

Highlights from Case Study on BXM Buy-Write Options Strategy

What is a Buy-Write Strategy?

A "Buy-Write" strategy, also known as a "covered call", is an investment strategy where the investor buys a stock or a basket of stocks and writes (or sells) call options that cover the stock position. The advantage of this strategy is that the option premium received cushions downside moves in an equity portfolio. The trade-off, however, is that the upside potential of the investment is truncated as the option is exercised above the strike price. Therefore, the buy-write strategy may be expected to outperform stocks in bear markets and under perform stocks in bull markets. The profit/loss profile of the buy-write strategy can be seen in Exhibit 1.

The BXM Index:

The CBOE S&P 500 BuyWrite Index (BXM) is a benchmark index designed to track the performance of a hypothetical buy-write strategy on the S&P 500 Index. Announced in 2002, the methodology of the BXM Index is based on (1) buying an S&P 500 index portfolio, and (2) writing the near-term S&P 500 "covered" call option, generally on the third Friday of each month. The call is held until it is cash-settled on the 3rd Friday of the following month, at which time a new one-month call option is written.

Exhibit 1 – Profit-and-Loss Diagram for Buy-Write Strategy

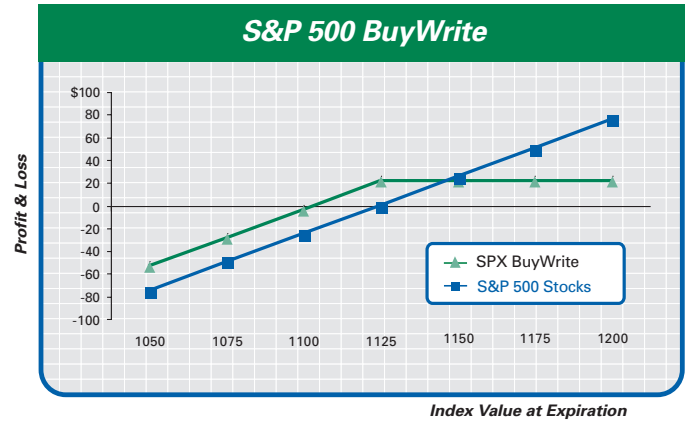


Exhibit 2 – Growth in the Value of \$1 (June 1, 1988 – March 31, 2004)

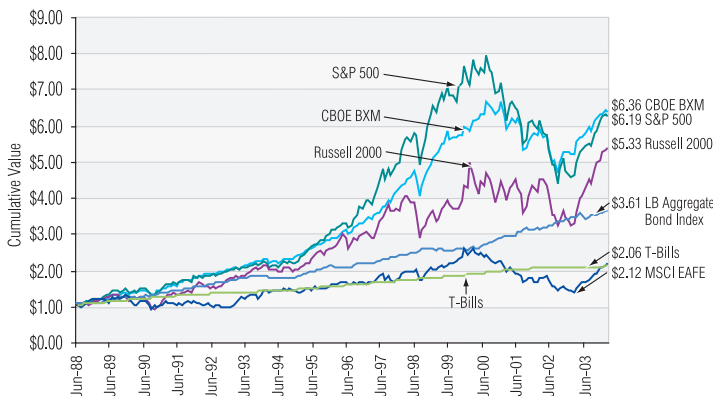


Exhibit 2: The value of a dollar invested on June 1, 1988. Cumulative returns for all asset classes in this study. The cumulative values of the CBOE BXM and the S&P 500 are closely related. As of March 31, 2004 the value of one dollar invested in CBOE BXM was \$6.36 while a dollar invested in the S&P 500 was worth \$6.19.

The Ibbotson Case Study:

Ibbotson Associates conducted a case study of the investment value of the CBOE S&P 500 BuyWrite (BXM) Index from a total portfolio perspective. In light of the fact that the Sharpe Ratio is based on the assumption of a normal distribution, the study used the Stutzer [2000] index and Leland's [1999] alpha to assess risk-adjusted performance, taking into account the skew and kurtosis of the covered call strategy. The study also examined the performance of the Rampart Investment Management investable version of the BXM. Finally, the study compared standard investor portfolios to portfolios with BXM substituted for large cap assets and found significant risk-adjusted performance improvement.

Summary of Results:

The results showed that the BXM Index has had relatively good risk-adjusted returns. The compound annual return of the BXM Index over the almost 16-year history of this study is 12.39 percent, compared to 12.20 percent for the S&P 500. The BXM had about two-thirds the volatility of the S&P 500. Risk-adjusted performance, as measured by the Stutzer index, was 0.22 for the BXM vs. 0.16 for the S&P 500. The study also found that the low tracking error (1.27 percent/yr) of the Rampart investable version of the BXM provides credible evidence of the investability of the BXM Index.

The following exhibits illustrate important aspects of the case study. More information (including the 36-page paper by Ibbotson) is available at the Ibbotson website at www.ibbotson.com and at the CBOE website at www.cboe.com/bxm.

Comparisons of Returns and Standard Deviations

During the 190-month time period studied, the BXM Index had:

- Higher returns and quite a bit lower volatility than the S&P 500, Russell 2000 and MSCI EAFE stock indexes.
- Higher returns and higher volatility than bonds and Treasury bills.
- High risk-adjusted returns as measured by the Stutzer Index, even when taking into account the negative skew. A monthly buy-write strategy takes in premium income and has a truncated monthly upside as the option is exercised above the strike price. Therefore, the buy-write strategy may be expected to outperform stocks in bear markets and underperform stocks in bull markets. The profit/loss profile of the buy-write strategy can be seen in Exhibit 1.

Exhibit 3 – Compound Annualized Returns
(June 1, 1988 – March 31, 2004)

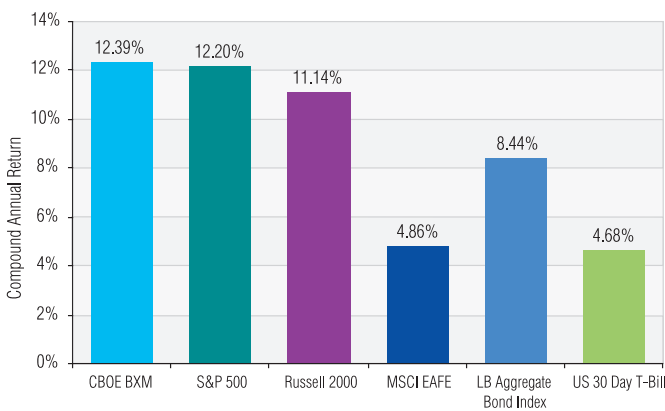


Exhibit 3: Compound annual returns for all asset classes over the period June 1, 1988 to March 31, 2004. Compound annual returns depend only on the beginning and ending values of the indexes and the elapsed time period. The growth rate of 12.39% for the CBOE BXM indicates that one dollar growing at this constant rate would have grown to \$6.36 over the study period.

Exhibit 4 – Annualized Standard Deviations
(June 1, 1988 – March 31, 2004)

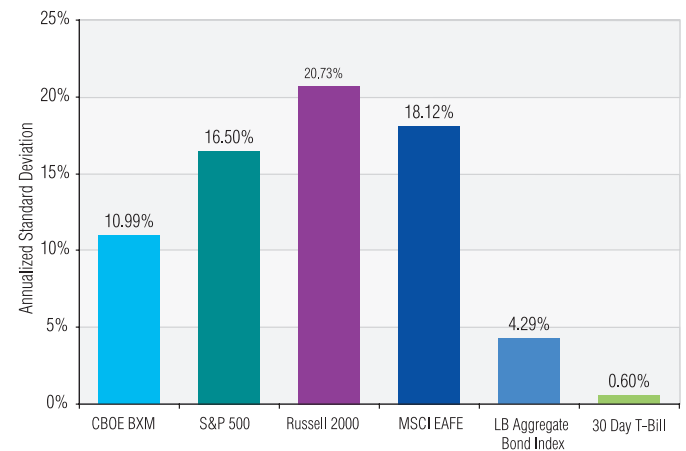


Exhibit 4: Annualized standard deviations for all asset classes over the period June 1, 1988 to March 31, 2004.

Exhibit 5 – Empirical Monthly Return Densities
(June 1, 1988 – March 31, 2004)

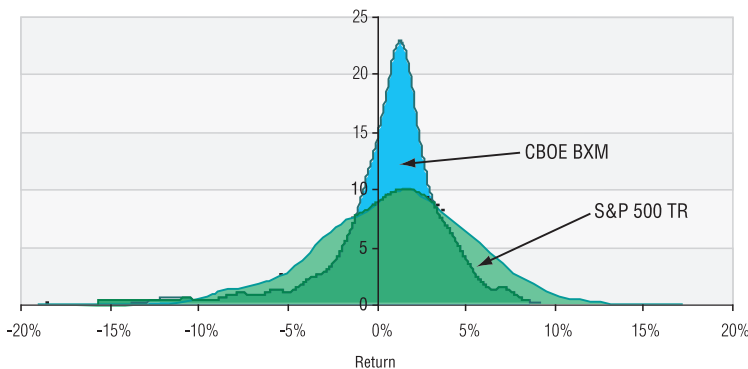


Exhibit 5: Empirical monthly return densities of the S&P 500 and the CBOE BXM over the period from June 1, 1988 to March 31, 2004. The narrower profile of the CBOE BXM return density illustrates its lower volatility. As noted in Exhibit 7, the skew for BXM is -1.249 and for S&P 500 was -0.456.

Exhibit 6 – Risk Adjusted Returns (as measured by the Stutzer index)
(June 1, 1988 – March 31, 2004)

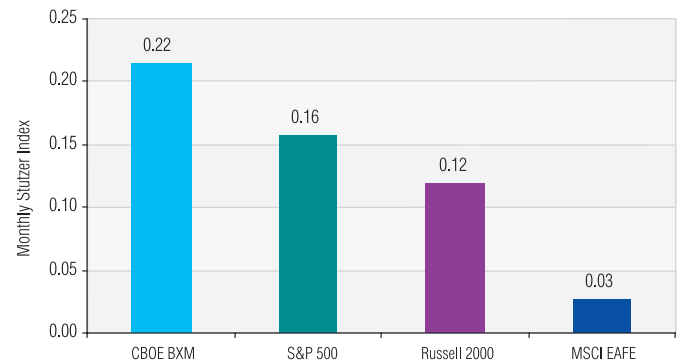


Exhibit 6: Monthly Stutzer index values for equity indexes, data from June 1988 to March 2004. The Stutzer (2000) index is a measure of risk-adjusted returns. It is a generalization of the Sharpe ratio that controls for skew and kurtosis in asset returns. The results indicate that the CBOE BXM has had considerably better risk-adjusted performance than the S&P 500. See Exhibit 7 for corresponding Sharpe ratios.

Summary Table of Statistics

Exhibit 7 – Summary Statistics for BXM and Other Investments
(June 1, 1988 – March 31, 2004)

Statistic	CBOE BXM	S&P 500	Russell 2000	MSCI EAFE	LB Aggregate Bond Index	30 Day T-Bill
Monthly Arithmetic Mean	1.02%	1.05%	1.03%	0.52%	0.68%	0.38%
Monthly Compound Rate of Return	0.98%	0.96%	0.88%	0.40%	0.68%	0.38%
Monthly Standard Deviation	2.83%	4.22%	5.31%	4.91%	1.15%	0.17%
Excess Return	0.64%	0.67%	0.64%	0.13%	0.30%	--
Monthly Sharpe ratio	0.225	0.1592	0.1210	0.0273	0.266	--
Monthly Stutzer index	0.216	0.1577	0.1201	0.0273	0.263	--
Autocorrelation	-0.012	-0.046	0.125	-0.045	0.151	0.961
Skew	-1.249	-0.456	-0.530	-0.111	-0.361	-0.050
Excess Kurtosis	3.963	0.609	1.047	0.321	0.356	-0.462
Annualized Arithmetic Mean	12.93%	13.40%	13.04%	6.38%	8.53%	4.68%
Annualized Compound Rate of Return	12.39%	12.20%	11.14%	4.86%	8.45%	4.68%
Ann. Standard Deviation	10.99%	16.50%	20.73%	18.12%	4.29%	0.60%
Annualized Sharpe Ratio	0.752	0.529	0.402	0.093	0.907	--

Exhibit 7: Summary statistics for BXM and selected asset classes, monthly data, June 1, 1988 to March 31, 2004. The Stutzer ratio is a measure of risk-adjusted returns controls for non-normality. It is equal to the Sharpe ratio for a normally distributed asset.

Sources of Returns

Selling index options 12 times a year can produce significant income. Over the 190-month period studied, the S&P 500 options were found to have an average implied volatility of 16.5% and a realized volatility of 14.9%. The average monthly premium was 1.69% of the underlying value.

Exhibit 8 – BXM Call Premiums as a Percentage of the Underlying Value
(June 1, 1988 – March 31, 2004)

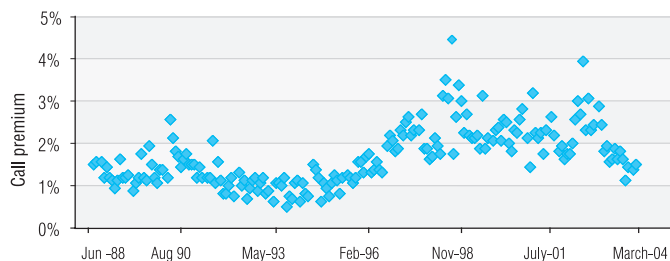


Exhibit 8: CBOE BXM call premiums earned as a percentage of underlying value, June 1988 to March 2004. The average monthly premium is 1.69%, an annualized rate of 22.31%.

Adding BXM to a Portfolio

The study also examines the impact of adding BXM to a standard portfolio.

Exhibit 9 – Expansion of the Mean-Variance Efficient Frontier when BXM is Added to the Asset Mix of Large Cap Stocks, Small Cap Stocks, International Stocks, Bonds, and Cash
(June 1, 1988 – March 31, 2004)

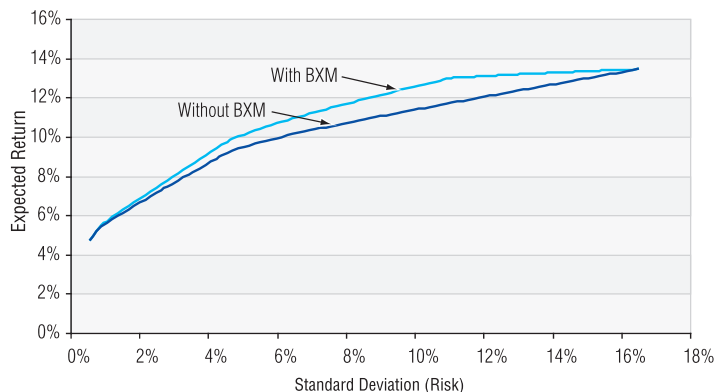


Exhibit 9: Expansion of the mean-variance efficient frontier when BXM is added to the asset mix. Monthly rebalance June 1988 to March 2004. Note that skew and kurtosis in assets is not taken into account in mean-variance analysis.

Exhibit 10 - Impact of adding 15% Rampart/BXM to a baseline portfolio of 95% equity and 5% fixed income.

Statistic	Baseline	15% Covered Call	
		Rampart	BXM
Monthly Mean	2.20%	2.12%	2.12%
Monthly Standard Deviation	3.15%	2.99%	2.99%
Excess Return	2.12%	2.04%	2.04%
Monthly Sharpe ratio	0.672	0.684	0.681
Monthly Stutzer index	0.741	0.760	0.757
Autocorrelation	0.234	0.209	0.200
Skew	0.438	0.501	0.501
Excess Kurtosis	-0.172	-0.021	-0.023
Annualized Mean	29.87%	28.70%	28.66%
Ann. Standard Deviation	13.91%	13.06%	13.10%
Annualized Sharpe ratio	2.075	2.119	2.111

Exhibit 10: Ibbotson Associates aggressive portfolio and with 15% of CBOE or Rampart BXM substituted for large cap. Monthly rebalance January 2003 to March 2004. Please visit www.ibbotson.com to see the full 35-page study with more analysis.

Rampart BXM – Evidence of Investability

In 2003 Rampart Investment Management Company became the first money management firm licensed to offer investment products based on the BXM Index. We also did a case study of the first 15 months of the performance of the Rampart BXM. Although there might be some capacity issues in the future if and when more assets begin to track the BXM Index, the tracking error of the Rampart BXM (1.27 percent per year) and the performance of the Rampart BXM offers evidence to suggest that the BXM Index could be an investable index that should be considered by investors.

Exhibit 11 – Supplementary Statistics for CBOE BXM, Rampart BXM and Other Investments
(Various Periods Through March 31, 2004)

Statistic	CBOE BXM	CBOE BXM (Short hist.)	Rampart BXM	S&P 500	Russell 2000	MSCI EAFE	LB Aggregate Bond Index
Treynor Ratio (%)	14.10	25.02	26.41	8.72	9.02	2.32	79.00
Jensen's Alpha (%)	2.93	1.22	1.95	0.00	0.27	-4.26	3.23
TStatistic of Jensen's Alpha	2.41	0.27	0.42	0.00	0.09	-1.25	3.28
M-Squared (%)	17.20	22.77	23.72	13.40	11.28	6.14	19.46
Beta	0.59	0.64	0.62	1.00	0.92	0.72	0.05
Semi Std. Dev.	7.79	4.54	4.56	10.90	13.84	12.26	2.94
Sortino Ratio	1.56	6.43	6.44	1.15	0.85	0.33	2.81
Number of months	190	15	15	190	190	190	190

Exhibit 11: Supplementary annualized performance statistics. Rampart performance is reported, note there is only 15 months of history. CBOE BXM performance is reported for both entire history and Rampart sub history.

Exhibit 12 – Supplementary Statistics for CBOE BXM, Rampart BXM, and Other Investments
(January 1, 2003 Through March 31, 2004)

Statistic	Rampart BXM	CBOE BXM	S&P 500	Russell 2000	MSCI EAFE	LB Aggregate Bond Index	30 Day T-Bill
Monthly Arithmetic Mean	1.34%	1.32%	1.85%	3.11%	2.59%	0.45%	0.08%
Monthly Compound Rate of Return	1.31%	1.30%	1.81%	3.03%	2.52%	0.44%	0.08%
Monthly Standard Deviation	2.25%	2.31%	3.07%	4.25%	3.80%	1.37%	0.01%
Excess Return	1.25%	1.24%	1.77%	3.03%	2.50%	0.37%	---
Monthly Sharpe ratio	0.556	0.535	0.577	0.712	0.658	0.271	---
Monthly Stutzer ratio	0.645	0.628	0.641	0.784	0.698	0.266	---
Autocorrelation	-0.19	-0.22	0.12	0.19	0.23	-0.06	0.46
Skew	1.11	1.21	0.58	0.32	0.16	-1.42	0.01
Excess Kurtosis	1.79	1.80	-0.21	-0.68	-0.07	3.92	-1.51
Annualized Arithmetic Mean	17.26%	17.05%	24.63%	44.43%	35.87%	5.57%	1.00%
Annualized Compound Rate of Return	16.95%	16.71%	24.02%	43.08%	34.84%	5.46%	0.99%
Ann. Standard Deviation	9.04%	9.27%	13.04%	20.72%	17.52%	4.97%	0.05%
Annualized Sharpe ratio	1.797	1.730	1.812	2.094	1.990	0.921	---

Exhibit 12: Summary statistics for Rampart BXM, CBOE BXM and selected asset classes, monthly data, January 1, 2003 to March 31, 2004.

Exhibit 13 – Month-by-Month Performance for CBOE BXM and Rampart BXM
(January 1, 2003 Through March 31, 2004)

	Rampart BXM	CBOE BXM
Jan-03	-0.40%	-0.52%
Feb-03	-0.77%	-0.80%
Mar-03	-0.18%	0.03%
Apr-03	7.07%	7.18%
May-03	2.26%	1.70%
Jun-03	-0.66%	-0.43%
Jul-03	2.36%	2.47%
Aug-03	2.96%	2.87%
Sep-03	-1.86%	-1.87%
Oct-03	4.11%	4.63%
Nov-03	1.43%	1.21%
Dec-03	1.16%	1.72%
Jan-04	1.33%	0.44%
Feb-04	1.32%	1.33%
Mar-04	-0.09%	-0.14%

Exhibit 13: Rampart BXM and CBOE BXM returns January 2003 to March 2004.

Ibbotson Associates, founded by Professor Roger Ibbotson in 1977, is a leading authority on asset allocation, providing products and services to help investment professionals obtain, manage and retain assets. The Chicago Board Options Exchange® (CBOE®) provided financial support for this paper. The CBOE S&P 500 BuyWrite Index (BXMSM) is designed to represent a proposed hypothetical buy-write strategy. Like many passive indexes, the BXM Index does not take into account significant factors such as transaction costs and taxes. Investors attempting to replicate the BXM Index should discuss with their brokers possible timing and liquidity issues. Past performance does not guarantee future results. Standard & Poor's®, S&P®, and S&P 500® are registered trademarks of The McGraw-Hill Companies, Inc. and are licensed for use by the CBOE. CBOE and Chicago Board Options Exchange are registered trademarks of the CBOE, and BXMSM is a servicemark of the CBOE. CBOE calculates and disseminates the BXM Index. The methodology of the BXM Index is owned by CBOE and may be covered by one or more patents or pending patent applications.