

Capstone Investment Advisors, LLC

# An Overview of Options Strategies

September 2016

## INTRODUCTION

Institutional and retail investors have traditionally used options and derivatives for risk management purposes. In more recent years, however, investors have started to use derivatives for return enhancement, recognizing that option- and derivatives-based strategies can improve the long term returns of a portfolio, provide an alternative means to source beta and add alpha to a portfolio.

This piece provides background on three of the more prevalent and common investment strategies amongst institutional investors:

- I. Call overwriting
- II. Put underwriting
- III. Volatility selling

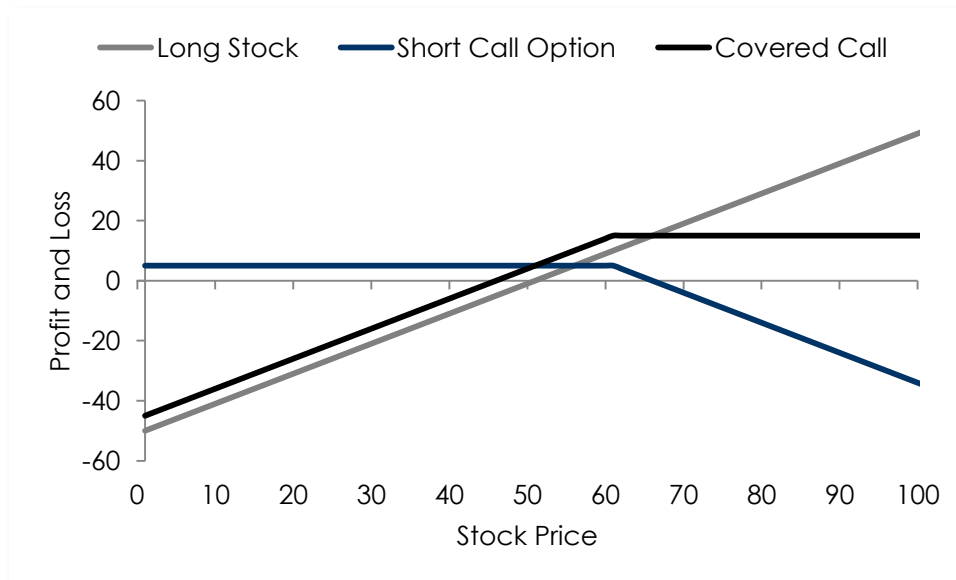
For each strategy, we discuss the investment rationale, list the potential benefits and risks, and summarize the hypothetical performance of relevant benchmarks.

To round out the discussion, we also provide an introduction to Capstone's Equity Replacement strategy, which combines elements of put underwriting and volatility selling and takes advantage of the investment opportunities created by call overwriting.

## CALL OVERWRITING

Call overwriting is perhaps the most widely used options-based strategy amongst institutional investors. It involves selling a call option on a stock that an investor currently owns where the strike price of the call option is typically higher than the current price of the stock. The combined position is often referred to as a covered call. The following chart compares the hypothetical profit and loss of a covered call position versus a long position in the stock on the option expiration date. It assumes that the strike is \$10 above the current stock price of \$50 and the option premium is \$5.

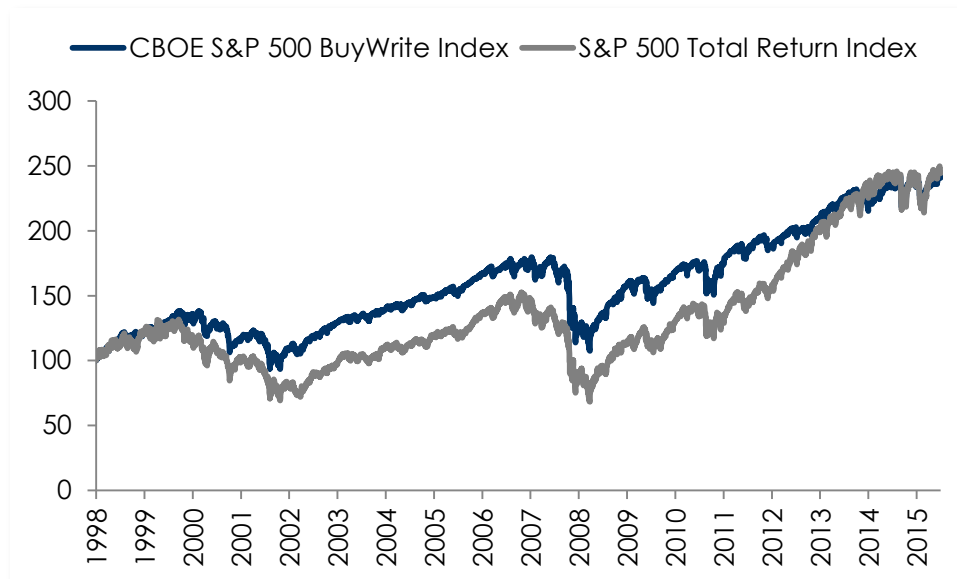
CHART 1: HYPOTHETICAL PROFIT AND LOSS OF COVERED CALL VERSUS LONG STOCK AT EXPIRATION



In a covered call position an investor caps his or her upside exposure to a stock in exchange for a premium from selling the call option. Most institutional investors employ call overwriting to reduce the risk of a long stock position, because the premium from selling a call option can offset losses stemming from a decrease in the stock price. The primary risk with call overwriting is that investors' portfolios could significantly underperform in a bull market such as in 2013.

The CBOE publishes an index called the CBOE S&P 500 BuyWrite Index, which tracks the hypothetical performance of a simple call overwriting strategy on the S&P 500 Index. While the cumulative return for the index is lower than the S&P 500 Index, its volatility is significantly lower; therefore, it has a higher Sharpe Ratio. The following chart compares the hypothetical performance of the BuyWrite Index to the S&P 500 Total Return Index.

CHART 2: HYPOTHETICAL PERFORMANCE OF CBOE S&P 500 BUYWRITE INDEX AND S&P 500 TOTAL RETURN INDEX



	CBOE S&P 500 BuyWrite Index	S&P 500 Total Return Index
<b>Annual Return</b>	5.2%	5.3%
<b>Standard Deviation</b>	14.0%	19.9%
<b>Sharpe Ratio (rf=0)</b>	0.37	0.27
<b>Max Drawdown</b>	-40.1%	-55.3%
<b>Correlation to S&amp;P TR 500</b>	0.92	1.00

\* Period is from December 17, 1998 to June 16, 2016. See <http://www.cboe.com/micro/bxm/bxmdescription-methodology.pdf> for a more detailed description of the CBOE S&P 500 BuyWrite Index.

Source: Bloomberg

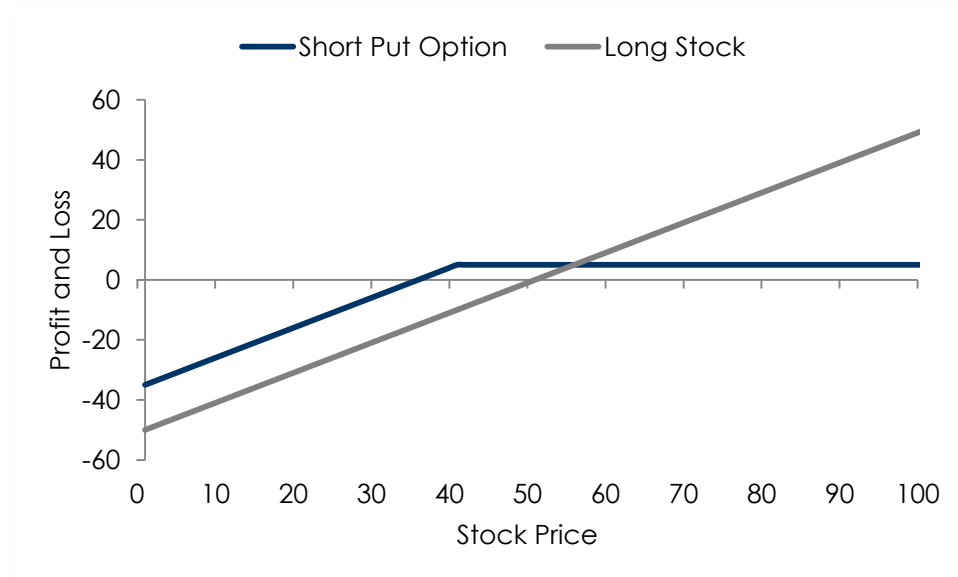
Because of the current low yield environment, many investors use call overwriting to generate additional income. The strategy has become so commonplace amongst institutional investors, that many public pensions, such as the \$187.4 billion California State Teachers' Retirement System<sup>1</sup>, have incorporated call overwriting strategies into their portfolios. There are also numerous mutual funds and exchange traded funds that employ a call overwriting strategy. Capstone believes that the growth of call overwriting has artificially depressed the price for call options, which presents an opportunity for investors, which is later discussed in section on Capstone's Equity Replacement strategy.

<sup>1</sup> <http://www.pionline.com/article/20150325/ONLINE/150329930/calstrs-taps-parametric-for-100-million-overlay-strategy>

## PUT UNDERWRITING

Whereas call overwriting is the most prevalent strategy amongst institutional investors, put underwriting is perhaps garnering the most interest recently. Put underwriting, which is often categorized as a “Smart Beta” strategy, involves selling a put option in order to synthetically gain long exposure to the underlying stock. Being short a put option is akin to being long a stock, because both positions are profitable if the stock price rises and vice versa. As such the main risk to the strategy is if the price of the underlying stock falls, but unlike with a long stock position, the premium from selling the put option can offset some of the loss. Also, similar to a covered call position, a short put position could significantly underperform in a bull market. The following chart illustrates the hypothetical payout profile of a short put option position versus a long position in a stock. It assumes that the strike is \$10 below the current stock price of \$50 and the option premium is \$5.

CHART 3: HYPOTHETICAL PROFIT AND LOSS OF SHORT PUT VERSUS LONG STOCK AT EXPIRATION

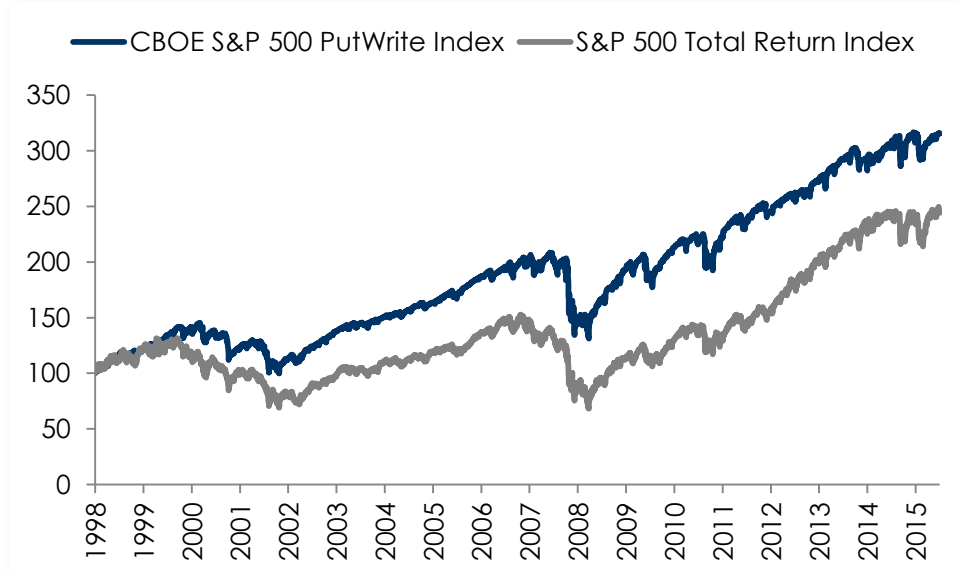


Put underwriting strategies have become increasingly popular as the price of put options have increased due to supply/demand imbalances caused by the recent banking regulations. The net effect of Dodd Frank, the Volcker Rule, Basell III, etc. has been to simultaneously decrease the supply of and increase the demand for put options, thereby pushing up the price for puts. It presents an opportunity for investors looking for an alternative approach to source equity beta, and some public pension funds have recently allocated assets to put underwriting strategies. Two recent examples include the \$28.2 billion South Carolina Retirement Systems and \$14.1 billion Hawaii Employees’ Retirement System<sup>2</sup>. Together they have committed to allocating \$3.2 billion to put underwriting strategies.

The CBOE publishes an index called the CBOE S&P 500 PutWrite Index which tracks the hypothetical performance of a simple put underwriting strategy on the S&P 500. The index not only has outperformed the S&P 500 Total Return Index but also has experienced a lower volatility. The following chart compares the hypothetical performance of the PutWrite Index to the S&P 500 Total Return Index.

<sup>2</sup> <http://www.pionline.com/article/20160421/ONLINE/160429958/south-carolina-allocates-nearly-19-billion-to-equity-options-infrastructure-strategies> and <http://www.pionline.com/article/20160321/ONLINE/160329984/hawaii-assigns-16-billion-total-to-4-managers-for-options-based-strategies>

CHART 4: HYPOTHETICAL PERFORMANCE OF CBOE S&P 500 PUTWRITE INDEX AND S&P 500 TOTAL RETURN INDEX



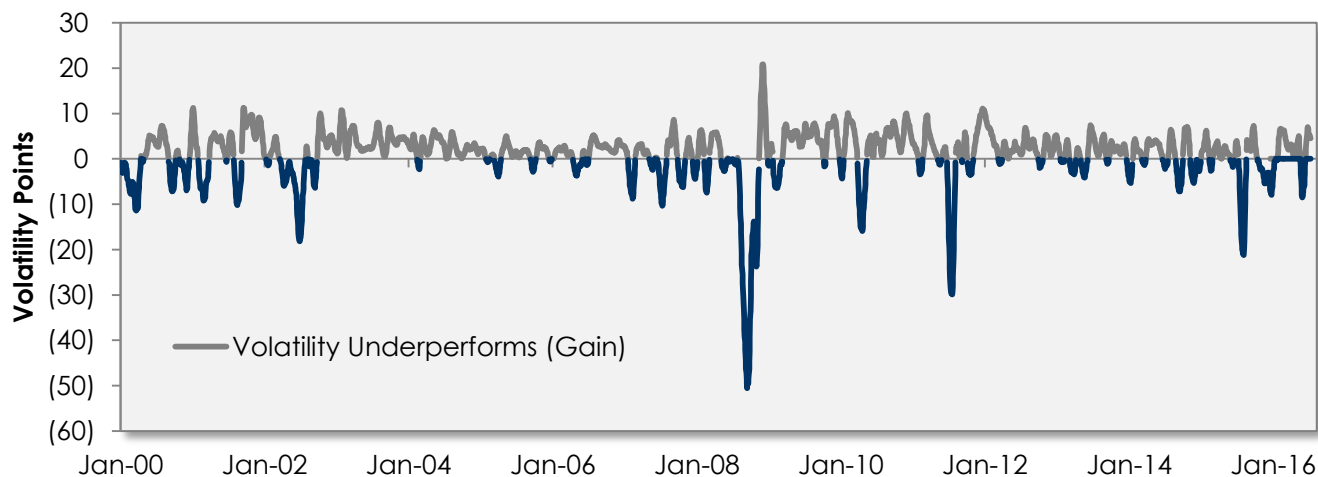
	<b>CBOE S&amp;P 500 PutWrite Index</b>	<b>S&amp;P 500 Total Return Index</b>
<b>Annual Return</b>	6.8%	5.3%
<b>Standard Deviation</b>	13.2%	19.9%
<b>Sharpe Ratio (rf=0)</b>	0.51	0.27
<b>Max Drawdown</b>	-37.1%	-55.3%
<b>Correlation to S&amp;P 500 TR</b>	0.89	1.00

\* Period is from December 17, 1998 to June 16, 2016. See <http://www.cboe.com/micro/put/putwritemethodology.pdf> for a more detailed description of the CBOE S&P 500 PutWrite Index.  
Source: Bloomberg

## VOLATILITY SELLING

Volatility selling, or volatility harvesting, is arguably the most complex of the three strategies to implement. The strategy seeks to capture the spread between implied and realized volatility of a stock. Implied volatility is the price of volatility embedded in an option, whereas realized volatility is the actual volatility experienced by the stock. There have been numerous academic studies that show investors typically overpay for volatility, and as a result, over the long run the spread between implied and realized volatility is positive.

CHART 5: SPREAD BETWEEN ONE-MONTH IMPLIED AND REALIZED VOLATILITY ON THE S&P 500 INDEX

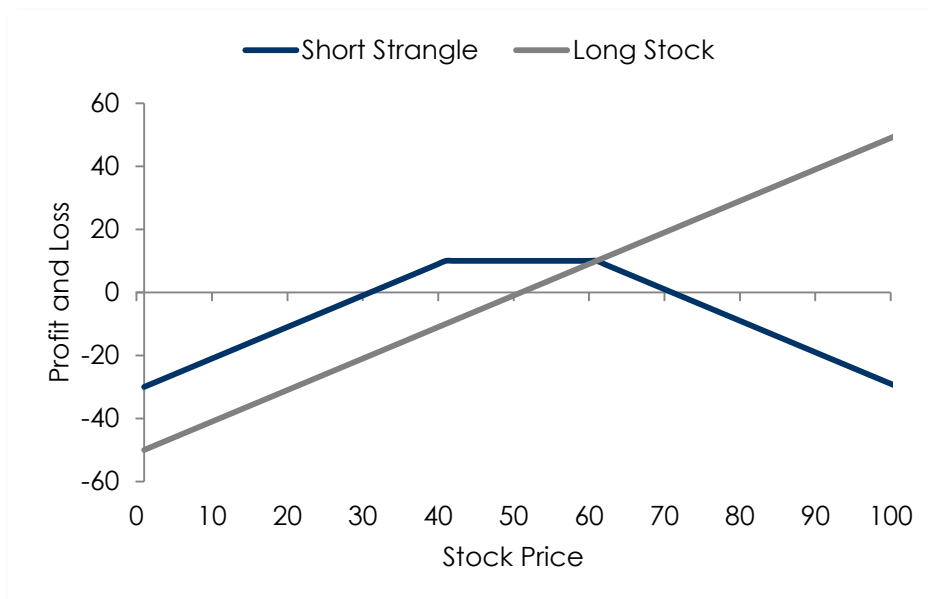


Spread of Implied Versus Realized Volatility		
	% of Days	Median
<b>Total</b>		2.05
<b>% Positive Spread</b>	69%	3.35
<b>% Negative Spread</b>	31%	-3.03

Source: Capstone

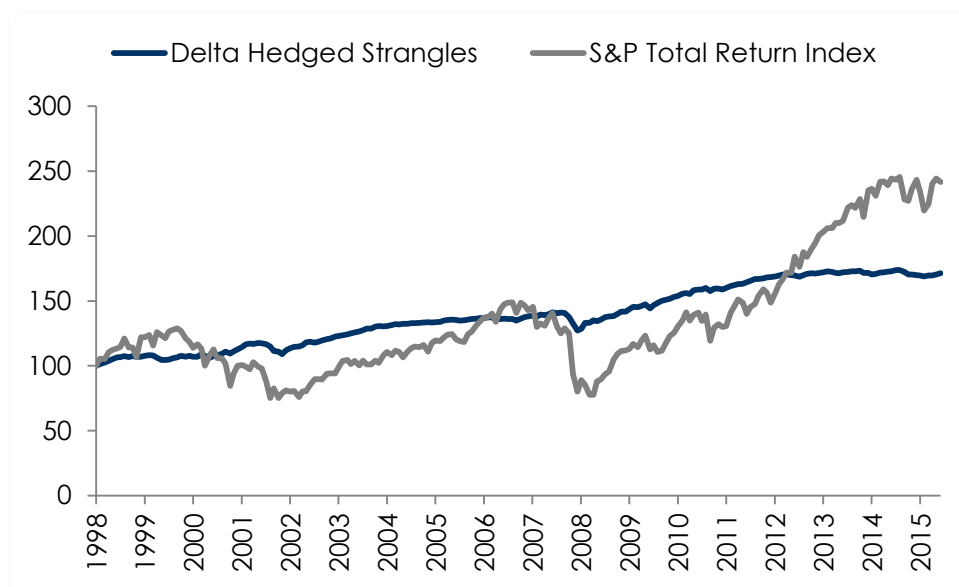
The typical trade involves selling a strangle (selling a call and put option with different strikes) and trading the underlying stock to hedge the option's exposure to fluctuations in the stock's price, a process known as delta hedging. Since volatility tends to increase when a stock falls, being short volatility is similar to being long a stock. The main risk to the strategy is that realized volatility can increase, sometimes significantly, in a bear market. The following chart illustrates the hypothetical payout profile of an unhedged short strangle position versus a long position in the stock. It assumes that the strikes for the strangle are \$10 above (for the call leg) and \$10 below (for the put leg) the current stock price of \$50. The option premium for strangle is \$10.

CHART 6: HYPOTHETICAL PROFIT AND LOSS OF SHORT STRANGLE VERSUS LONG STOCK AT EXPIRATION



Compared to call overwriting and put underwriting, volatility selling is less correlated and less risky than a long position in a stock; therefore, it is more of an alpha generating strategy. The following chart compares the hypothetical performance of an unlevered volatility selling strategy on the S&P 500 index implemented through delta-hedged strangles to the S&P 500 Total Return Index. The strikes of the strangles are approximately 97.5 for the put and 102.5 for the call (as a percentage of the spot price), and the expiration date is one month. The strategy uses exchange traded options.

CHART 7: HYPOTHETICAL PERFORMANCE OF DELTA HEDGED STRANGLES OF THE S&P 500 INDEX AND S&P 500 TOTAL RETURN INDEX



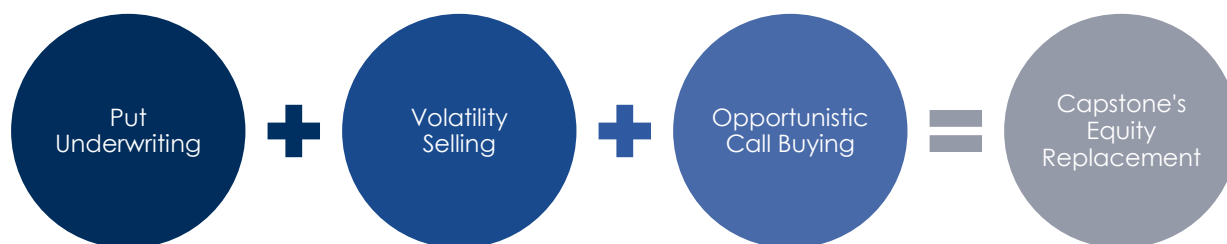
	Delta Hedged Strangles	S&P 500 Total Return Index
<b>Annual Return</b>	3.1%	5.2%
<b>Standard Deviation</b>	3.2%	17.8%
<b>Sharpe Ratio (rf=0)</b>	0.99	0.29
<b>Max Drawdown</b>	-10.0%	-47.9%
<b>Correlation to S&amp;P 500 TR</b>	0.38	1.00

\* Period is from December 17, 1998 to May 20, 2016. Results are shown gross of fees. Back tested performance does not represent the results of actual trading using client assets but were achieved by means of the retroactive application of a model. The hypothetical performance presented was compiled after the end of the period depicted and does not represent the actual investment decisions of Capstone Investment Advisors, LLC. Hypothetical performance results have many inherent limitations. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown.

Source: Bloomberg, Capstone

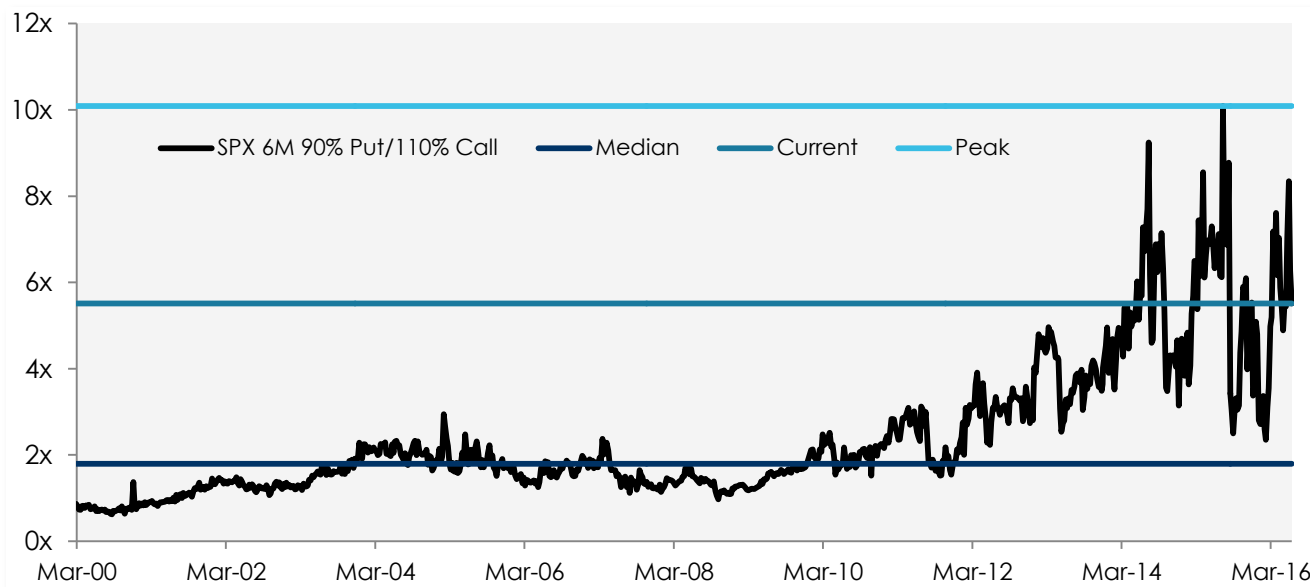
## CAPSTONE'S APPROACH TO EQUITY REPLACEMENT

The goal of Capstone's Equity Replacement strategy is to provide long equity-like exposure by combining elements of the three strategies discussed. In very simple terms it is a combination of put underwriting, volatility selling and opportunistic call buying. Each strategy is actively managed through trade selection and portfolio construction in order to outperform the passive versions of the strategies. The result is a diversified investment strategy whose hypothetical return and risk is better than a cash investment in equities.



Capstone believes that the current market environment is particularly favorable for its Equity Replacement strategy. Recent regulations have simultaneously diminished the supply of put options while increasing investor demand, which has increased the price for puts. At the other end of the spectrum, there has been an increase in the supply of call options from institutional investors who have implemented call overwriting programs to generate additional income in the current low yield environment. This has decreased the price of calls. One way to better understand the recent impact of banking regulations and call overwriting is by looking at the relative prices of out-of-the-money put and call options. The following chart shows the ratio of the prices of a 6-month 90% put option and a 6-month 110% call option on the S&P 500 Index. Before 2010 the ratio averaged around 2x. Since then it has spiked. At one point the put was 10x more expensive than the call, and the current ratio is approximately 6x.

CHART 8: RATIO OF THE PRICES OF 6-MONTH 90% PUTS AND 110% CALLS ON THE S&P 500 INDEX



Source: Capstone

By taking the other side of these supply/demand imbalances and adding a volatility selling program to take advantage of the persistent spread between implied and realized volatility, Capstone's Equity Replacement seeks to offer an alternative means for sourcing equity beta with potentially higher returns and lower downside risk.

## CONCLUSION

More institutional investors are beginning to understand the potential benefits of including options and derivatives-based strategies in their portfolios. They see the value that can be added by not only using options for risk mitigation, but also for return enhancement. This piece outlined three of the more prevalent strategies amongst institutional investors: call overwriting, put underwriting and volatility selling. Capstone's Equity Replacement looks to combine elements of put underwriting and volatility selling and take advantage of the investment opportunities created by call overwriting to create a diversified investment strategy. It offers an alternative means for sourcing equity beta to institutional investors and can be potentially used as a substitute to cash investment in equities.



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