhibit 8)
- **Faster Average Recovery (in months):** Since 2001 the PUTR Index average recovery time was 21% faster from the drawdown troughs than the Russell 2000 Index. (Exhibit 10)
- **Richly Priced Index Options:** Since 2004 the implied volatility for the Russell 2000 has averaged about 2.88 volatility points higher than its realized volatility, and the rich pricing for index options may have facilitated higher returns for option-selling indexes such as PUTR and BXRD (when compared with the CBOE Russell 2000 Zero-Cost Spread Collar Index (CLLR)). (Exhibits 6 and 18)
- **Tail Risk:** During the five years when the Russell 2000 return was negative, the PUTR and CLLR indexes had higher returns than the Russell 2000 Index. (Exhibit 26)

Past performance is not predictive of future returns.

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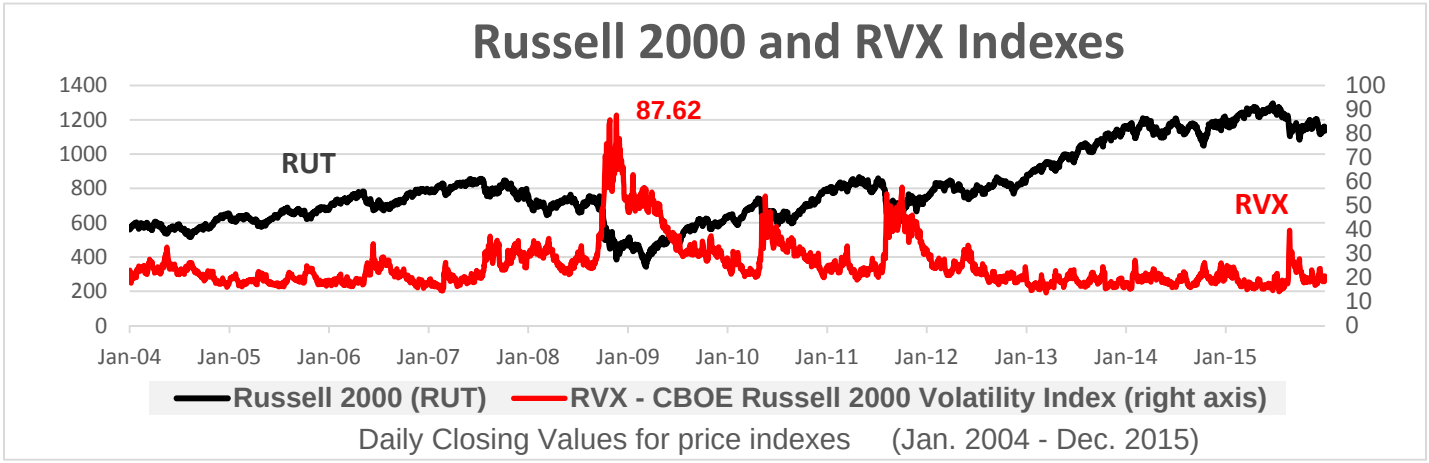
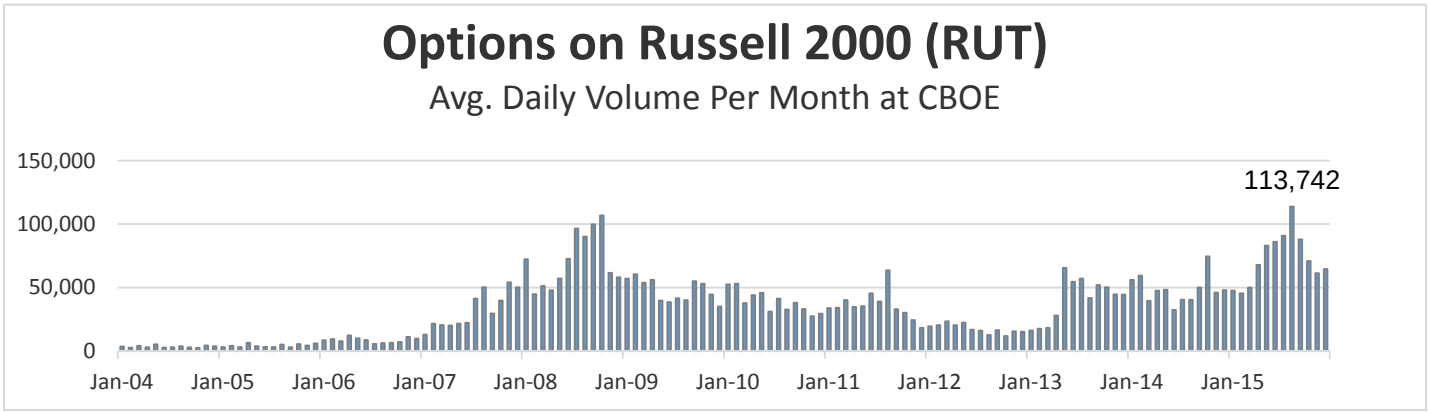
Descriptions of Options-Based Indexes

Strategy	Symbol	Year Introduced/ Price History Begins
CBOE Russell 2000 BuyWrite Index is a benchmark index that measures the performance of a theoretical portfolio that sells Russell 2000 Index (RUT) call options, against a portfolio of the stocks included in the Russell 2000 Index. A "buy-write," also called a covered call, generally is considered to be an investment strategy in which an investor buys a stock or a basket of stocks, and also sells call options that correspond to the stock or basket of stocks. This strategy can be used to enhance portfolio returns and reduce volatility.	**BXR**	2006/ 2000
CBOE Russell 2000 Zero-Cost Put Spread Collar Index is designed to track the performance of a hypothetical option trading strategy that 1) holds a long position indexed to the Russell 2000 Index; 2) on a monthly basis buys a 2.5 percent to 5 percent Russell 2000 Index put option spread; and 3) sells a monthly out-of-the-money (OTM) Russell 2000 Index call option to cover the cost of the put option spread. The CLLR Index rolls on a monthly basis, typically every third Friday of the month.	**CLLR**	2015/ 2001
CBOE Russell 2000 30-Delta BuyWrite Index is designed to track the performance of a hypothetical covered call strategy that holds a long position indexed to the Russell 2000 Index and sells a monthly out of the money (OTM) Russell 2000 Index call option. The call option written is the strike nearest to the 30 Delta at 10:00 a.m. CT on the Roll Date. The BXRD Index rolls on a monthly basis, typically every third Friday of the month.	**BXRD**	2015/ 2001
CBOE Russell 2000 PutWrite Index is designed to track the performance of a hypothetical strategy that sells a monthly at-the-money (ATM) Russell 2000 Index put option. The written Russell 2000 put option is collateralized by a money market account invested in one-month Treasury bills. The PUTR Index rolls on a monthly basis, typically every third Friday of the month.	**PUTR**	2015/ 2001
CBOE Russell 2000 Conditional BuyWrite Index is designed to track the performance of a hypothetical covered call strategy that holds a long position indexed to the Russell 2000 Index and sells a monthly at-the-money (ATM) Russell 2000 Index call option. The written number of ATM call options will be either ½ unit or one unit and will be determined by the level of the CBOE Russell Volatility Index (RVX Index) when the call option is written on the Roll Date. The BXRC Index rolls on a monthly basis, typically every third Friday of the month.	**BXRC**	2015/ 2004
CBOE Russell 2000 One-Week PutWrite Index is designed to track the performance of a hypothetical strategy that sells an ATM Russell 2000 Index put option on a weekly basis. The maturity of the written Russell 2000 put option is one week to expiry. The written Russell 2000 put option is collateralized by a money market account invested in one-month Treasury bills. The WPTR Index rolls on a weekly basis, typically every Friday.	**WPTR**	2015/ 2011

Source: CBOE

Exhibit 1: Russell 2000 – Prices, Volatility, & Options Volume





The Russell 2000 Index generally is regarded as the premier benchmark index for U.S. small-capitalization stocks. In 2015 more than $460 billion in assets was benchmarked to the Russell 2000 Index. The CBOE Russell 2000 Volatility Index℠ (RVX℠) is a key measure of market expectations of near-term volatility conveyed by Russell 2000® stock index option prices. It measures the market's expectation of 30-day volatility implicit in the prices of near-term Russell 2000 options. Volume data is from Jan 2004 to Dec 2015 Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

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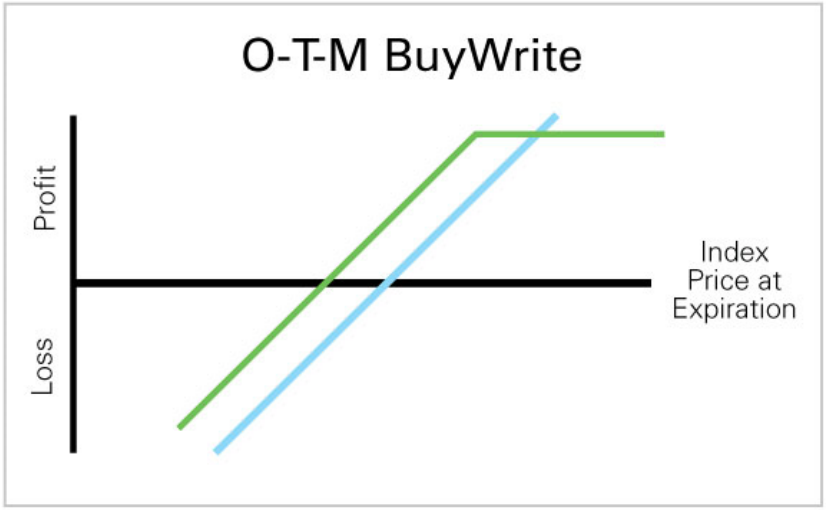
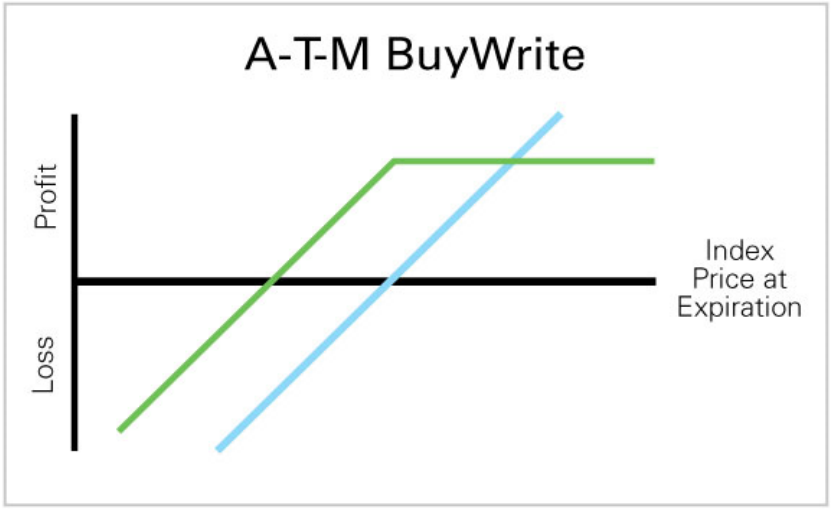
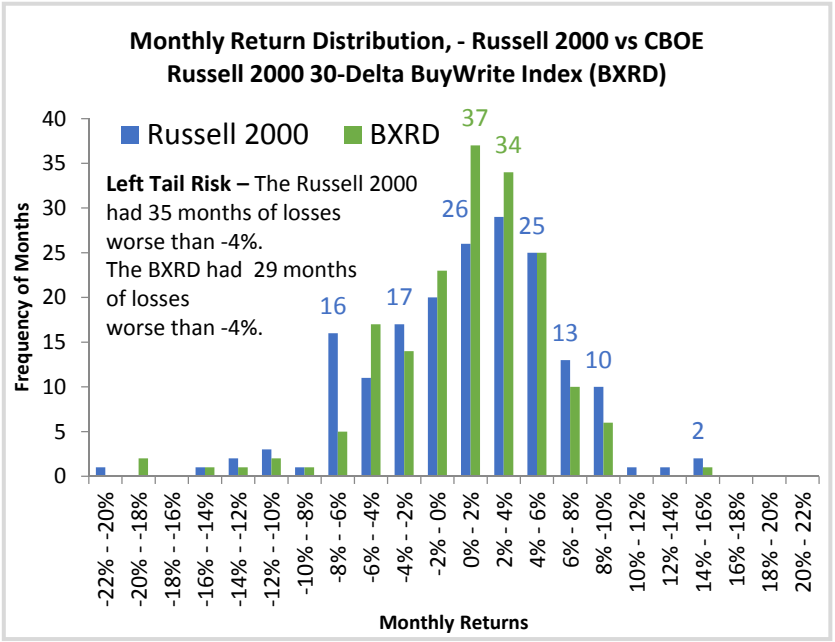
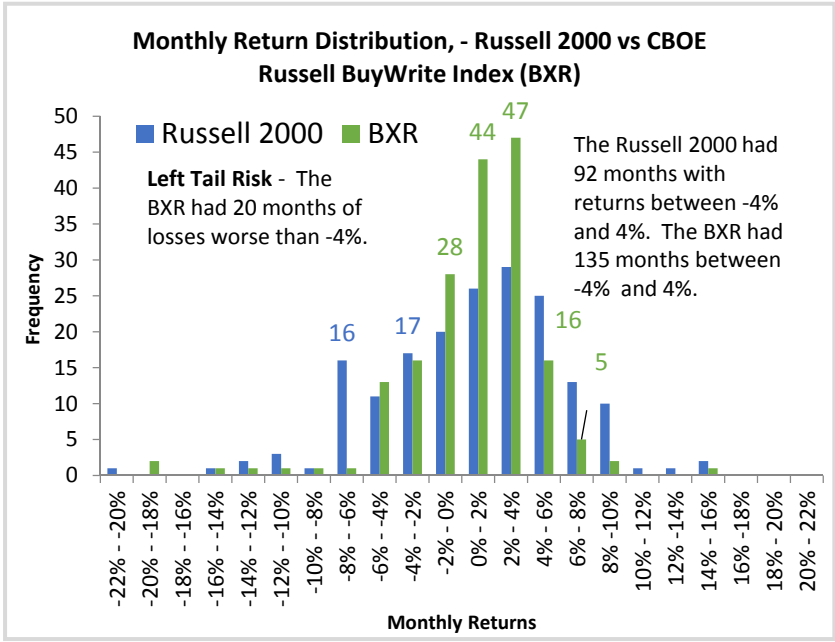
Exhibit 2: P&L Diagrams and Histograms of Returns









The options-based indexes tend to have a higher frequency of months between -4% & 4%. Histogram data is for the 179 months from Feb. 2001 to Dec. 2015. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

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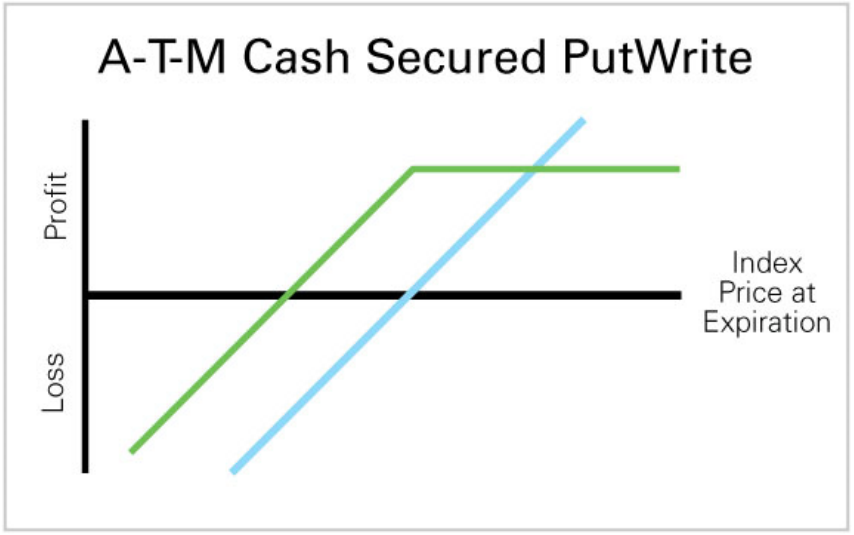
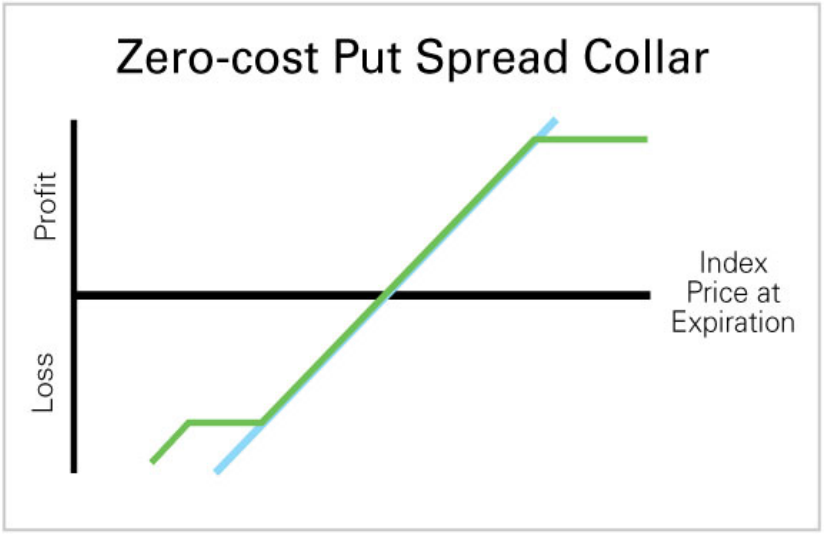
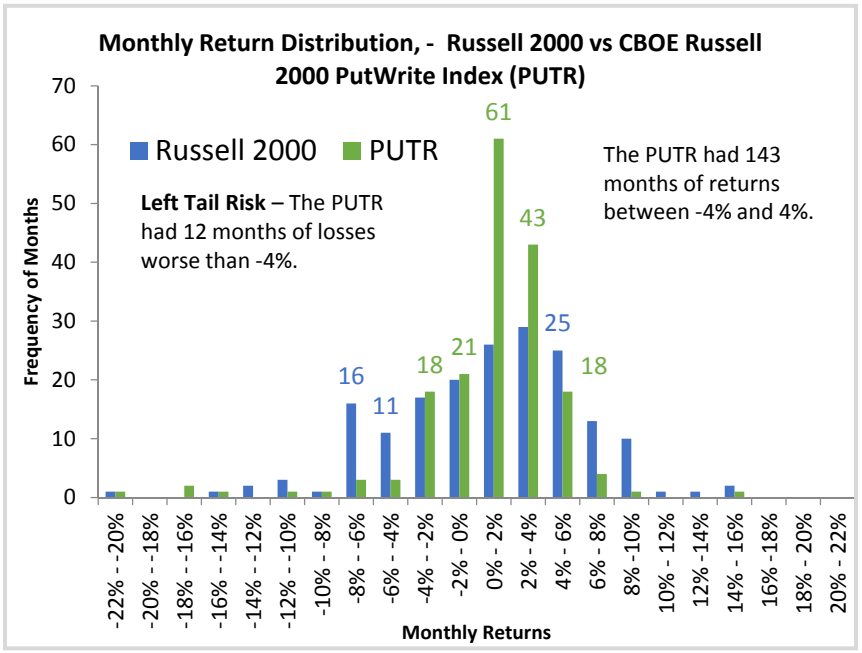
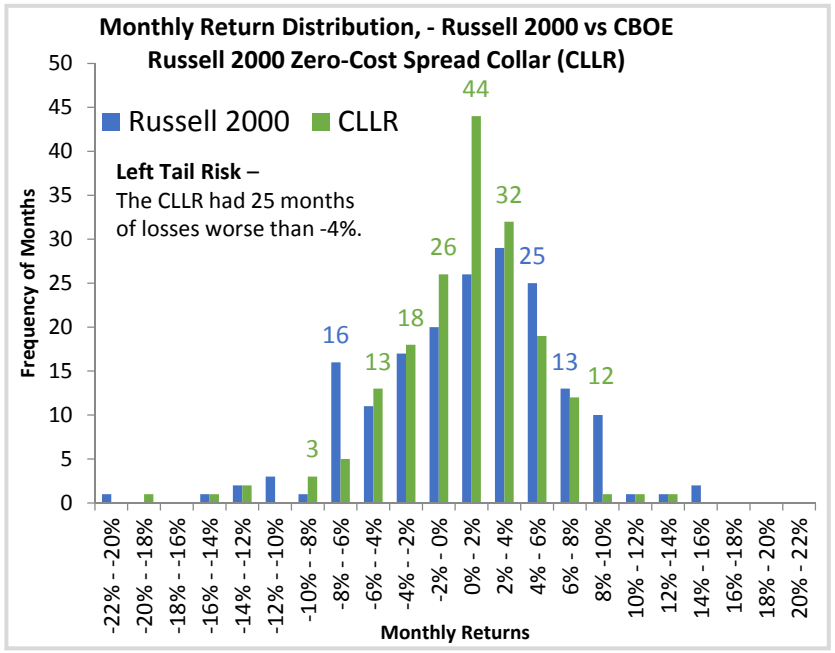
Exhibit 3: P&L Diagrams and Histograms of Returns









The options-based indexes tend to have higher frequency of months between -4% & 4%. Histogram data is for the 179 months from Feb. 2001 to Dec. 2015. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

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Exhibit 4: Frequency of Monthly Returns Since 2001

	CLLR	PUTR	BXRD	BXR	Russell 2000	Russell 1000	FTSE All-World (GBP)	30-Yr T-Bond (Citi)
Positive Returns (#)	110	128	113	115	107	112	110	103
Negative Returns(#)	69	51	66	64	72	67	69	76
Total (#)	179	179	179	179	179	179	179	179
Positive Returns (%)	61%	72%	63%	64%	60%	63%	61%	58%
Negative Returns (%)	39%	28%	37%	36%	40%	37%	39%	42%
Total (%)	100%	100%	100%	100%	100%	100%	100%	100%
Maximum Month	12.52%	14.16%	14.22%	14.01%	15.46%	11.21%	16.22%	10.78%
Minimum Month	-18.92%	-20.90%	-19.49%	-19.01%	-20.80%	-17.46%	-14.61%	-12.46%
Avg Positive Month	3.22%	2.53%	3.49%	2.79%	4.39%	3.14%	3.23%	3.12%
Avg Negative Month	-3.86%	-3.69%	-4.23%	-3.63%	-4.73%	-3.89%	-2.90%	-3.75%

This table summarizes the frequency of positive and negative months (from Feb. 2001 to through Dec. 2015) and illustrates the downside protection provided by the options-based indexes. PUTR had the highest percent of positive monthly returns. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

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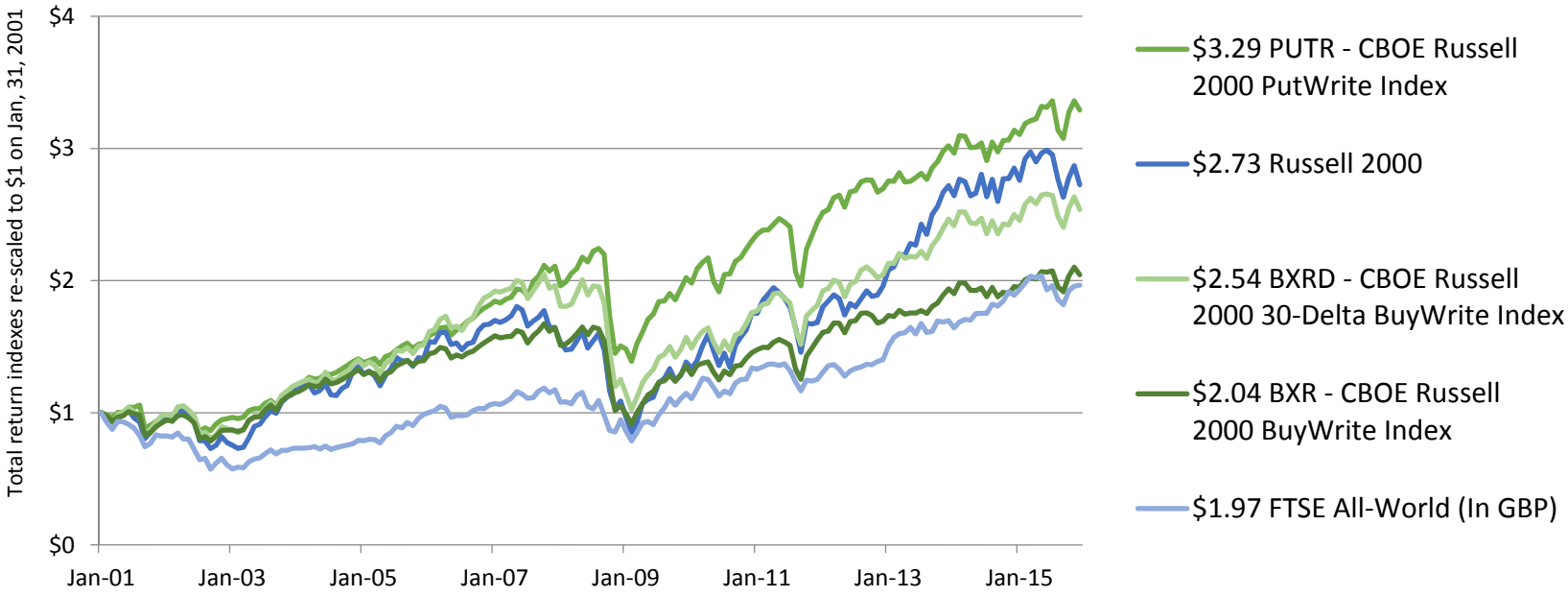
Exhibit 5: Growth in Benchmark Indexes Since 2001 (Jan. 31, 2001 – Dec.31, 2015)



2008	2009	2010	2011	2012	2013	2014	2015	Returns in Recent Years
-28.5%	34.3%	13.8%	6.1%	10.4%	12.0%	3.9%	4.9%	PUTR - CBOE Russell 2000 PutWrite Index
-33.8%	27.2%	26.9%	-4.2%	16.3%	38.8%	4.9%	-4.4%	Russell 2000
-36%	28.5%	7.5%	6.8%	9.0%	14.5%	0.9%	4.6%	BXR - CBOE Russell 2000 BuyWrite Index
-19.4%	21.2%	16.7%	-6.6%	12.0%	21.0%	11.3%	4.1%	FTSE All-World (in GBP)

All indexes in this paper (except for the RVX) are total return indexes. Data from Jan 2001 – Dec 2015. Total return indexes with reinvested dividends (but taxes and transaction costs are not included). Since 2008 the CBOE Russell 2000 BuyWrite Index (BXR) and the CBOE Russell 2000 PutWrite Index have not experienced a losing year. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE www.cboe.com/benchmarks.

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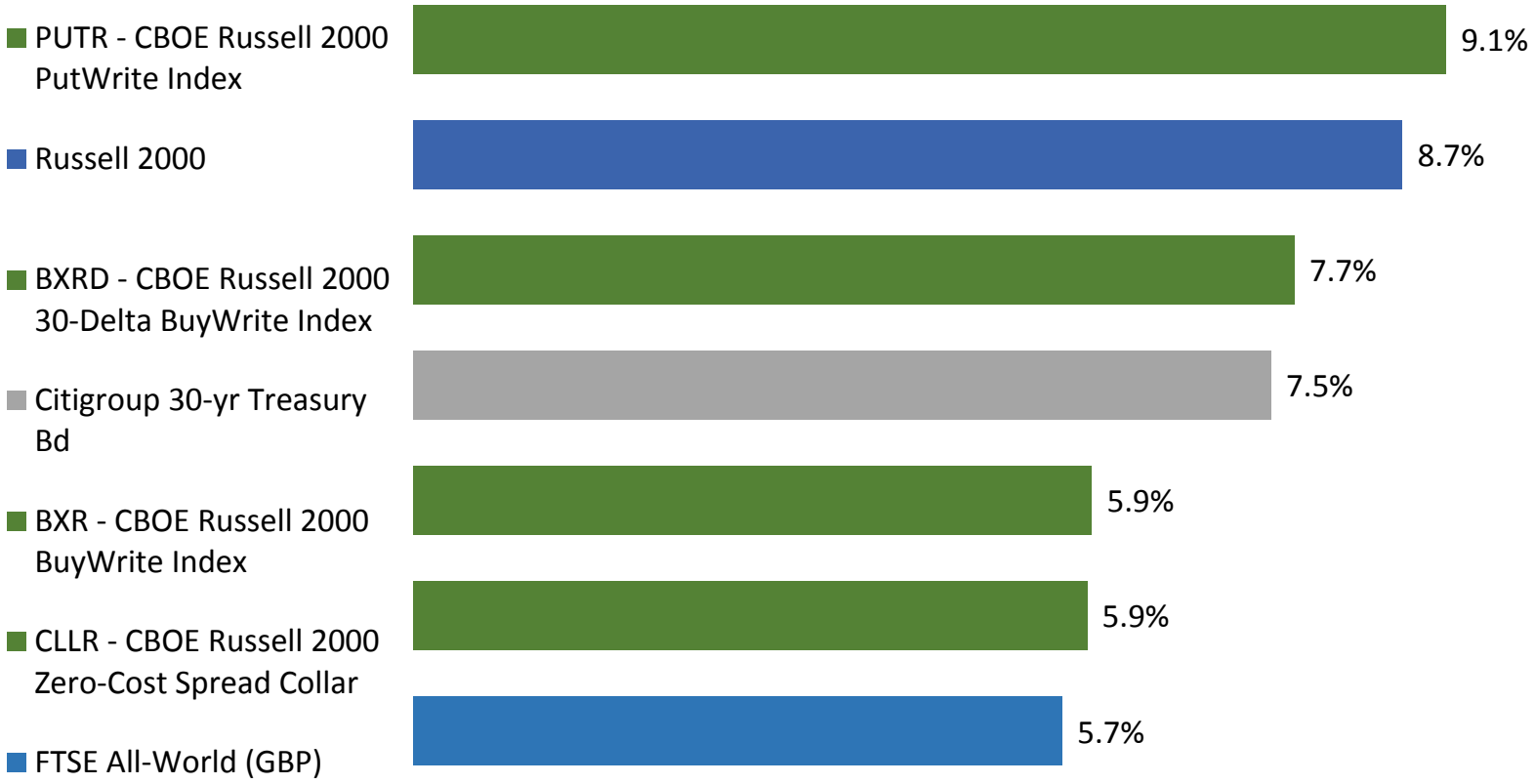
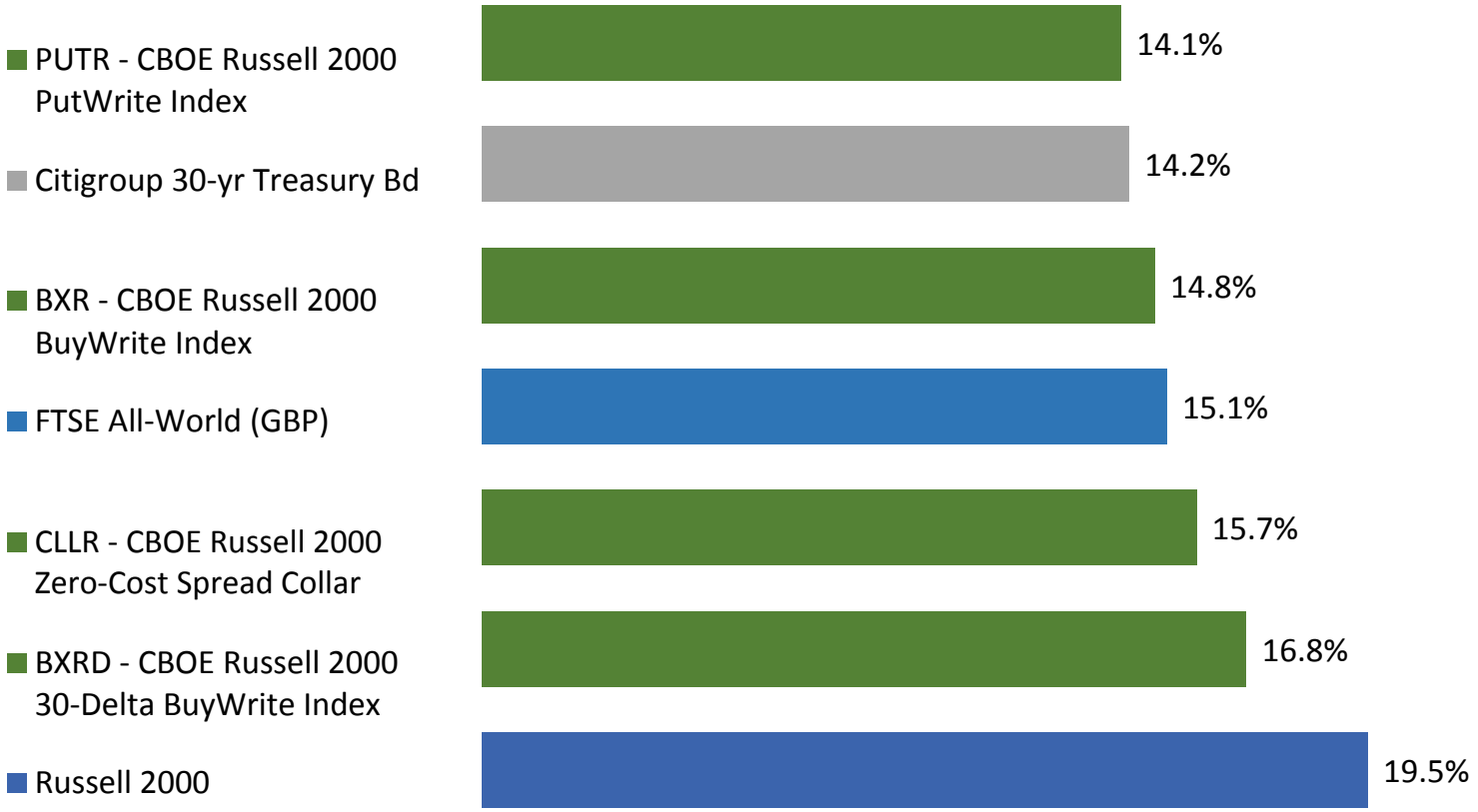
Exhibit 6: Annualized Returns Since 2001 (Jan. 31, 2001 – Dec. 31, 2015)



Annualized returns of Russell options-based indexes, Russell 2000 and fixed income. Data is from Jan 2001 to Dec 2015. PUTR has the highest return and followed by the Russell 2000 index. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

Please see the last slide for important disclosures.

Exhibit 7: Annualized Standard Deviations Since 2001 (Jan. 31, 2001 – Dec. 31, 2015)



Annualized standard deviations of Russell options-based indexes and traditional investments. Data is from Jan 2001 to Dec 2015. PUTR has the lowest standard deviation and followed by the 30-year T-bond index. As noted in Exhibit 6, PUTR outperformed other indexes. The rich volatility risk premium may offer some explanation for the performance of PUTR. The options-based indexes tend to have lower standard deviations compared to the Russell 2000. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

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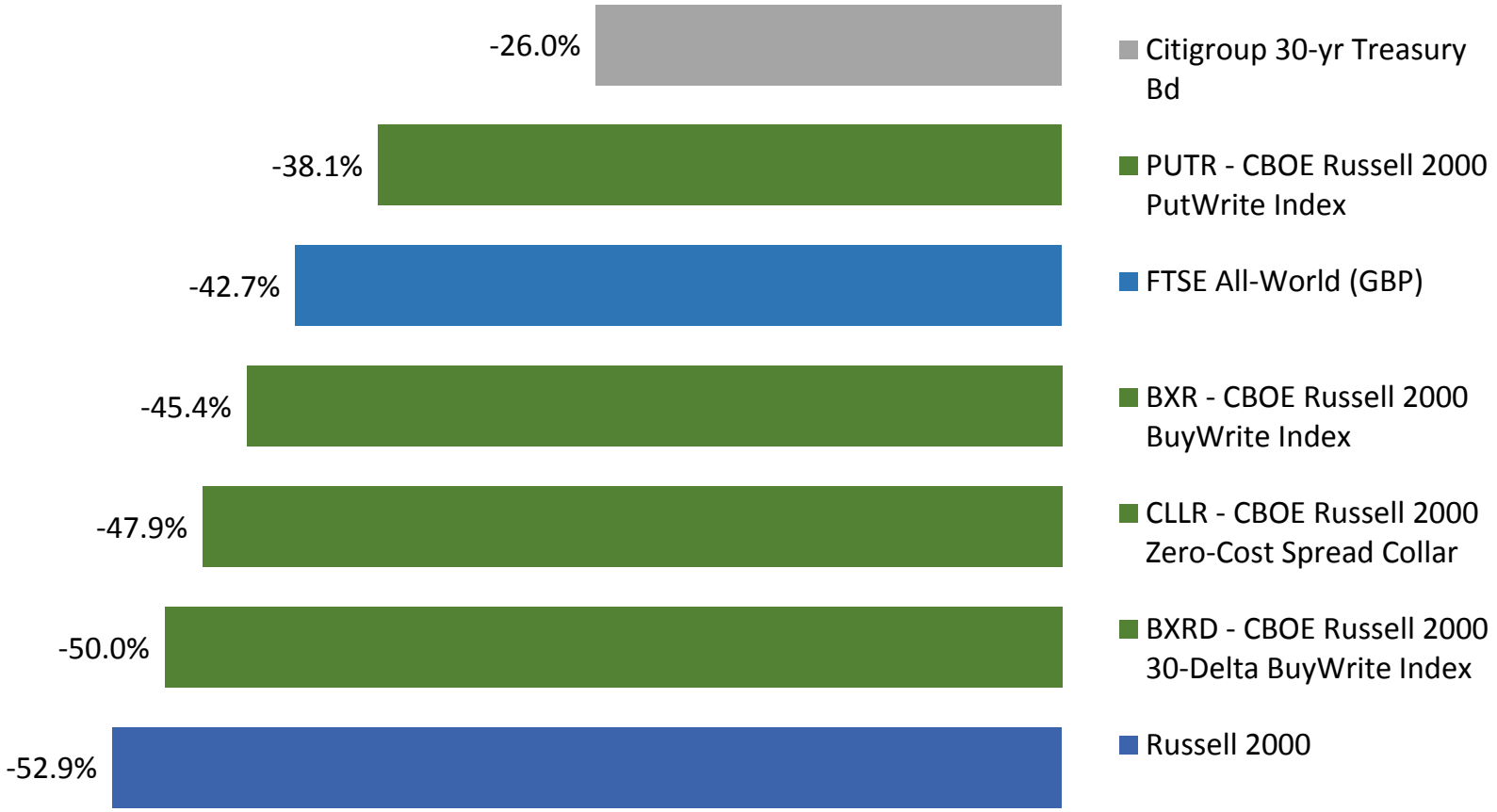
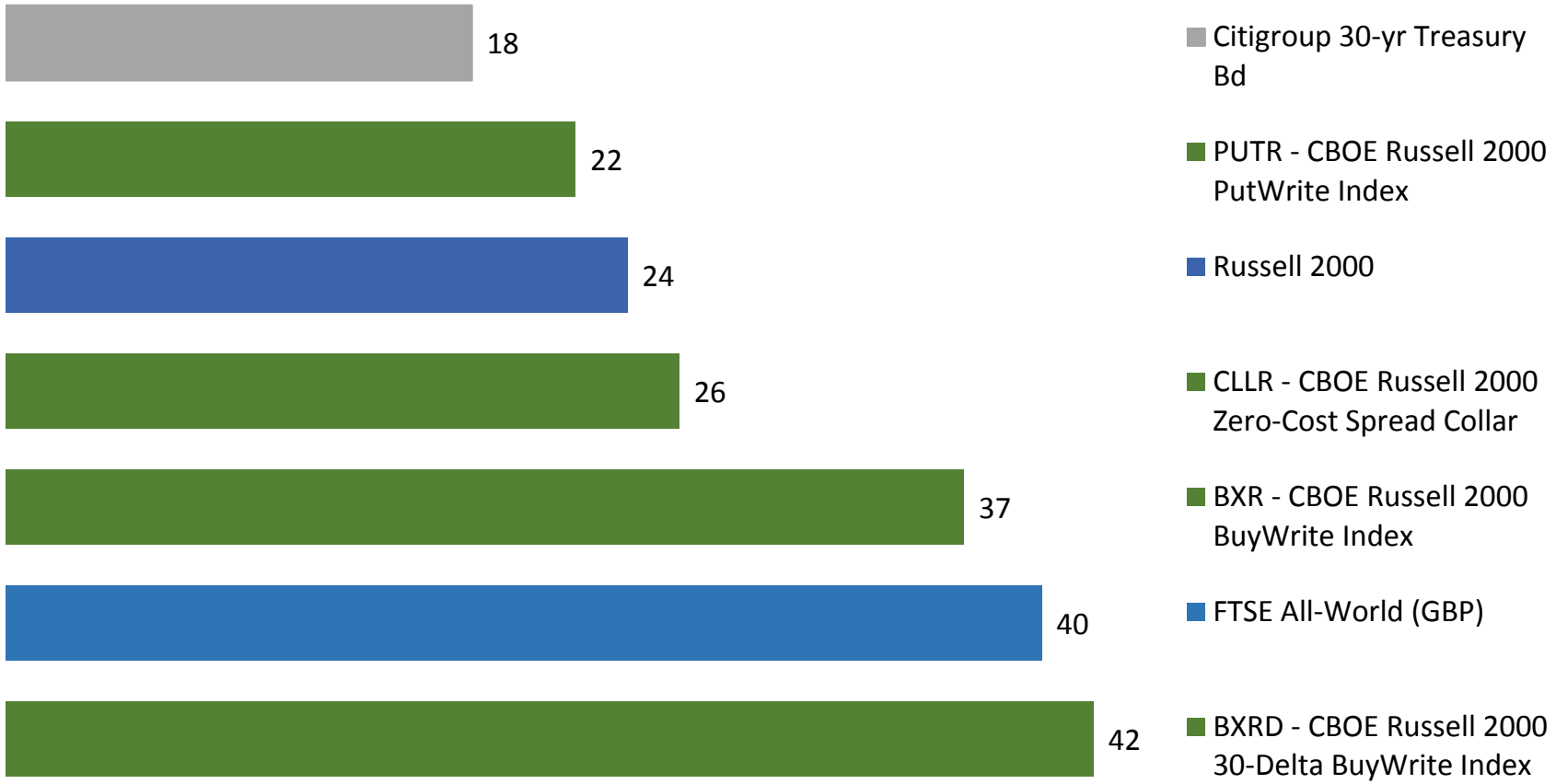
Exhibit 8: Maximum Drawdowns Since 2001 (Jan. 31, 2001 – Dec. 31, 2015)



Maximum Drawdown is an indicator of the worst loss an investment would have previously experienced. Data from Jan 2001 to Dec 2015. After fixed income, PUTR has the lowest maximum drawdown. All of the Russell options-based indexes have a smaller maximum drawdown than the Russell 2000 index. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

Exhibit 9: Maximum Recovery Period (in Months) Since 2001

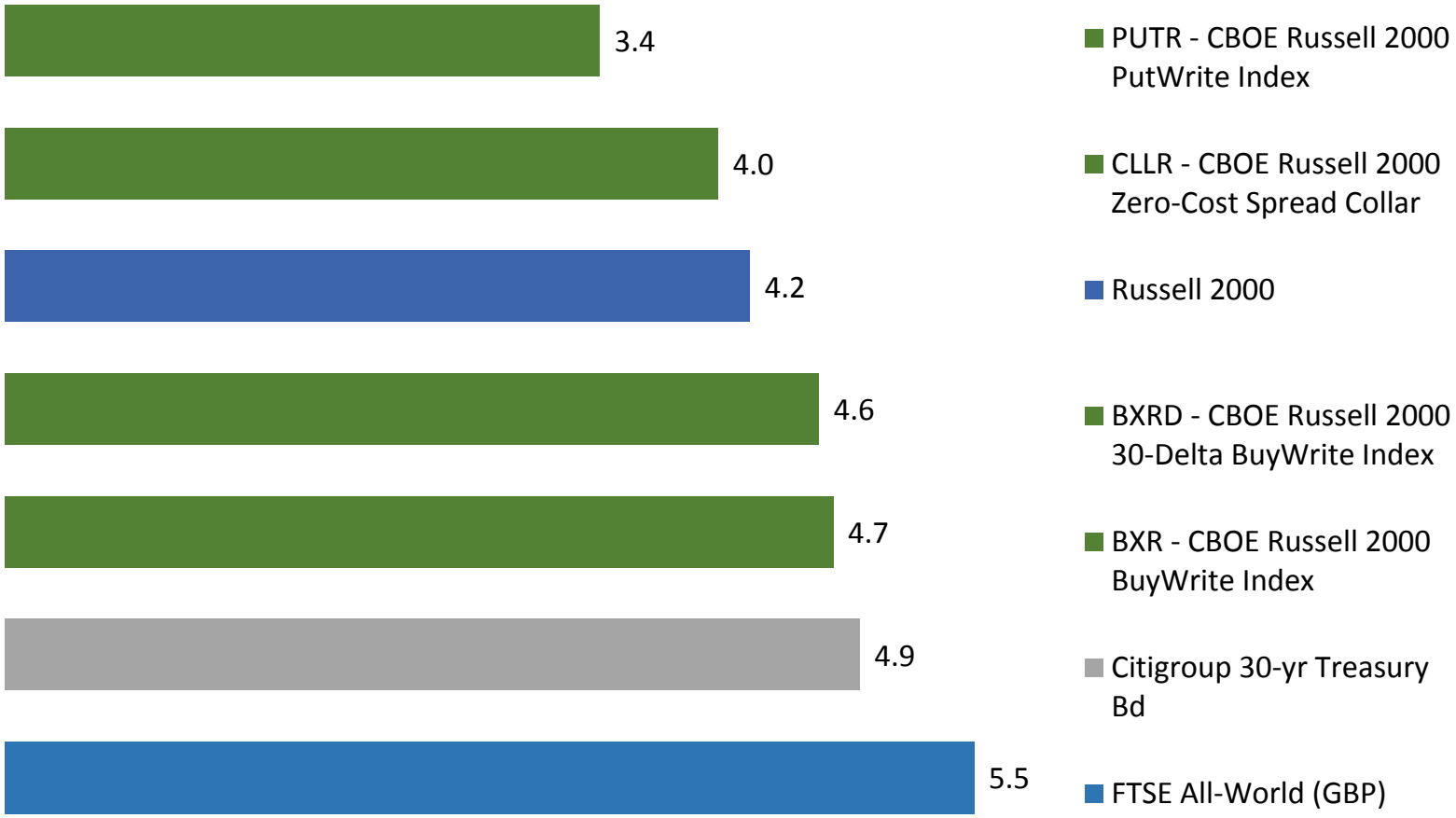
(Jan. 31, 2001 – Dec. 31, 2015)



Maximum recovery is the longest period of months for the index to recover to a new peak from a drawdown. A relatively fast recovery from a drawdown may be considered beneficial when combined with other metrics. For example, the longest recovery periods for the 30 Year bond index and the PUTR index was 18 months and 22 months respectively. Data from Jan 2001 to Dec 2015. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

Exhibit 10: Average Recovery Period (in Months) Since 2001

(Jan. 31, 2001 – Dec. 31, 2015)



Average recovery is the average period of months it has historically taken for an index to reach a new peak from its respective drawdown. A fast recovery period may be considered beneficial when considered with other metrics. For example, PUTR and the Russell 2000 averages about 3.4 months and 4.2 months respectively to recover from a drawdown. Data from Jan 2001 to Dec 2015. Past performance is not predictive of future returns. Sources: Bloomberg and CBOE

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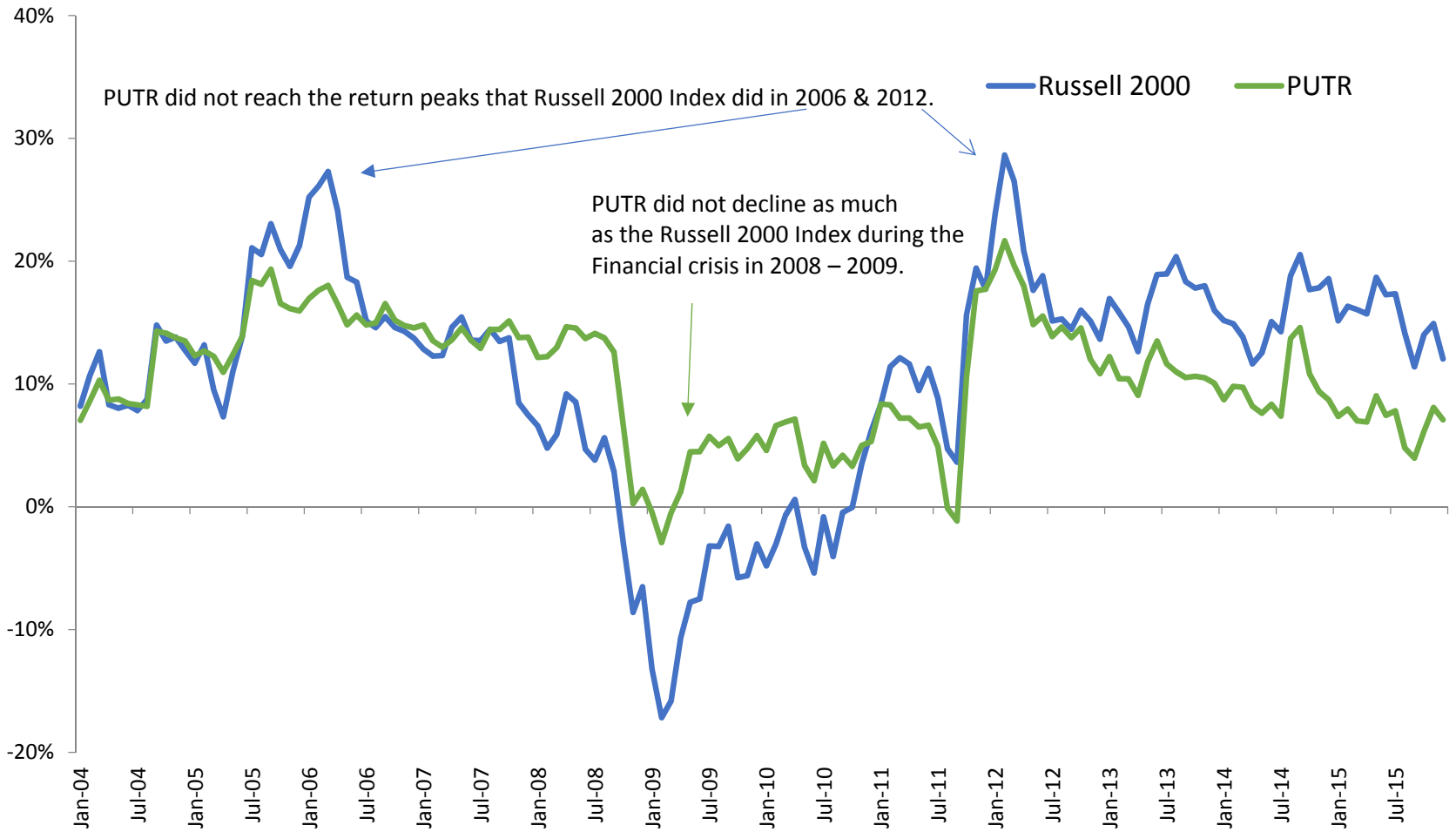
Exhibit 11: Rolling 3-Year Annualized Return - PUTR vs Russell 2000



Data from Jan. 31, 2001 to Dec. 31, 2015. The chart is a 3-year rolling return on an annualized basis for the Russell 2000 Index and the options-based CBOE Russell 2000 PutWrite Index (PUTR). In 2005 PUTR did not reach the return peaks that Russell 2000 Index did. However, PUTR did not decline as much as the Russell 2000 Index during the financial crisis in 2008 - 2009. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

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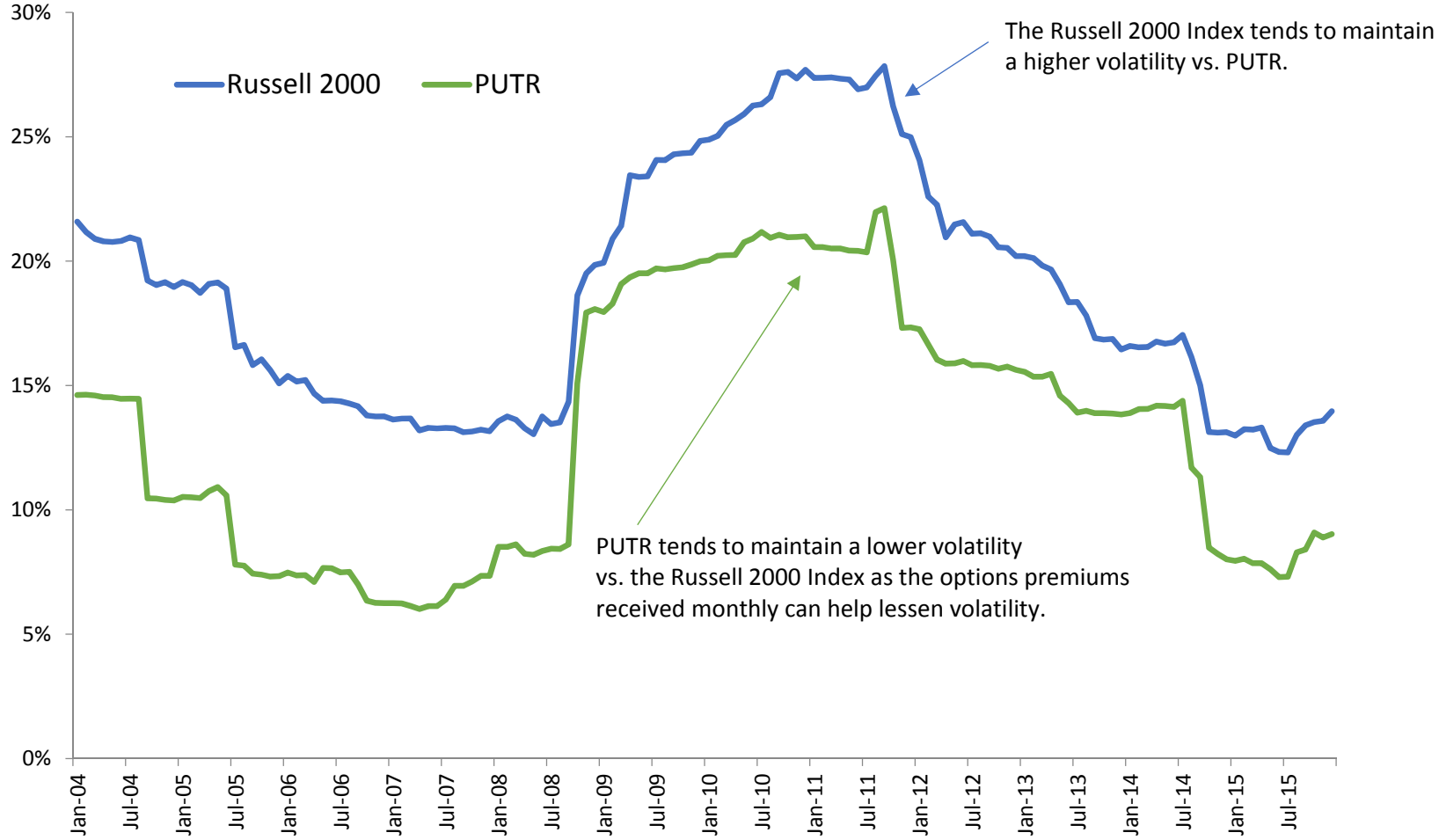
Exhibit 12: Rolling 3-Year Annualized Standard Deviation - PUTR vs Russell 2000



Data from Jan. 31, 2001 to Dec. 31, 2015. The chart is a 3-year rolling annualized standard deviation of the Russell 2000 Index and the options-based CBOE Russell 2000 PutWrite Index (PUTR). PUTR tends to maintain lower volatility vs. the Russell 2000 Index as the options premiums received monthly can help lessen volatility. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

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Exhibit 13: Summary Statistics

PUTR had the highest annualized returns, lowest annualized standard deviation, lowest average recovery, and highest Sharpe ratio

Summary Statistics Jan. 31, 2001 to Dec. 31, 2015

	Options-based Benchmark Indexes							
	CLLR	**PUTR**	**BXRD**	**BXR**	**Russell 2000**	**Russell 1000**	**FTSE All-World**	**30-Yr T-Bond (Citi)**
Annualized Return	5.9%	9.1%	7.7%	5.9%	8.7%	6.1%	5.7%	7.5%
Avg Monthly Return	0.5%	0.8%	0.6%	0.5%	0.7%	0.5%	0.5%	0.6%
Monthly Std Dev	4.5%	4.1%	4.9%	4.3%	5.6%	4.4%	4.3%	4.1%
Annualized Std Dev	15.7%	14.1%	16.8%	14.8%	19.5%	15.2%	15.1%	14.2%
Beta vs Market	0.78	0.59	0.82	0.67	1.00	0.70	0.62	-0.24
Max Drawdown	-47.9%	-38.1%	-50.0%	-45.4%	-52.9%	-51.1%	-42.7%	-26.0%
Max Recovery (months)	26	22	42	37	24	38	40	18
Avg Recovery (months)	4.0	3.4	4.6	4.7	4.2	6.3	5.5	4.9
Max Monthly Return	12.52%	14.16%	14.22%	14.01%	15.46%	11.21%	10.78%	16.22%
Min Monthly Return	-18.92%	-20.90%	-19.49%	-19.01%	-20.80%	-17.46%	-12.46%	-14.61%
Avg Positive Months	3.22%	2.53%	3.49%	2.79%	4.39%	3.14%	3.12%	3.23%
Avg Negative Months	-3.86%	-3.69%	-4.23%	-3.63%	-4.73%	-3.89%	-3.75%	-2.90%
Positive Std Dev	2.43%	2.00%	2.41%	2.11%	3.05%	2.43%	2.44%	2.98%
Negative Std Dev	3.66%	4.54%	4.08%	4.12%	3.93%	3.29%	3.27%	2.51%
S-ratio™	0.66	0.44	0.59	0.51	0.77	0.74	0.75	1.19
Skewness	-0.88	-1.95	-1.08	-1.49	-0.52	-0.65	-0.56	0.35
Kurtosis	2.39	8.32	2.81	5.42	0.88	1.27	0.43	2.62
Sharpe Ratio	0.25	0.50	0.34	0.27	0.34	0.27	0.25	0.39
Sortino Ratio	0.31	0.45	0.41	0.28	0.49	0.36	0.33	0.63

Of the options-based indexes, PUTR has the highest return, lowest standard deviation, lowest maximum drawdown, shortest recovery, the highest Sharpe ratio and highest Sortino ratio. However, PUTR also has the lowest Skewness and lowest S-ratio™. The beta of the options-based indexes ranged from 0.59 to 0.82. A risk-free rate of 2% was utilized for Sharpe & Sortino ratios. S-ratio™ = positive standard deviation/ negative standard deviation. Past performance is not predictive of future returns.
Sources: Bloomberg, CBOE, Federal Reserve

Exhibit 14: Index Correlations of Monthly Returns Since 2004

(Feb. 29, 2004 - Dec. 31, 2015)

	Russell 2000	RVX	CLLR	PUTR	BXRD	BXR	S&P GSCI	30-Yr T-Bond (Citi)	FTSE All-World (GBP)
Russell 2000	1								
RVX	-0.66	1							
CLLR	0.97	-0.63	1						
PUTR	0.82	-0.62	0.85	1					
BXRD	0.94	-0.65	0.97	0.93	1				
BXR	0.87	-0.63	0.91	0.97	0.97	1			
S&P GSCI	0.37	-0.28	0.38	0.44	0.42	0.43	1		
30-Yr T-Bond (Citi)	-0.33	0.22	-0.31	-0.32	-0.34	-0.33	-0.33	1	
FTSE All-World (in GBP)	0.80	-0.65	0.78	0.66	0.76	0.71	0.25	-0.13	1

Index correlations of monthly returns from Feb 2004 to Dec 2015. The RVX had a negative correlation to 6 of the 7 indexes listed in this table. The options-based indexes tend to have a high correlation to the Russell 2000 index as most of the options-based indexes are long the Russell 2000 Index. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

Exhibit 15: Big One-Week Moves for the Russell 2000 Index

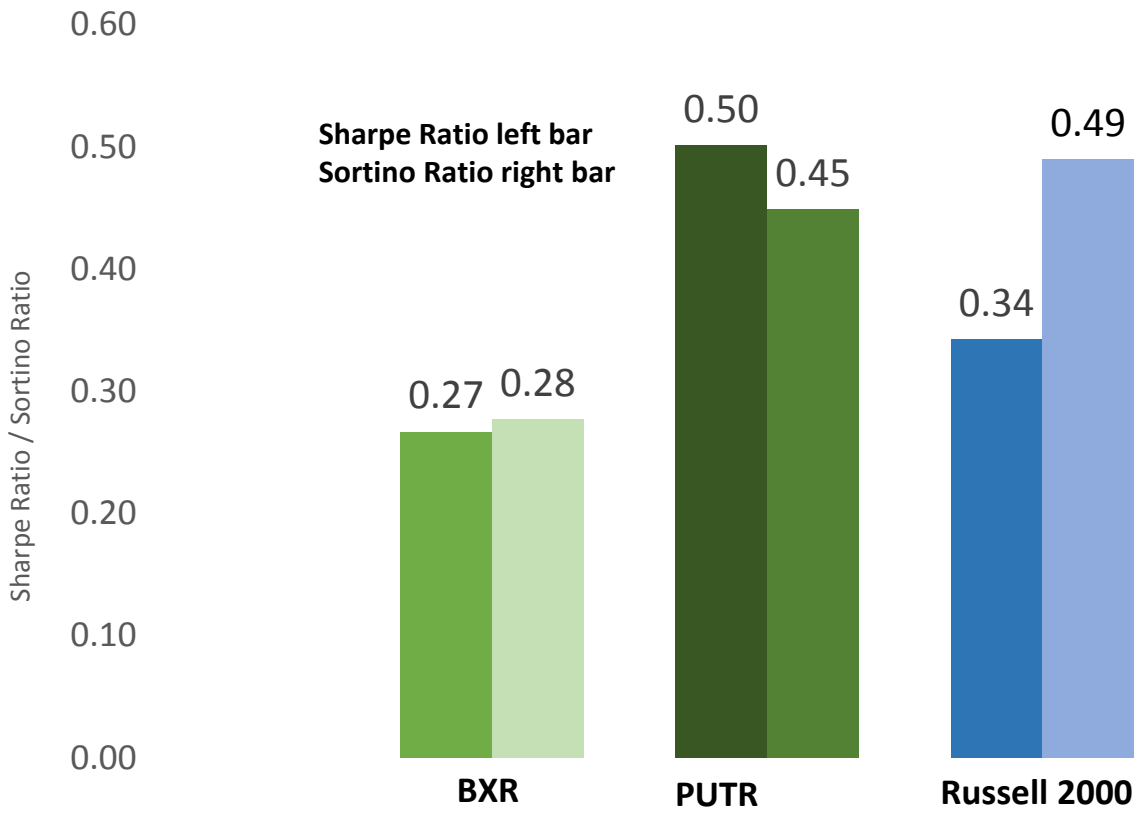
16 Weeks In Which Russell 2000 Index Rose or Fell by More Than 8% During the Period from 2001 Through 2015

	Stock Indexes						*Options-based Benchmark Indexes*				
Week Ending	Russell 2000	Russell 1000 Growth Index	Russell 1000 Value Index	FTSE China 50 Index (in US$)	FTSE All-World Index (in GBP)	CBOE Russell 2000 Volatility (RVX)	CBOE Russell 2000 BuyWrite (BXR)	CBOE Russell 2000 30-Delta BuyWrite Index (BXRD)	CBOE Russell 2000 PutWrite Index (PUTR)	CBOE Russell 2000 Zero-Cost Spread Collar Index (CLLR)	CBOE Russell 2000 Conditional BuyWrite Index (BXRC)
10-Oct-2008	-15.6%	-16.6%	-19.7%	-19.6%	-16.6%	41.6%	-15.3%	-15.6%	-15.4%	-15.0%	-15.6%
21-Sep-2001	-14.0%	-12.7%	-10.8%	-0.6%	-8.9%	N/A	-14.2%	-14.1%	-14.3%	-14.1%	N/A
3-Oct-2008	-12.1%	-10.7%	-9.0%	-6.3%	-5.3%	30.1%	-11.3%	-11.7%	-10.5%	-10.5%	-11.0%
21-Nov-2008	-10.9%	-7.2%	-10.3%	-8.8%	-9.5%	11.5%	-15.5%	-12.8%	-11.3%	-11.9%	-13.7%
24-Oct-2008	-10.5%	-8.0%	-6.3%	-16.5%	-1.0%	17.3%	-7.9%	-8.6%	-5.8%	-9.5%	-6.7%
5-Aug-2011	-10.3%	-7.4%	-7.8%	-7.5%	-8.3%	29.7%	-9.5%	-10.1%	-9.5%	-8.3%	-9.5%
6-Mar-2009	-9.7%	-5.2%	-9.1%	-2.6%	-5.9%	9.2%	-8.5%	-9.3%	-8.2%	-8.5%	-8.5%
14-Nov-2008	-9.7%	-6.5%	-6.2%	2.8%	-0.3%	20.6%	-8.4%	-9.6%	-8.1%	-8.7%	-8.4%
7-May-2010	-8.9%	-6.4%	-6.8%	-6.4%	-4.4%	61.7%	-7.3%	-3.1%	-6.5%	-2.0%	-2.1%
23-Sep-2011	-8.6%	-6.4%	-7.1%	-12.1%	-5.4%	27.3%	-5.9%	-7.2%	-5.3%	-7.1%	-5.6%
20-Feb-2009	-8.3%	-5.5%	-8.3%	-6.6%	-7.1%	5.3%	-6.7%	-8.5%	-6.7%	-7.0%	-8.1%
14-Oct-2011	8.6%	6.7%	5.5%	7.2%	4.2%	-19.2%	7.5%	8.6%	7.3%	7.0%	7.5%
2-Dec-2011	10.4%	7.2%	7.8%	9.6%	7.4%	-14.6%	7.6%	13.4%	7.2%	8.5%	7.2%
13-Mar-2009	12.1%	9.0%	13.0%	7.7%	10.0%	-13.5%	11.8%	12.0%	11.2%	10.8%	11.7%
31-Oct-2008	14.2%	11.4%	10.3%	13.1%	8.4%	-24.8%	10.7%	13.1%	10.0%	13.2%	10.6%
28-Nov-2008	16.4%	10.5%	14.7%	12.8%	8.2%	-19.0%	7.3%	7.9%	4.1%	11.7%	5.3%

Data in the table above is for total return benchmark indexes (except for the RVX Index). Note that during weeks in which the Russell 2000 fell or rose by 8% the RVX was negatively correlated as the RVX tends to rally when equities decline (downside volatility). Past performance is not predictive of future returns. Sources: Bloomberg, CBOE.

Please see the last slide for important disclosures.

Exhibit 16: Risk-Adjusted Returns (Jan. 31, 2001 to Dec. 31, 2015)



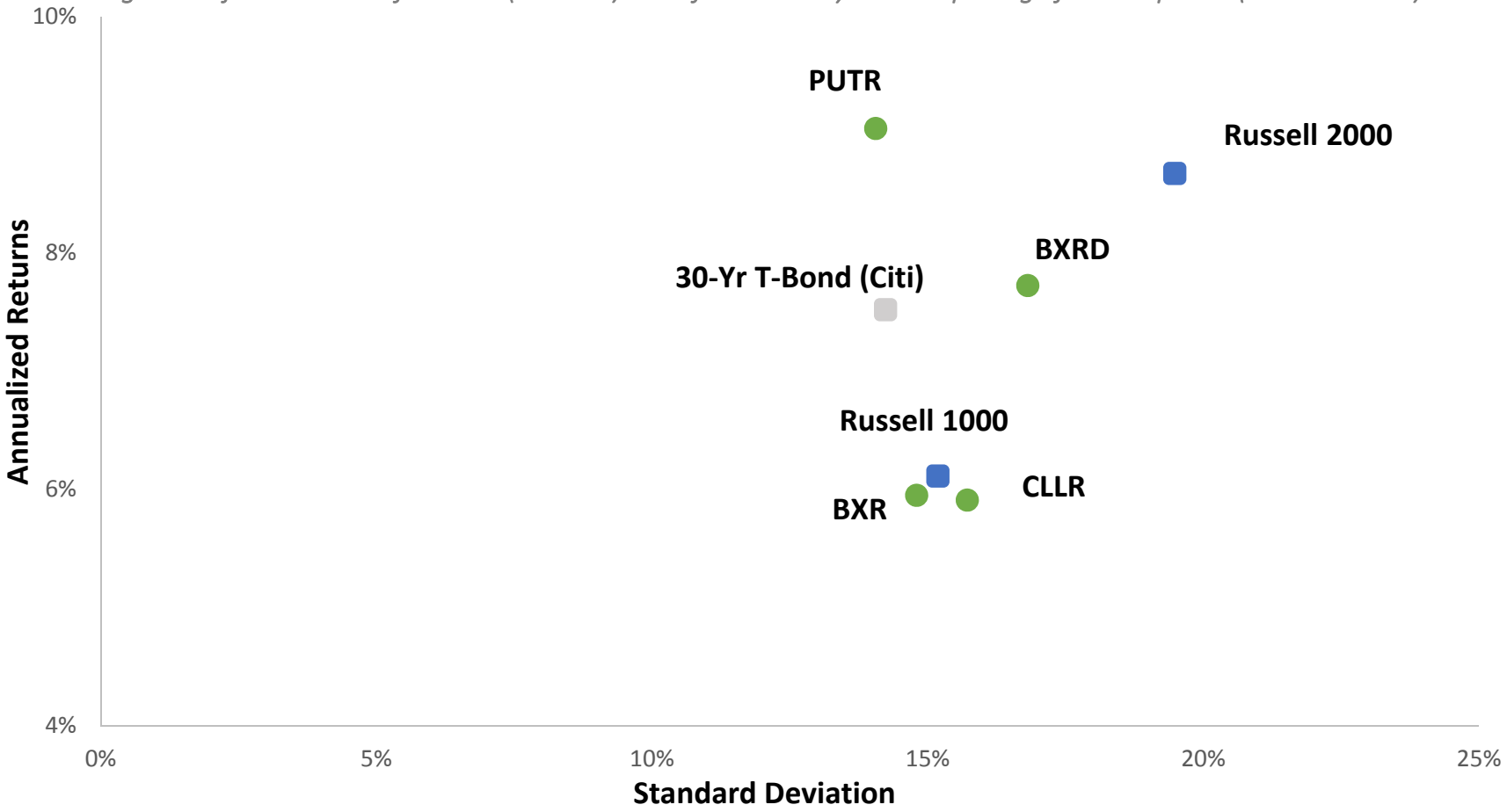
A risk-free rate of 2% was utilized for Sharpe & Sortino ratios. The Sharpe ratio = (return – risk free rate) / standard deviation. The Sortino ratio = (return – minimum acceptable return) / semi-deviation. Data Jan 2001 to Dec 2015. Risk-adjusted returns are imperfect when measuring non-normal distributions. The indexes listed above are negatively skewed. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE.

Please see the last slide for important disclosures.

Exhibit 17: Risk and Return

(Jan. 31, 2001 – Dec. 31, 2015)

The PUTR Index had the highest annualized returns and lowest annualized standard deviation.
Strong risk-adjusted returns for PUTR (vs. CLLR) were facilitated by the rich pricing of index options (See Exhibit 18)

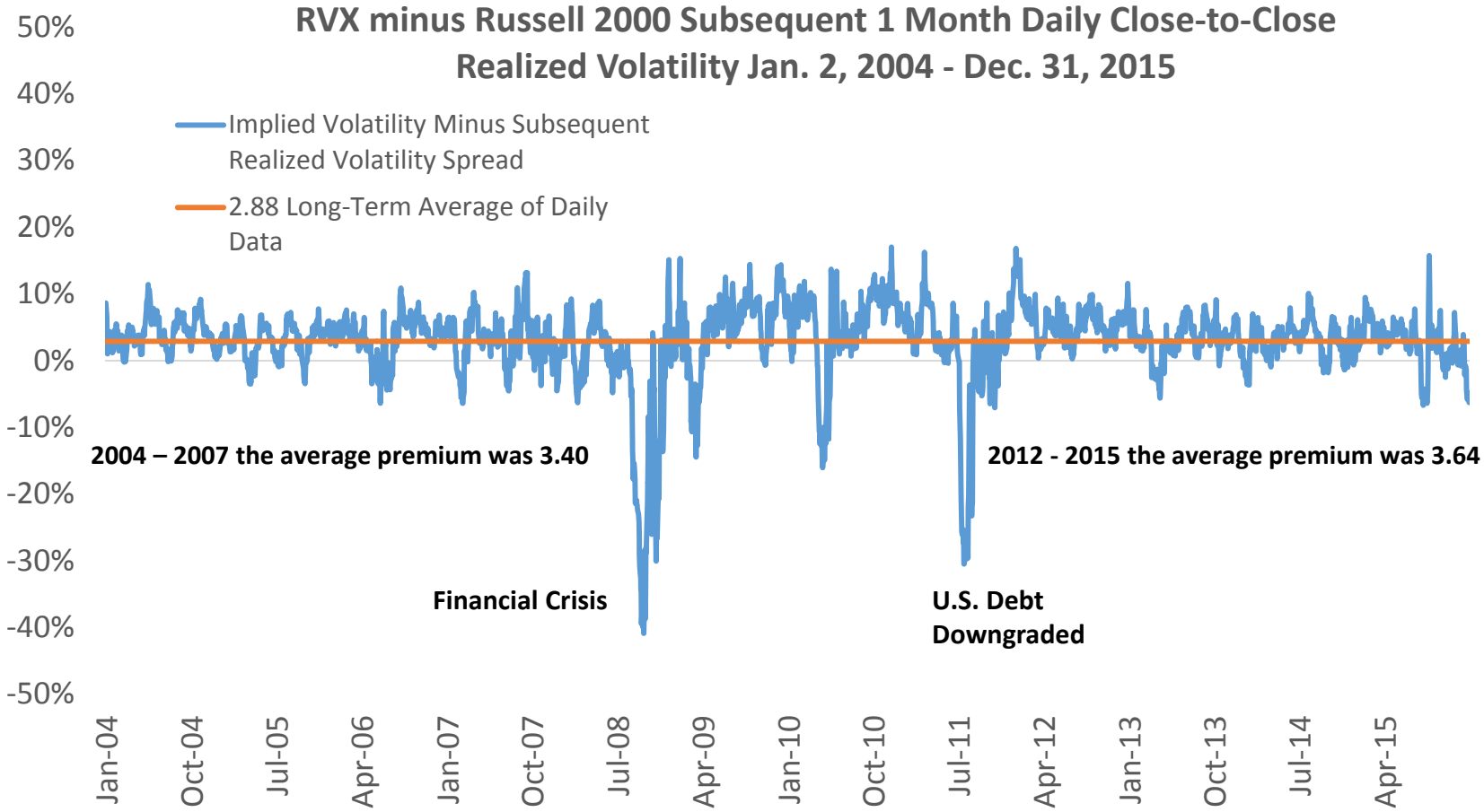


Annualized returns and standard deviations for the CBOE Russell options-based indexes and traditional equity and fixed income indexes. PUTR tends to have the lowest standard deviation relative to its return. Data from Jan 2001 to Dec 2015. Past performance is not predictive of future returns. Source: Bloomberg, CBOE

Please see the last slide for important disclosures.

Exhibit 18: Volatility Risk Premium Since 2004

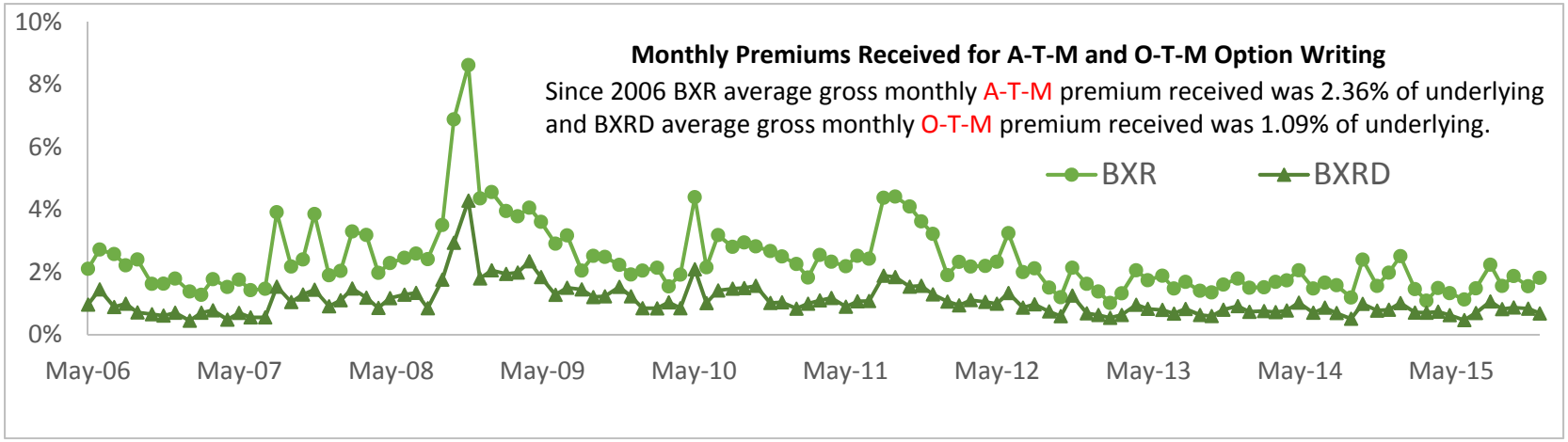
Rich pricing of RUT Index options facilitated strong risk-adjusted returns for the PUTR Index



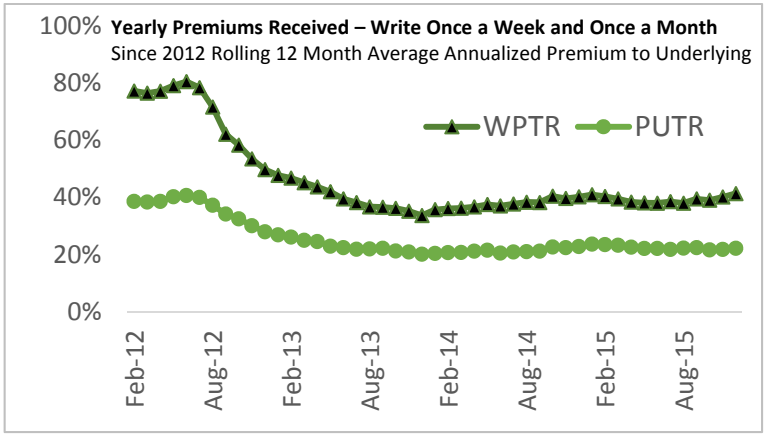
Since 2004 the estimated average difference between RVX Index implied volatility vs. Russell 2000 realized volatility of daily close-to-close was 2.88 volatility points. This means the expected volatility over the next 30 days usually has been higher than the realized volatility. This may cause options to frequently be richly priced and may offer ongoing opportunities to reward sellers of option premiums (see, e.g. , Exhibits 16 and 17). The maximum & minimum difference is 17 and -40.89 volatility points respectively.

From 2004 to 2007 the average premium was 3.40. From 2012 to 2015 the average premium was 3.64. Discounting the major events 2008 thru 2011, the risk premium tends to be higher than the long term average. Past performance is not predictive of future returns.
Sources: Bloomberg, CBOE

Exhibit 19: Gross Premiums Received for Index Option Writing



Re: the chart above, with many at-the-money (A-T-M) option writing strategies, investors can receive more gross premiums (but also forgo stock upside in times of bull markets) when compared to certain out-of-the-money (O-T-M) option writing strategies. The Weeklys[SM] options offer potential for greater premium received on an annualized basis due to rolling four times a month vs. a monthly option rolling only once a month. The premium for Weeklys options average about 2X more in gross income vs. monthly options. The greater premium may also be due to Weeklys options having a short time decay opposed to the longer dated options and tend to be more responsive to the immediate market volatility. Please note that the premiums are gross amounts shown as a positive percentage of the underlying index value, and the net return for option-writing can be negative (see table below).



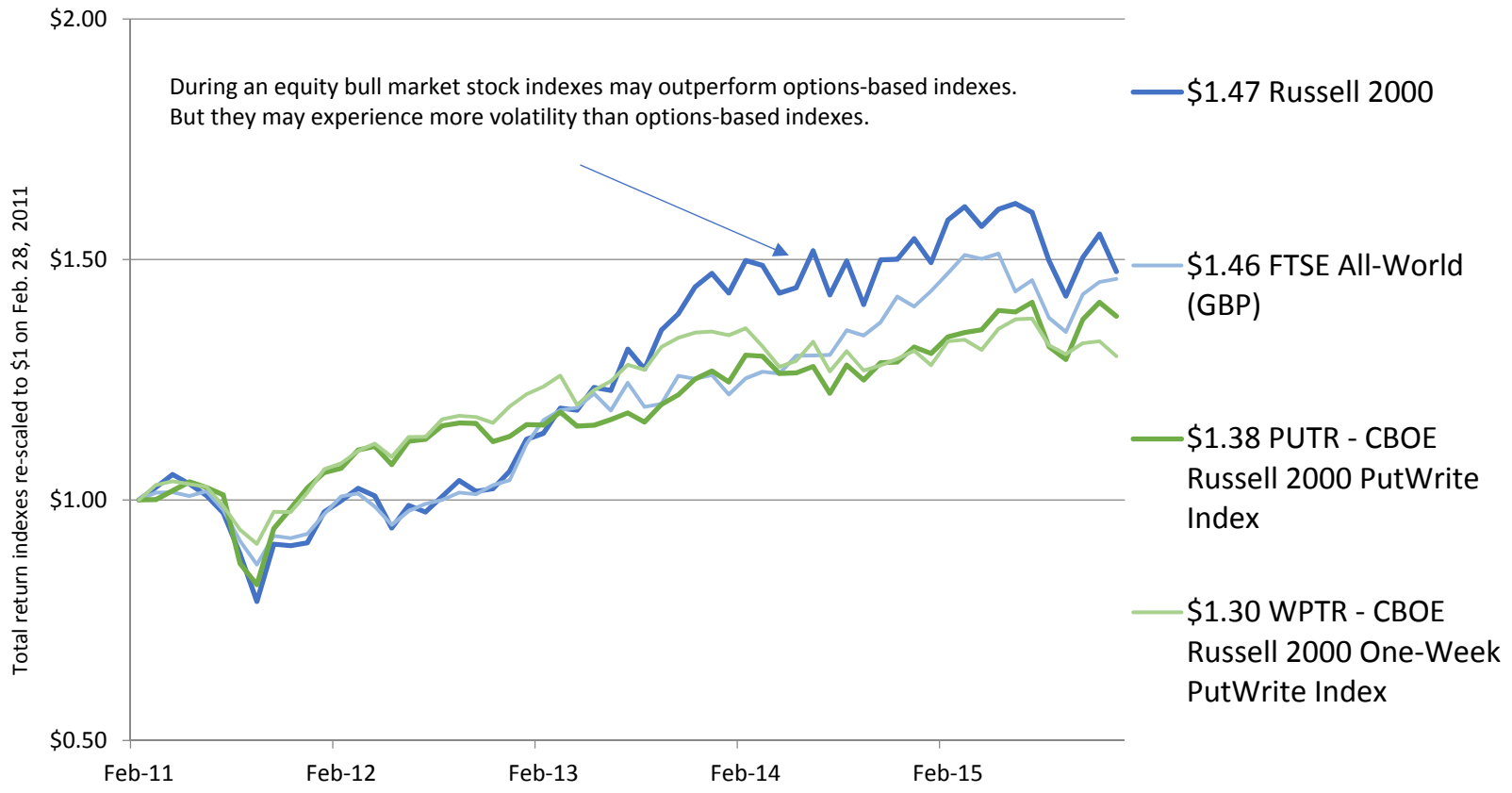
Net Returns in Recent Years 2007 to 2015

	2007	2008	2009	2010	2011	2012	2013	2014	2015
BXR	5.8%	-36.0%	28.5%	7.5%	6.8%	9.0%	14.5%	0.9%	4.6%
BXRD	3.9%	-36.2%	25.4%	11.8%	3.3%	12.7%	20.6%	1.5%	1.5%
Russell 2000	-1.6%	-33.8%	27.2%	26.9%	-4.2%	16.3%	38.8%	4.9%	-4.4%

Premium data through Dec. 2015. Past performance is not predictive of future returns. Sources: Bloomberg , CBOE

Exhibit 20: Comparing Traditional Stock Indexes to Options-Based Indexes During an Equity Bull Market

(Feb. 28, 2011 – Dec. 31, 2015)



Investing $1 in 2011, in total return indexes with reinvested dividends (but taxes and transaction costs are not included). Data from Feb 2011 to Dec 2015. During an equity bull market stock indexes may outperform options-based indexes. But they may experience more volatility than options-based indexes. Past performance is not predictive of future returns. Source: Bloomberg, CBOE

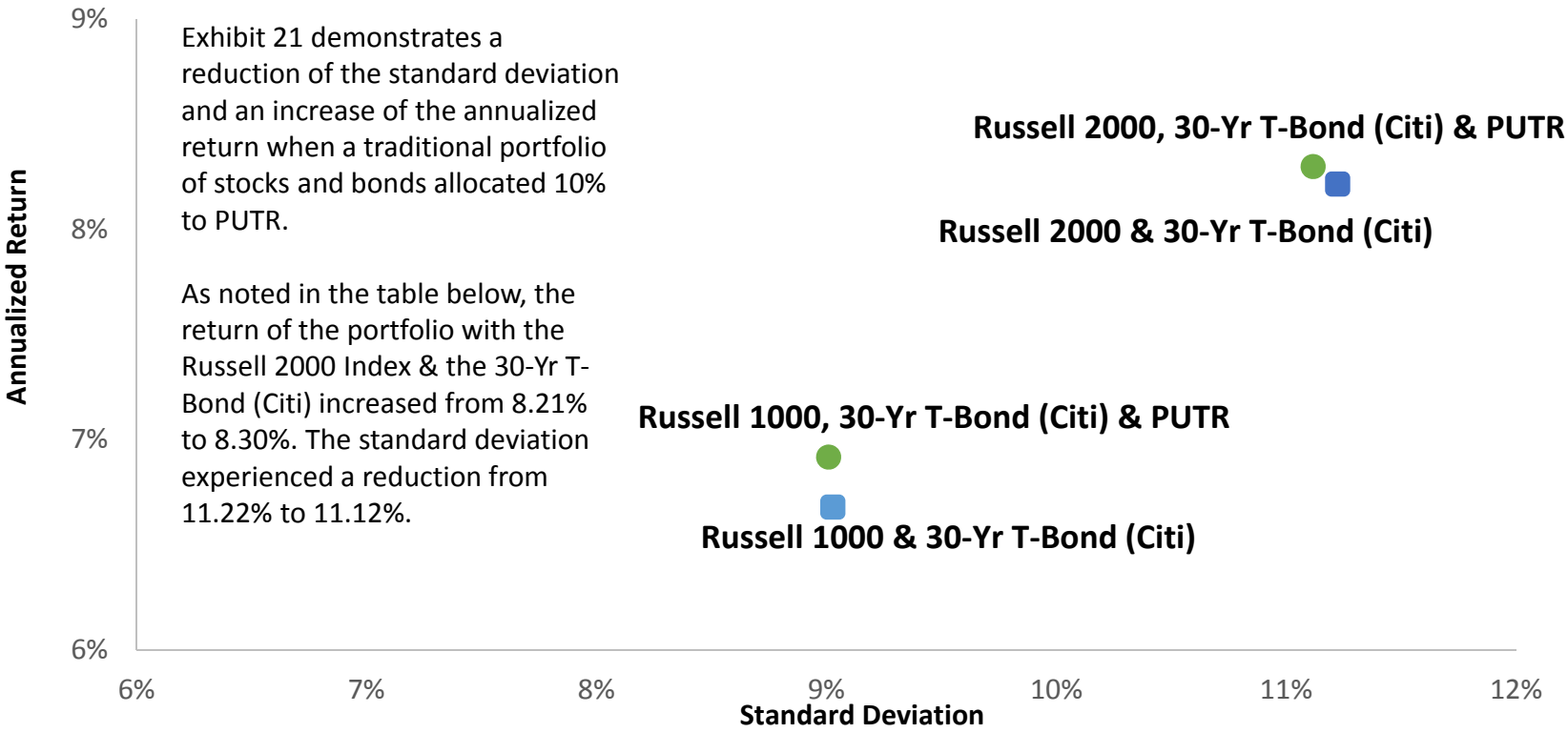
Please see the last slide for important disclosures.

Exhibit 21: Impact of a 10% Allocation to an Options-Based Index

Jan. 31, 2001 – Dec. 31, 2015

Exhibit 21 demonstrates a reduction of the standard deviation and an increase of the annualized return when a traditional portfolio of stocks and bonds allocated 10% to PUTR.

As noted in the table below, the return of the portfolio with the Russell 2000 Index & the 30-Yr T-Bond (Citi) increased from 8.21% to 8.30%. The standard deviation experienced a reduction from 11.22% to 11.12%.

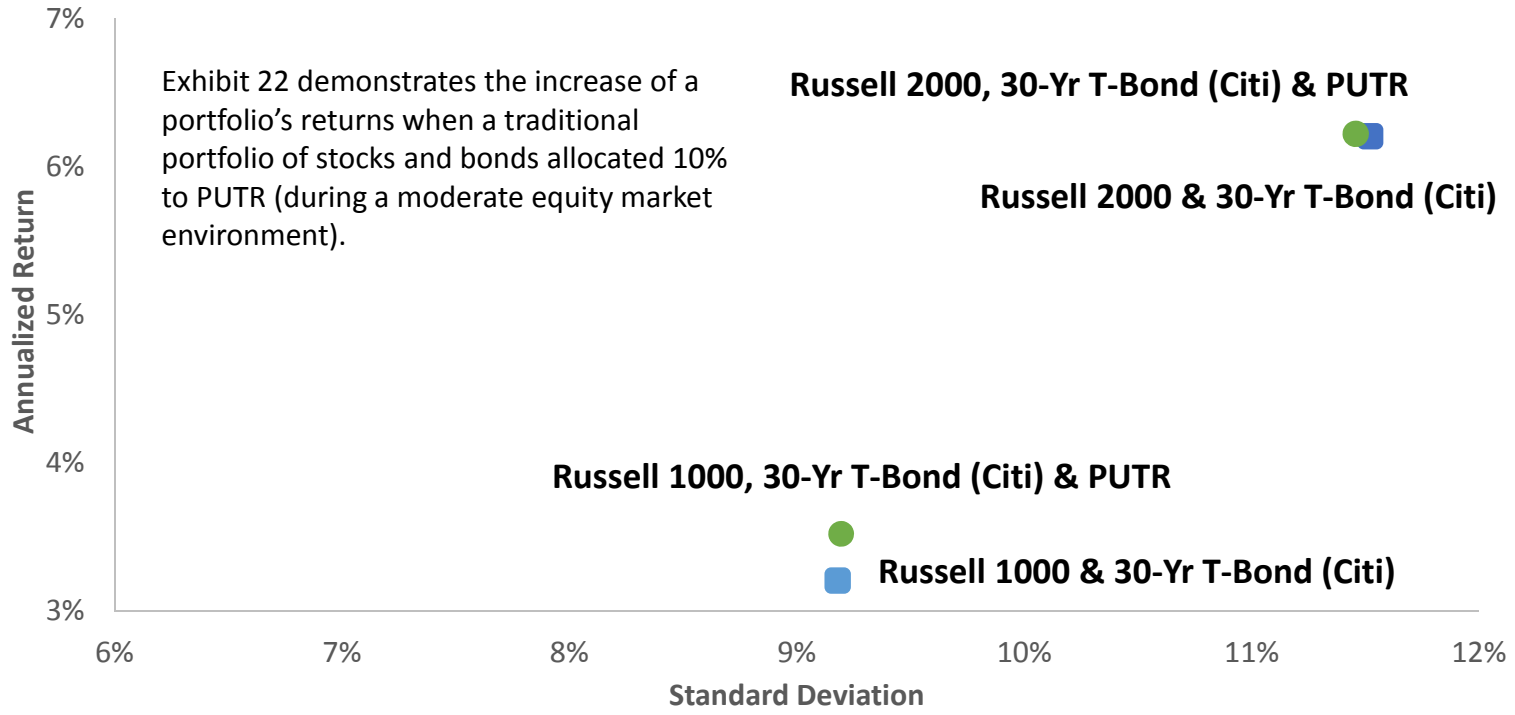


	Russell 1000 & 30-Yr T-Bond (Citi)	With PUTR	Russell 2000 & 30-Yr T-Bond (Citi)	With PUTR
Annualized Return	6.68%	6.92%	8.21%	8.30%
Standard Deviation	9.03%	9.01%	11.22%	11.12%

Annualized Risk and return impact of a traditional 60/40 portfolio so that the allocations are 54% stocks, 36% T-bonds and 10% PUTR (on this Exhibit and on the following four Exhibits). All indexes are total return. From Jan 2001 to Dec 2015. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

Exhibit 22: Impact of a 10% Allocation to an Options-Based Index

Jan. 31, 2001 – Dec. 31, 2008 (Moderate Market)



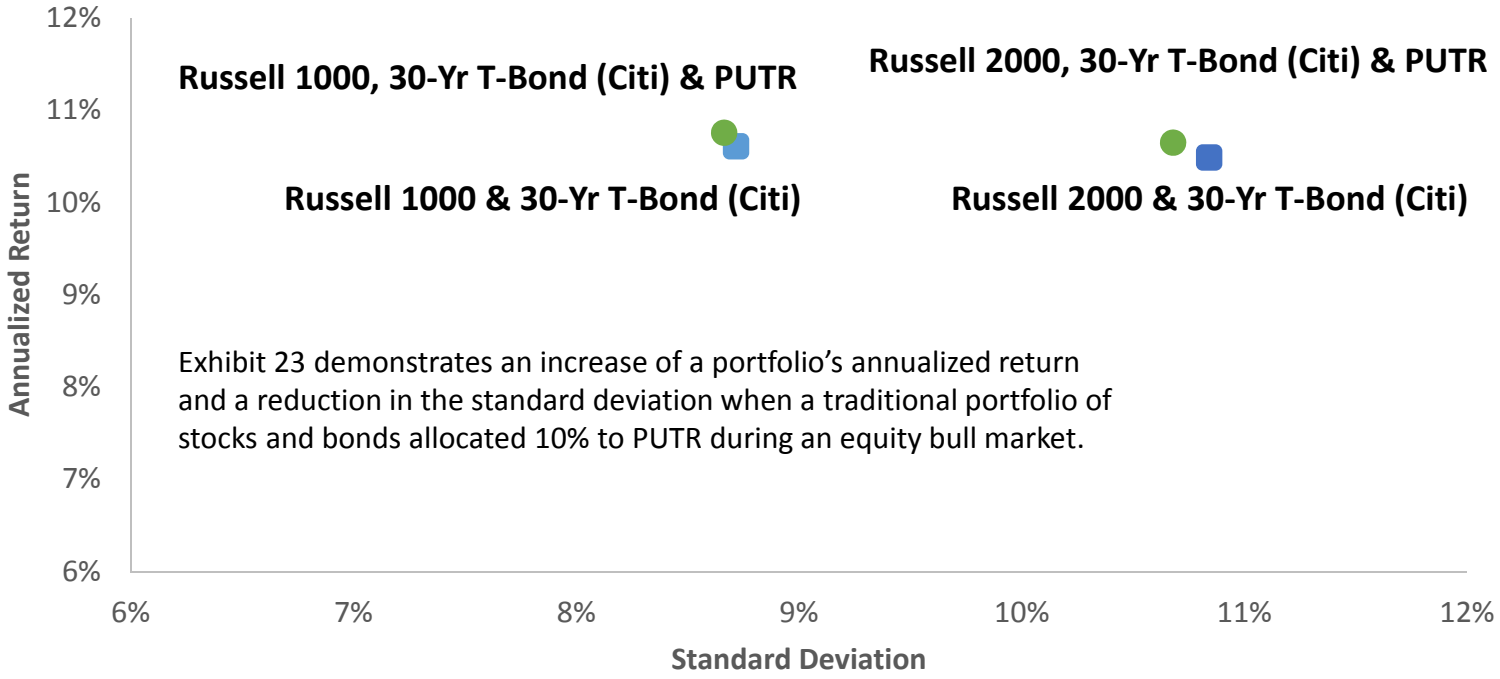
	Russell 1000 & 30-Yr T-Bond (Citi)	With PUTR	Russell 2000 & 30-Yr T-Bond (Citi)	With PUTR
Annualized Return	3.21%	3.52%	6.21%	6.22%
Standard Deviation	9.18%	9.20%	11.52%	11.46%

Annualized Risk and return impact of a traditional 60/40 portfolio allocating 10% to PUTR. All indexes are total return. From Jan 2001 to Dec 2008. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

Please see the last slide for important disclosures.

Exhibit 23: Impact of a 10% Allocation to an Options-Based Index

Jan. 31, 2009 – Dec. 31, 2015 (Bull Market)



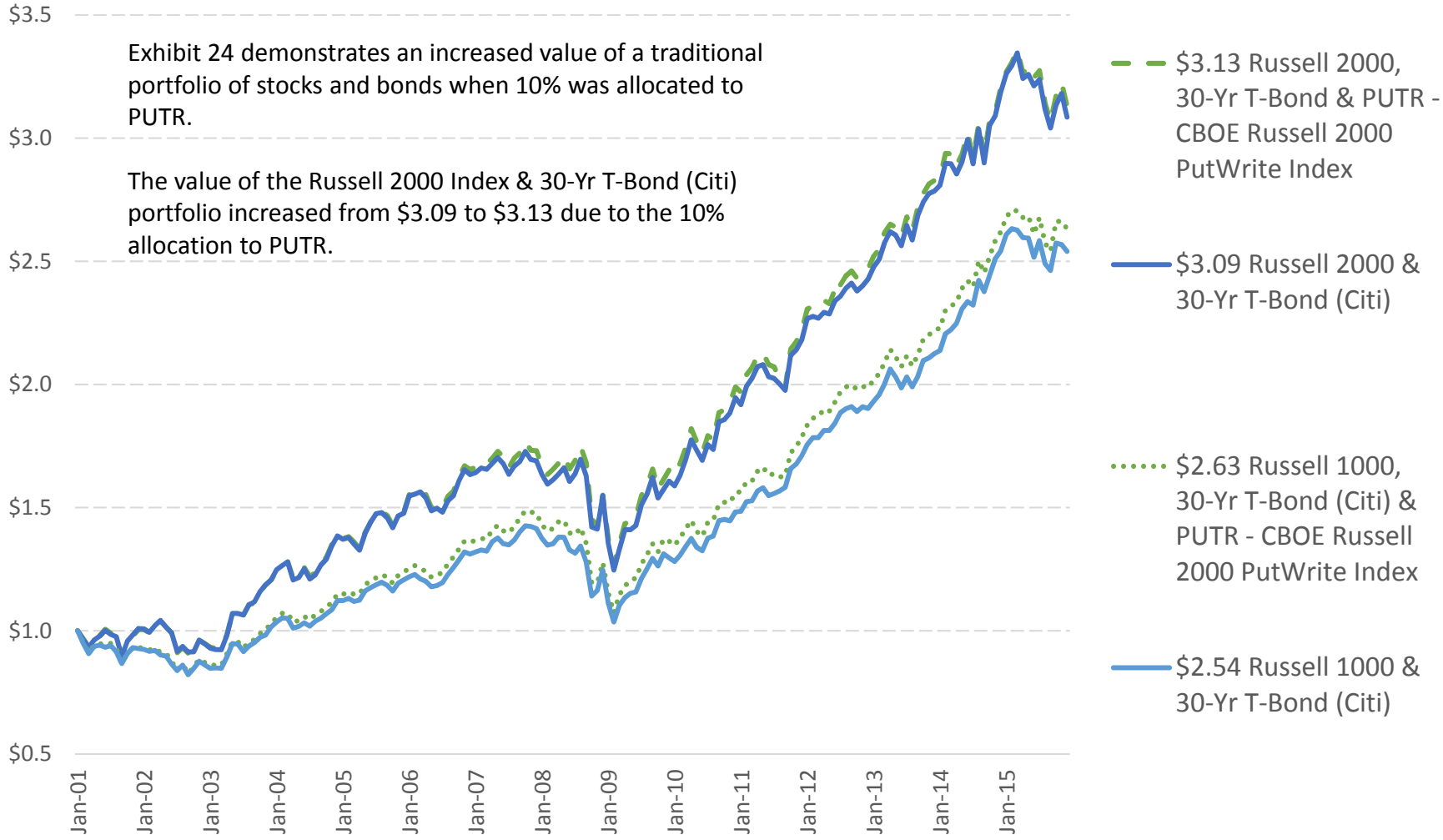
	Russell 1000 & 30-Yr T-Bond (Citi)	With PUTR	Russell 2000 & 30-Yr T-Bond (Citi)	With PUTR
Annualized Return	10.61%	10.75%	10.49%	10.65%
Standard Deviation	8.72%	8.66%	10.84%	10.68%

Annualized Risk and return impact of a traditional 60/40 portfolio allocating 10% to PUTR. All indexes are total return. From Jan 2009 to Dec 2015. Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

Please see the last slide for important disclosures.

Exhibit 24: Impact of a 10% Allocation to an Options-Based Index

(Jan. 31, 2001 – Dec. 31, 2015)



Impact of NAV when a traditional 60/40 portfolio allocates 10% to the PUTR - CBOE Russell 2000 PutWrite Index . Data from Jan 2001 to Dec 2015. Past performance is not predictive of future returns. Sources: Bloomberg , CBOE

Please see the last slide for important disclosures.

Exhibit 25: Impact of Allocating 10% to PUTR Since 2001

(Jan. 31, 2001 – Dec. 31, 2015)

A 10% allocation to PUTR led to a slight improvement in annualized returns, annualized standard deviations, and Sharpe ratios

	Russell 1000 & 30-Yr T-Bond (Citi)	Russell 1000, 30-Yr T-Bond (Citi) & PUTR -CBOE Russell 2000 PutWrite Index	Russell 2000 & 30-Yr T-Bond (Citi)	Russell 2000, 30-Yr T-Bond (Citi) & PUTR - CBOE Russell 2000 PutWrite Index
Annualized Return	6.68%	6.92%	8.21%	8.30%
Avg Monthly Return	0.56%	0.58%	0.68%	0.69%
Monthly Std Dev	2.61%	2.60%	3.24%	3.21%
Annualized Std Dev	9.03%	9.01%	11.22%	11.12%
Max Drawdown	-27.40%	-27.88%	-27.87%	-28.34%
Max Recovery (months)	19.0	19.0	14.0	14.0
Avg Recovery (months)	4.1	3.7	2.7	3.1
Max Monthly Return	7.12%	6.88%	9.64%	9.07%
Min Monthly Return	-10.78%	-11.79%	-12.78%	-13.60%
Avg Positive Months	2.03%	1.99%	2.53%	2.48%
Avg Negative Months	-2.03%	-2.03%	-2.55%	-2.60%
Positive Std Dev	1.43%	1.45%	1.88%	1.82%
Negative Std Dev	2.17%	2.23%	2.53%	2.56%
S-ratio™	0.66	0.65	0.74	0.71
Skewness	-1.02	-1.08	-0.78	-0.87
Kurtosis	3.25	3.66	2.80	2.98
Sharpe Ratio	0.52	0.55	0.55	0.57
Sortino Ratio	0.62	0.64	0.71	0.71

All indexes are total return. Data from Jan 2001 to Dec 2015. The above table offers results of the two traditional portfolios allocating 10% to the PUTR - CBOE Russell 2000 PutWrite Index. Past performance is not predictive of future returns.
Sources: Bloomberg, CBOE

Please see the last slide for important disclosures.

Exhibit 26: Annual Returns of Indexes Since 2002

In all five years when the Russell 2000 declined, the PUTR & CLLR indexes had higher returns than the Russell 2000 Index

	Options-based Benchmarks Indexes										
	BXR	**BXRD**	**PUTR**	**CLLR**	**BXRC**	**WPTR**	**RVX**	**Russell 2000**	**Russell 1000**	**FTSE All-World (GBP)**	**30-Yr T-Bond (Citi)**
2002	-5.9%	-10.1%	-0.1%	-14.7%				-20.5%	-21.7%	-26.6%	16.2%
2003	32.0%	36.6%	23.8%	28.7%				47.3%	29.9%	20.9%	0.8%
2004	15.8%	16.7%	19.0%	10.9%	15.6%		-21.8%	18.3%	11.4%	8.3%	8.7%
2005	5.0%	8.1%	8.3%	7.1%	2.9%		6.4%	4.6%	6.3%	24.9%	8.8%
2006	11.6%	24.8%	19.0%	20.1%	14.8%		-5.3%	18.4%	15.5%	7.2%	-1.1%
2007	5.8%	3.9%	16.1%	-0.5%	5.3%		65.0%	-1.6%	5.8%	10.8%	10.2%
2008	-36.0%	-36.2%	-28.5%	-33.5%	-36.4%		67.7%	-33.8%	-37.6%	-19.4%	41.3%
2009	28.5%	25.4%	34.3%	27.1%	28.7%		-42.6%	27.2%	28.4%	21.2%	-25.9%
2010	7.5%	11.8%	13.8%	15.2%	7.5%		-13.6%	26.9%	16.1%	16.7%	8.7%
2011	6.8%	3.3%	6.1%	1.7%	6.8%	1.5%	30.0%	-4.2%	1.5%	-6.6%	35.4%
2012	9.0%	12.7%	10.4%	12.7%	9.3%	17.7%	-31.3%	16.3%	16.4%	12.0%	2.4%
2013	14.5%	20.6%	12.0%	20.5%	16.4%	13.0%	-19.3%	38.8%	33.1%	21.0%	-15.0%
2014	0.9%	1.5%	3.9%	4.2%	1.5%	-2.9%	29.4%	4.9%	13.2%	11.3%	29.3%
2015	4.6%	1.5%	4.9%	-1.8%	1.7%	-0.9%	-9.1%	-4.4%	0.9%	4.1%	-3.1%

All indexes are total return except for RVX. Data from 2002 to Dec 2015. Data for BXRC, WPTR & the RVX began post 2002. As highlighted in grey, years when the Russell 2000 return was negative or slightly positive, the options-based indexes often outperformed. The WPTR and CLLR indexes are the only options-based indexes to experience a losing year since 2008. The RVX index often experiences opposite annualized returns vs the Russell 2000 index due the negative correlation of the two indexes as the RVX rallies when equities decline (downside volatility). Past performance is not predictive of future returns. Sources: Bloomberg, CBOE

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Links to benchmark indexes and many of the papers above are at www.cboe.com/benchmarks

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