

Highlights of

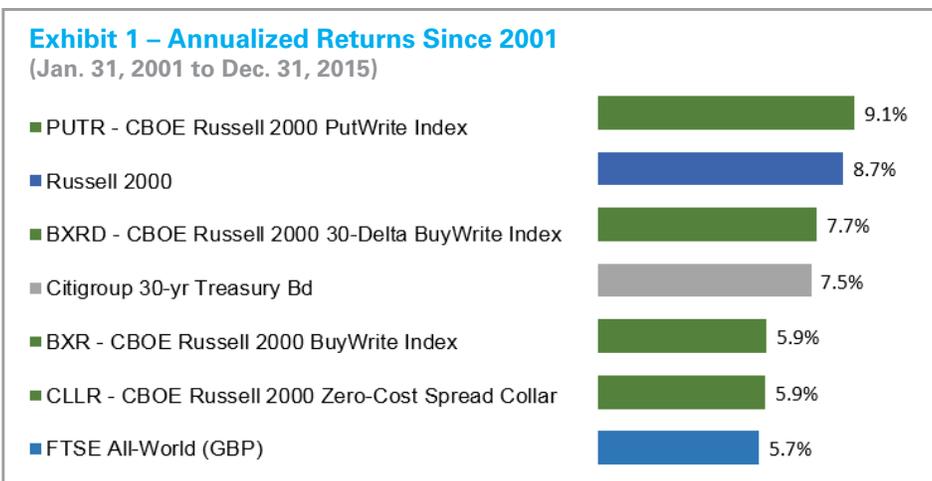
ANALYZING RUSSELL 2000 OPTIONS-BASED BENCHMARK INDEXES DESIGNED TO PROVIDE ENHANCED YIELDS AND RISK-ADJUSTED RETURNS (JANUARY 2016)

By Mark Shore, Adjunct Professor, DePaul University, Chief Research Officer, Shore Capital Research LLC

This paper presents highlights from a 33-page study that examines six benchmark indexes that invest in Russell 2000® Index (RUT) options and compares their performances with those of traditional benchmark stock and bond indexes. This is the first comprehensive study that examines the performance of multiple options-strategy benchmark indexes that incorporate Russell 2000 Index options. The benchmarks studied include the CBOE Russell 2000 BuyWrite Index (BXR); CBOE Russell 2000 Zero-Cost Put Spread Collar Index (CLLR); CBOE Russell 2000 Conditional BuyWrite Index (BXRC); CBOE Russell 2000 30-Delta BuyWrite Index (BXRD); CBOE Russell 2000 PutWrite Index (PUTR); and CBOE Russell 2000 One-Week PutWrite Index (WPTR).

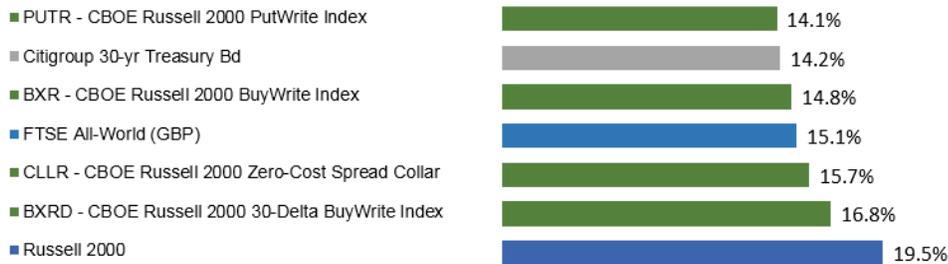
Key findings of the study include:

- **Higher risk-adjusted returns.** Since 2001, the PUTR Index had higher returns, lower volatility and a higher Sharpe Ratio than both the Russell 2000 Index and the Citigroup 30-Year Treasury Bond Index.
- **Lower volatility and betas.** Since 2001, the PUTR, BXR, CLLR and BXRD indexes each had lower annualized standard deviations (ranging from 14% to 20% lower) than the Russell 2000 Index. The options-based indexes also had lower betas (ranging from 0.59 to 0.82) to the Russell 2000 Index.
- **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 indexes (when compared with the CLLR Index).
- **Annual premium income** was higher when writing WeeklysSM options. In 2015, the aggregate gross premium (as a percentage of the underlying) was 41.4% for the WPUT Index, 22.2% for the PUTR Index, 19.5% for the BXR Index, and 9.2% for the BXRD Index. While a one-time premium collected by the WPUT Index (which writes RUT Weeklys options) usually was smaller than a one-time premium collected by the monthly PUTR and BXR indexes, the WPUT Index had higher aggregate annual premiums because premiums were collected 52 times, rather than 12 times, per year.



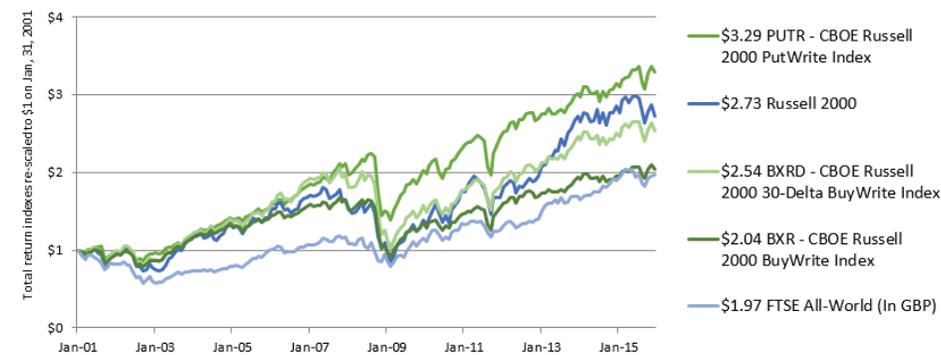
Sources: Bloomberg and CBOE

Exhibit 2 – Annualized Standard Deviations Since 2001
(Jan. 31, 2001 to Dec. 31, 2015)



Sources: Bloomberg and CBOE

Exhibit 3 – Growth in Benchmark Indexes Since 2001
(Jan. 31, 2001 to Dec. 31, 2015)



Sources: Bloomberg and CBOE

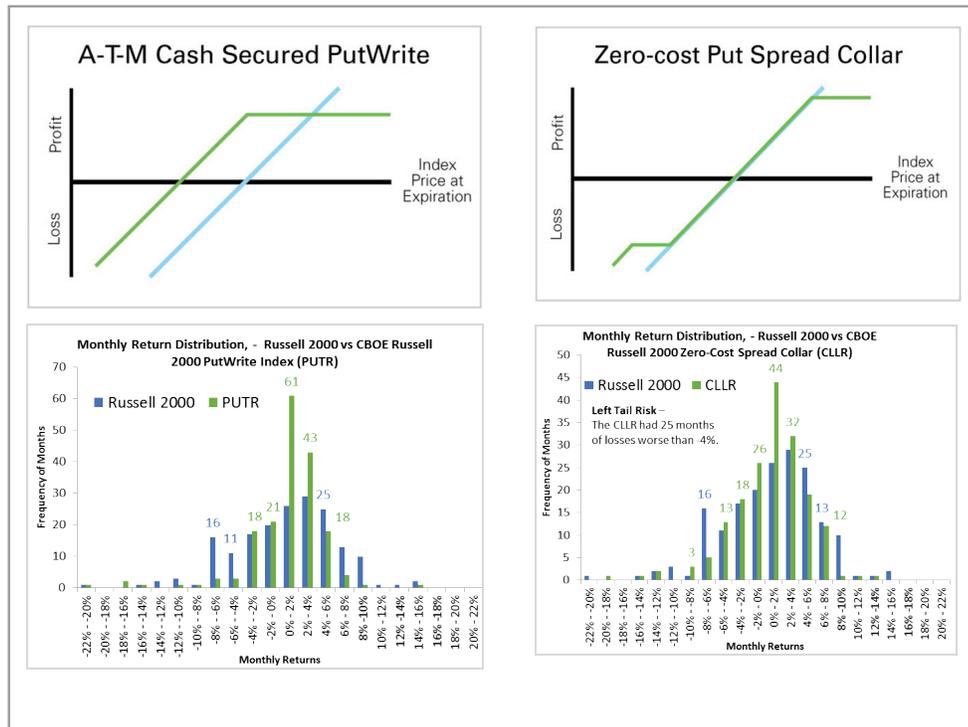
Exhibit 4 – Summary Statistics
(Jan. 31, 2001 to Dec. 31, 2015)

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

	Options-based Benchmark Indexes				Russell 2000	Russell 1000	FTSE All-World	30-Yr T-Bond (Citi)
	CLLR	PUTR	BXRD	BXR				
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%
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

Sources: Bloomberg, CBOE and Federal Reserve

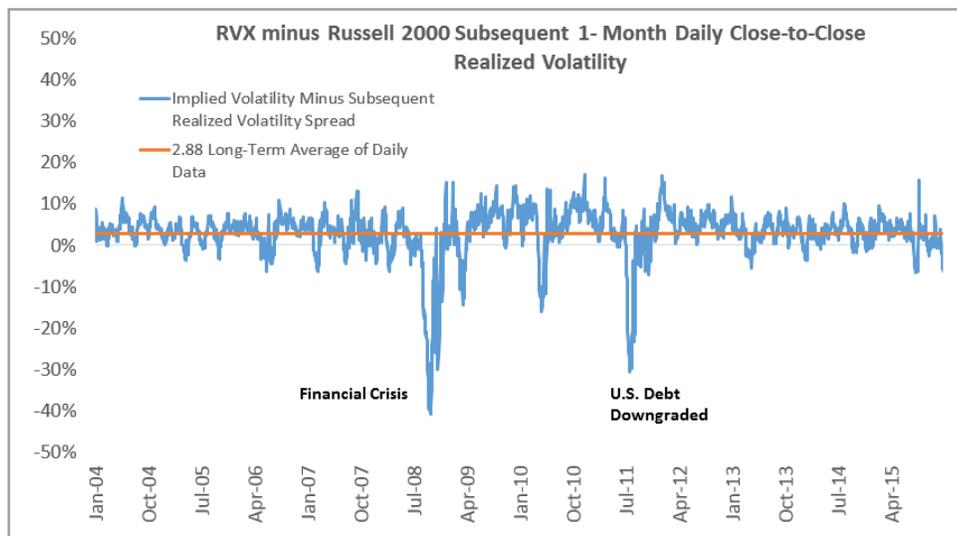
Exhibit 5 - Profit-and-Loss Diagrams and Histograms of Returns
(Jan. 31, 2001 to Dec. 31, 2015)



Sources: Bloomberg and CBOE

Exhibit 6 – Volatility Risk Premium Since 2004

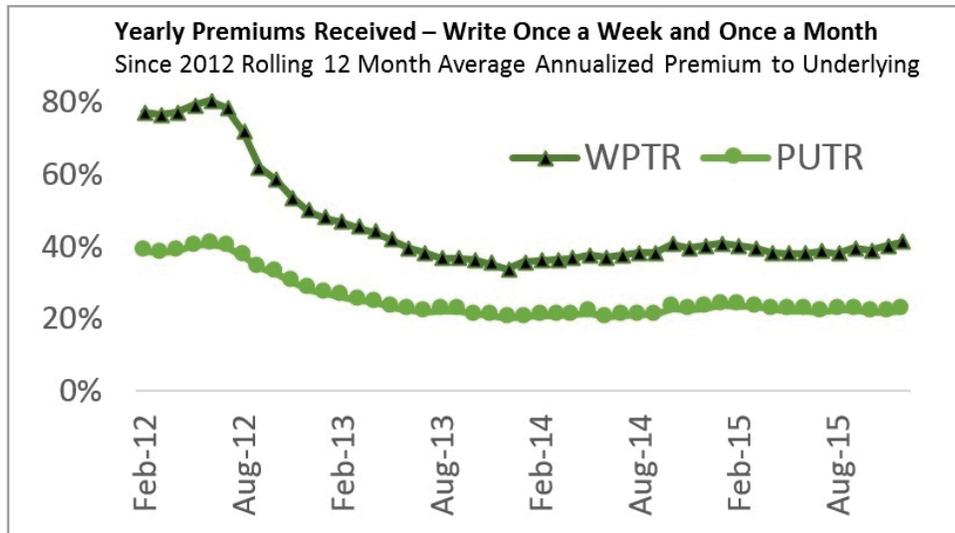
(Jan. 2, 2004 to Dec. 31, 2015) The estimated average difference between RVX Index implied volatility vs. Russell 2000 realized volatility was 2.88 volatility points. Rich pricing of RUT Index options may have facilitated strong risk-adjusted returns for the PUTR Index.



Sources: Bloomberg and CBOE

Exhibit 7 – Gross Premiums Received by WPTR and PUTR Indexes

Annual gross premium income was higher when writing WeeklysSM options. In 2015, the aggregate gross premium (as a percentage of the underlying) was 41.4% for the WPTR Index, 22.2% for the PUTR Index, 19.5% for the BXR Index, and 9.2% for the BXR Index. While a one-time premium collected by the WPUT Index (which writes RUT Weeklys options) usually was smaller than a one-time premium collected by the monthly PUTR and BXR indexes, the WPUT Index had higher aggregate annual premiums because premiums were collected 52 times, rather than 12 times, per year. Please note that the premiums are gross amounts shown as a positive percentage of the underlying index value, and the net returns for option-writing can be negative.



Sources: Bloomberg and CBOE

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