The Cash-secured PutWrite Strategy and Performance of Related Benchmark Indexes

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Over the past decade, many investors have become less concerned about positioning themselves to take advantage of the next bull market in equities and more concerned about finding ways to reduce the volatility of their portfolios and increase risk-adjusted return. This is due to the turbulence experienced by major stock indexes from the subprime mortgage and credit crises and the earlier bursting of the dot-com bubble. It is also due to a return to more realistic expectations for returns from equity investments and more sophisticated ways of garnering these returns such as Portable Alpha and Liability Driven Investment programs. Some of the more popular and successful strategies for increasing the risk-adjusted returns of portfolios have involved systematically selling index options. This is because historically, index options often have been richly priced, and option sellers rather than buyers have been rewarded. Since 1990 the average future volatility implied by the prices of S&P 500 Index options has generally been greater than the average subsequent actual volatility of the index. A rich body of literature exists focusing on the mispricing of index options. Rubinstein [1994] and Jackwerth [2000] find that out-of-the-money puts are systematically overpriced. This rich pricing has been explained in a variety of manners. Garleanu, Pedersen, and Poteshman [2006] attribute it to excess demand for protective puts. In contrast, Bakshi and Kapadia [2003] explain option overpricing by a negative volatility risk premium. Still others find that observed option prices are consistent with jump risk premiums and/or stochastic volatility models (e.g., Broadie, Chernov, and Johannes [2007] and Benzoni, Collin-Dufresne, and Goldstein [2005]).

The primary focus of this article is a description and analysis of the relative performance and volatility of a strategy that takes advantage of this disparity in order to reduce portfolio volatility and generate risk-adjusted returns superior to those of the S&P 500 Index. It involves the cash-secured sale of at-the-money (ATM), S&P 500 Index put options (also known as a collateralized put or put-write strategy) and is the basis for the first major benchmark index for this strategy, the CBOE S&P 500 PutWrite Index (ticker PUT). Over a period of more than 22 years, the PUT Index has generated compound annual returns in excess of the S&P 500 Total Return Index, with 39% less volatility, and it has offered significant outperformance versus the S&P 500 Index during both of this decade's bear markets. Additionally, the PUT Index won the award for Most Innovative New Benchmark Index at the 2007 Super Bowl of Indexing Conference.

BACKGROUND ON LISTED OPTIONS

Trading of exchange-listed, SEC-regulated options contracts began with the launch of the Chicago Board Options Exchange® (CBOE®) in 1973—the same year the landmark Black-Scholes options pricing model was published. On U.S. exchanges there are some key differences between single-stock options and many cash-settled index options: the buyer of a single-stock option often may engage in an early exercise of the option (before the expiration date), and actual stocks are used for settlement. On the other hand, the holder of a cash-settled option on the S&P 500® Index (SPX℠) may exercise the option only at the expiration of the option, and the option is settled based on the special settlement price of the S&P 500® Index (generally on the morning of third Friday of the month), and the settlement is in cash (no stocks are delivered).

SALE OF CASH-SECURED PUT OPTIONS

An investor who engages in a cash-secured (or collateralized) put sale strategy sells (or "writes") a put option contract and at the same time deposits in his brokerage account the full cash amount for a possible purchase of underlying shares. The cash is deposited in order to ensure that it would be available should the investor be assigned on the short put position and therefore obligated to purchase shares at the put's strike price. While the cash is on deposit, it may generally be invested in short-term, interest-bearing instruments.

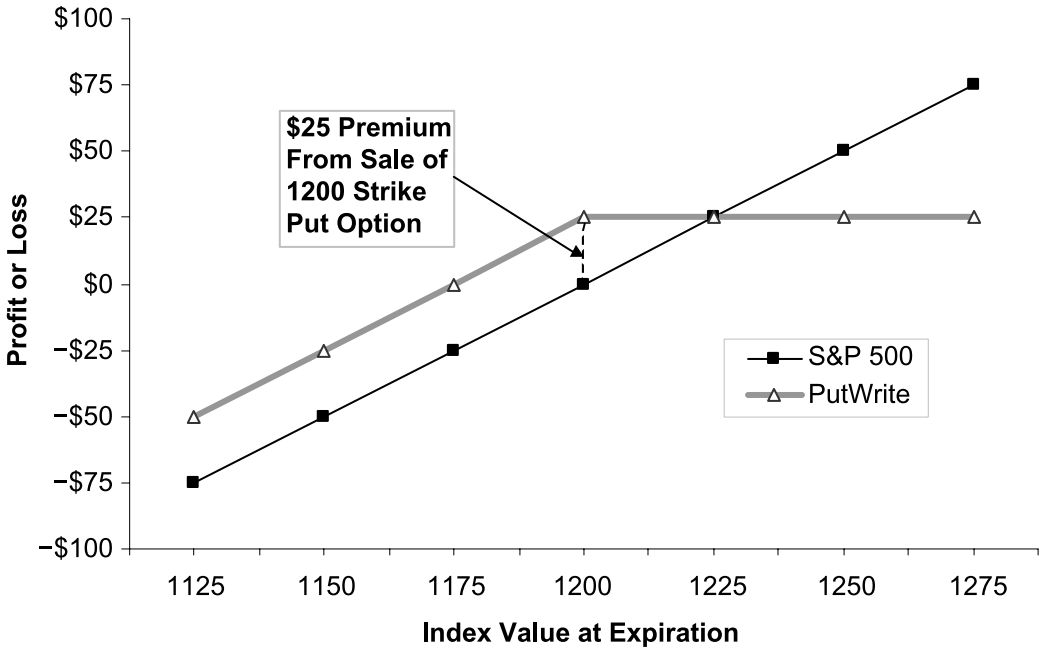
Ignoring interest income, the risk-reward profile of an ATM, S&P 500 Index collateralized put-writing strategy is identical to that of an ATM, S&P 500 covered call strategy. In both programs the upside is limited to the premium received from the option sold, and the downside is equal to that of the S&P 500 minus the premium received. The success of these programs comes from the fact that historically, any monthly underperformance due to the "capped" upside of these strategies tends to be recompensed relatively quickly in succeeding months by the consistent capture of rich option premium. Please see the sample profit-and-loss diagram for the sale of a collateralized S&P put option in Exhibit 1.

BENCHMARK INDEXES FOR OPTIONS-BASED STRATEGIES

In conjunction with the publication of an article by Professor Robert Whaley of Duke University

EXHIBIT 1

Sample Profit-and-Loss Diagram for PutWrite Strategy



(Whaley [2002]) in 2002, CBOE introduced the first major benchmark index for an options-based strategy, the CBOE S&P 500 BuyWrite Index (BXM[SM]). The BXM Index and later buywrite indexes were designed to show the performance of various covered call (or buy-write) strategies. The covered call is one of the most popular and well-known option-based strategies. In recent years there have been many articles written about the BXM Index and the buy-write strategy on the S&P 500 index (see, e.g., Roeder [2004], Crawford [2005], Feldman and Roy [2005], Hill et al. [2006], and Clary [2007]) as well as the buy-write on broader indices including the Russell 2000 (see Kapadia and Szado [2007]). In addition, more than $20 billion was invested in funds and investment products designed to engage in the buy-write strategy. After CBOE introduced five buy-write indexes, some investors inquired as to the possibility of new benchmark indexes based on put options. CBOE recently introduced the CBOE S&P 500 95–110 Collar Index (CLL), a benchmark for the "collar" strategy in which an investor buys protective put options for downside protection, and sells covered call options to help finance the cost of the puts. (See Szado and Kazemi [2008] for an empirical analysis of the performance of the collar strategy.) In light of the fact that the index put options have often had higher implied volatility than index call options, investors also expressed interest in seeing a possible benchmark index that reflected the sale of index put options.

THE CBOE S&P 500 PUTWRITE INDEX (PUT)

In mid-2007 CBOE introduced the first major benchmark index for the cash-secured ATM put sale strategy—the CBOE S&P 500 PutWrite Index (PUT)—and Ansbacher Investment Management, Inc. became the first money management firm to gain a license on the PUT Index. Daily historical prices on the PUT Index are available back to June 30, 1986. The PUT Index tracks the performance of a hypothetical investment strategy that overlays short, ATM, S&P 500 put option positions over a money market account. The number of puts sold is set to equal the exposure to S&P 500 downturns that is represented by the cash collateral.

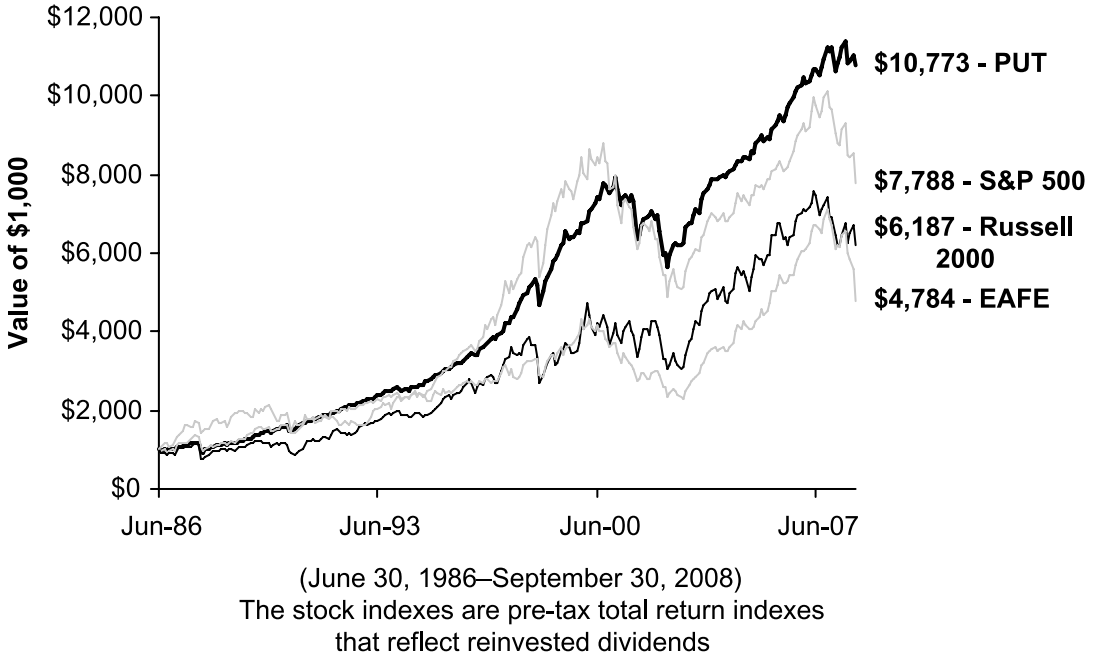
The PUT Index is designed to reflect a strategy in which one invests cash at one- and three-month Treasury Bill rates and sells a sequence of one-month at-the-money S&P 500 (SPX[SM]) put options. The short put position is collateralized in the sense that the Treasury bills can finance the maximum possible loss from final settlement of the SPX puts. Therefore, the program does not employ leverage in the traditional sense of increased exposure to some underlying security. The PUT portfolio is rebalanced on the third Friday of the month when the puts expire and a new batch of puts is sold. This procedure is referred to as the "roll." On every third roll, the total cash in the PUT portfolio is reinvested at the three-month Treasury bill rate. The rebalanced portfolio is long three-month Treasury bills and short one-month, SPX puts. On other roll dates, the cash obtained from selling new SPX puts is invested at the one-month Treasury bill rate, and the cash required to settle expiring in-the-money puts is financed first by one-month Treasury bills and second by three-month Treasury bills—if necessary. On such roll dates, the rebalanced portfolio typically is long one- and three-month Treasury bills and short one-month SPX puts. More information on the PUT Index is available at www.putwrite.com.

PERFORMANCE OF CBOE S&P 500 PUTWRITE INDEX (PUT) AND OTHER INDEXES OVER MORE THAN 22 YEARS

Exhibits 2 through 13 provide a comparison for the performance of the PUT Index and other total return indexes from July 1986 through September 2008—a 268-month period in which stocks experienced both bull and bear markets. Overall, the PUT Index had strong performance when compared to the other total return indexes. Over this period, the PUT experienced 977% growth, substantially higher than the growth of the seven other indexes in Exhibits 2 and 3, including the 678% growth experienced by the S&P 500 Index. As shown in Exhibit 2, the PUT Index and various stock indexes all experienced declines and rises over different time periods, but investors often ask whether an investment has had negative performance over longer time periods. Exhibit 4 shows that the S&P 500 generally had stronger rolling five-year annualized returns than the PUT Index in the late 1990s, but that from 2002 through 2004, the S&P 500 often had negative five-year returns while the PUT Index maintained consistent positive five-year returns. An overall view of Exhibit 4 also shows that PUT generally has had smoother returns

EXHIBIT 2

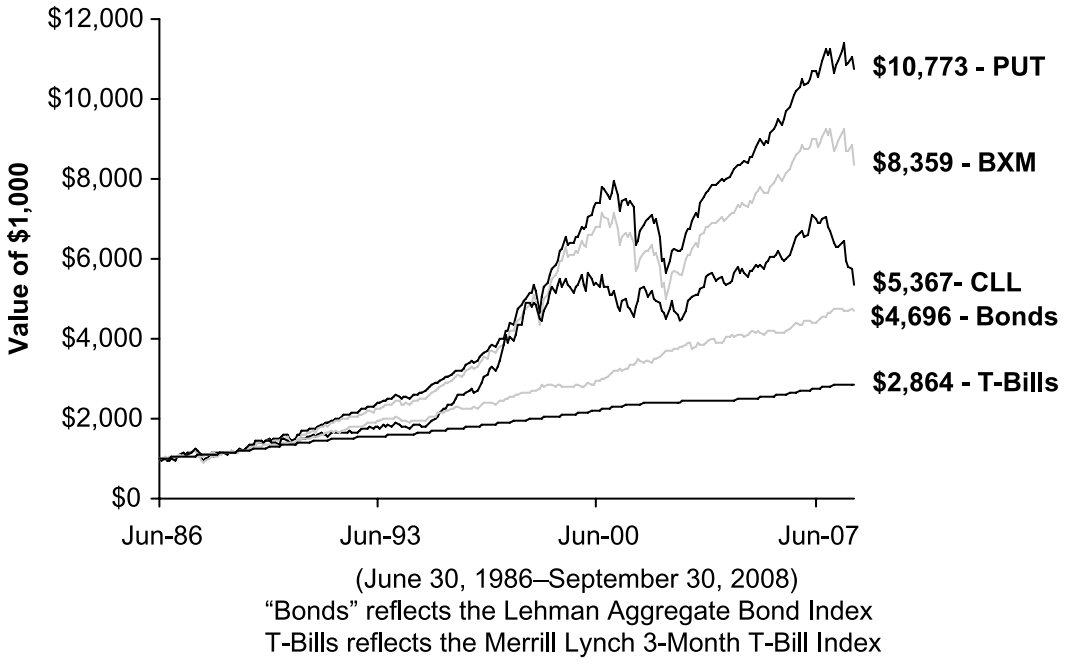
PUT and Stock Indexes Since June 30, 1986



Sources: PerTrac and Bloomberg.

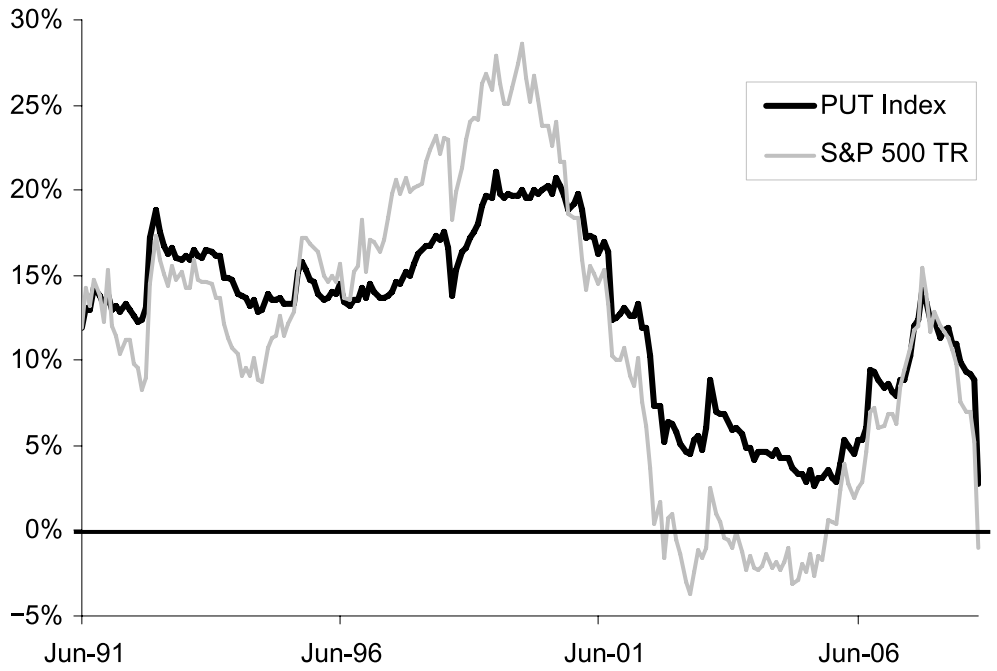
EXHIBIT 3

Fixed Income and Options-based Indexes Since June 30, 1986



Sources: PerTrac and Bloomberg.

EXHIBIT 4
Rolling 5-Year Annualized Returns



Sources: PerTrac and Bloomberg.

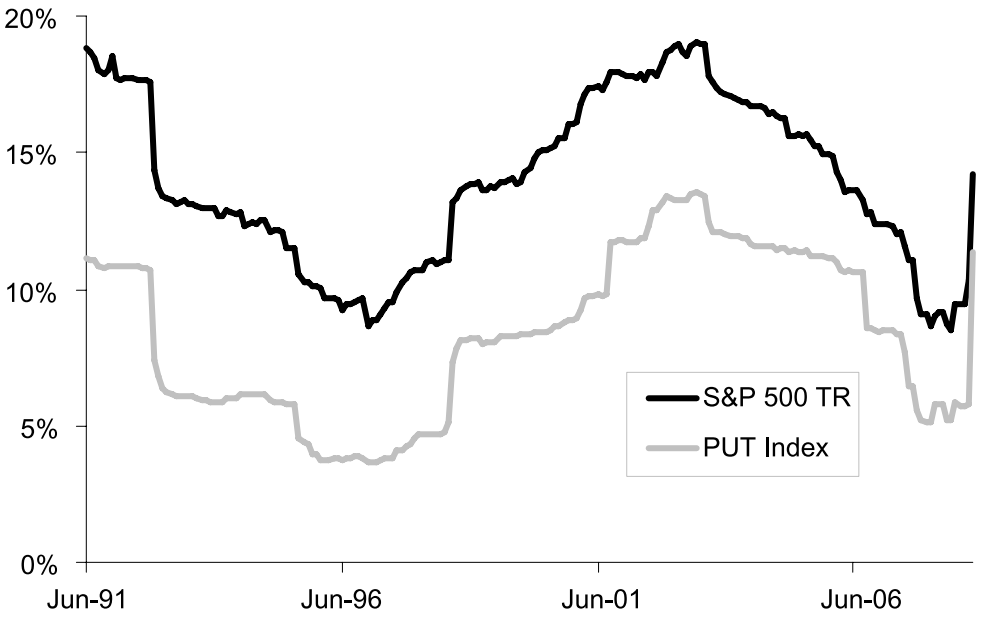
than the S&P 500 Index. Moreover, the PUT Index consistently has had lower five-year rolling standard deviations than the S&P 500 Index (see Exhibit 5). The S&P 500 rose more than the PUT Index during the bull market from mid-1994 through March 2000 (see Exhibit 6), but the PUT Index significantly outperformed both the S&P 500 and MSCI EAFE stock indexes in this decade's two bear markets shown in Exhibits 7 and 8, as the PUT Index generated income through the sale of index options and the holding of Treasury bills.

Over the 268-month period studied, the PUT Index had a compound annualized return of 11.27%, higher than any of the other seven indexes studied (see Exhibit 9). The PUT Index had an annualized standard deviation of 9.13%, lower than the stock indexes and options-based indexes, but higher than the bond and cash indexes (see Exhibit 10), and the PUT Index was in an attractive position toward the northwest in the efficient frontier graph at Exhibit 11. Exhibit 12 presents a table with 18 comparative statistics for eight indexes, and the PUT Index has more desirable statistics than the three stock indexes in a number of categories, including the Sharpe Ratio, Sortino Ratio, annualized alpha, and information ratio. When reviewing these statistics, one caveat is the fact that all eight of the indexes have a negative skew, and the skewness of the PUT Index is more negative than the other indexes. Arditti [1967] suggests that investors that exhibit non-increasing absolute risk aversion prefer positive skewness over negative skewness. Therefore, investments with negatively skewed return distributions should provide expected returns greater than investments with positive skew. See Whaley [2002] and Feldman and Roy [2005] for more discussion of the issue of how skewness can impact comparisons made with the Sharpe Ratio and other measures of risk-adjusted returns.

A comparison of calendar year returns in Exhibit 13 further reinforces the fact that the PUT Index often has had smoother returns than the S&P 500 Index. For the 21 full calendar years from 1987 through 2007, the PUT Index had positive returns in 18 years and negative returns in three years. The PUT Index had greater-than-20-percent returns in five calendar years, and its biggest yearly loss prior to 2008 was a 10.6% decline in 2001.

EXHIBIT 5

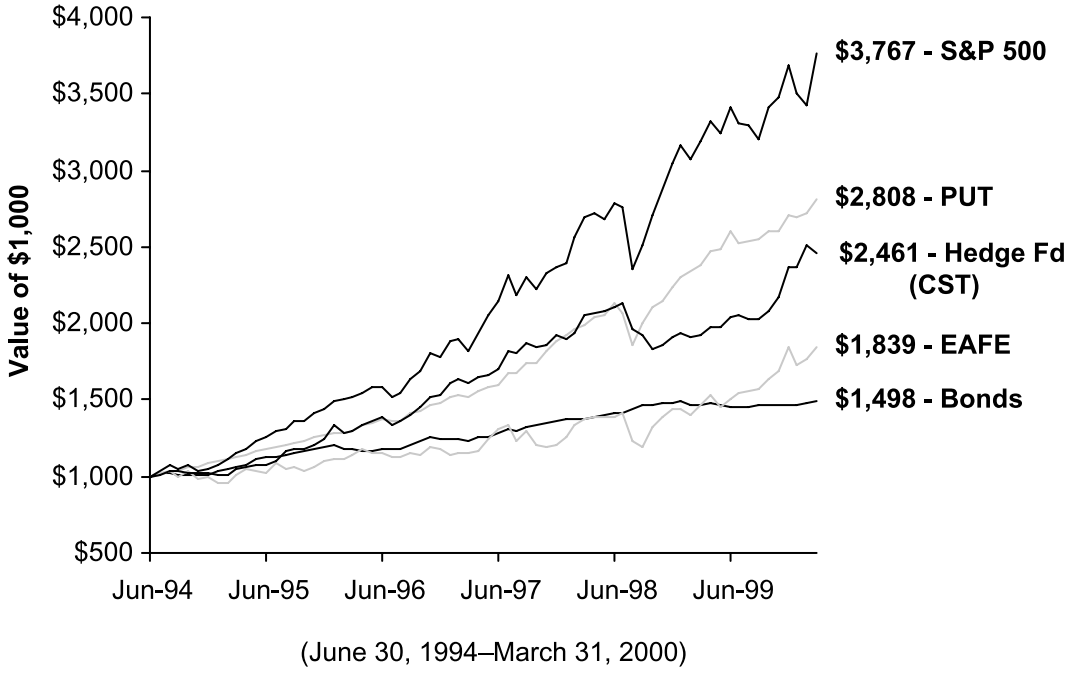
Rolling 5-Year Annualized Standard Deviation



Sources: PerTrac and Bloomberg.

EXHIBIT 6

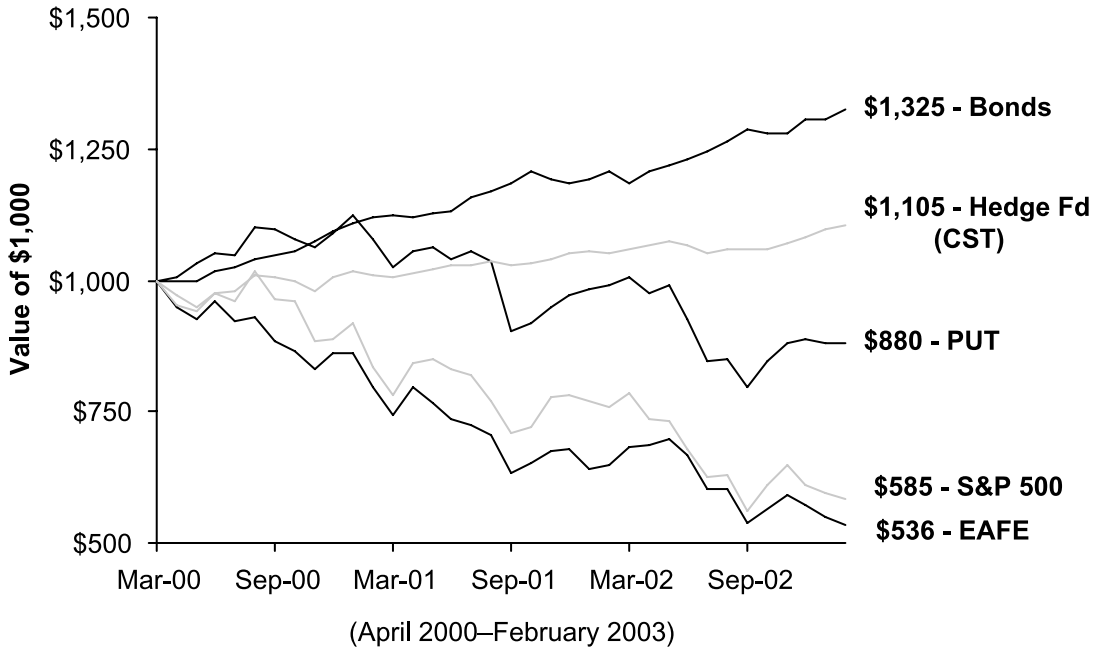
Bull Market Performance (July 1994–March 2000)



Sources: PerTrac and Bloomberg.

EXHIBIT 7

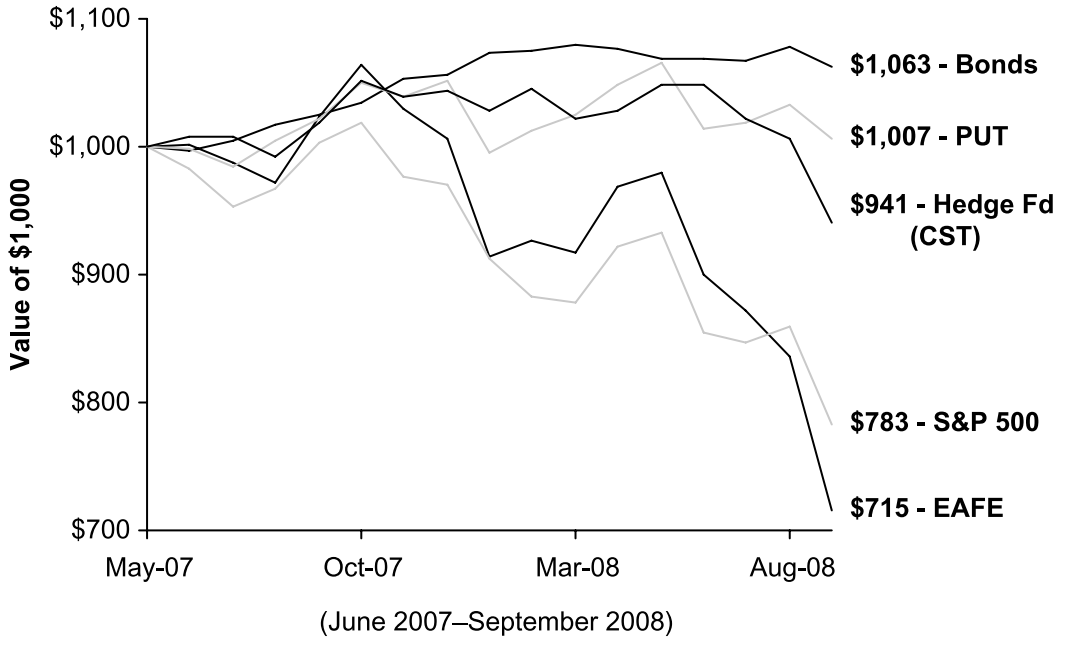
Bear Market Performance (April 2000–February 2003)



Sources: PerTrac and Bloomberg.

EXHIBIT 8

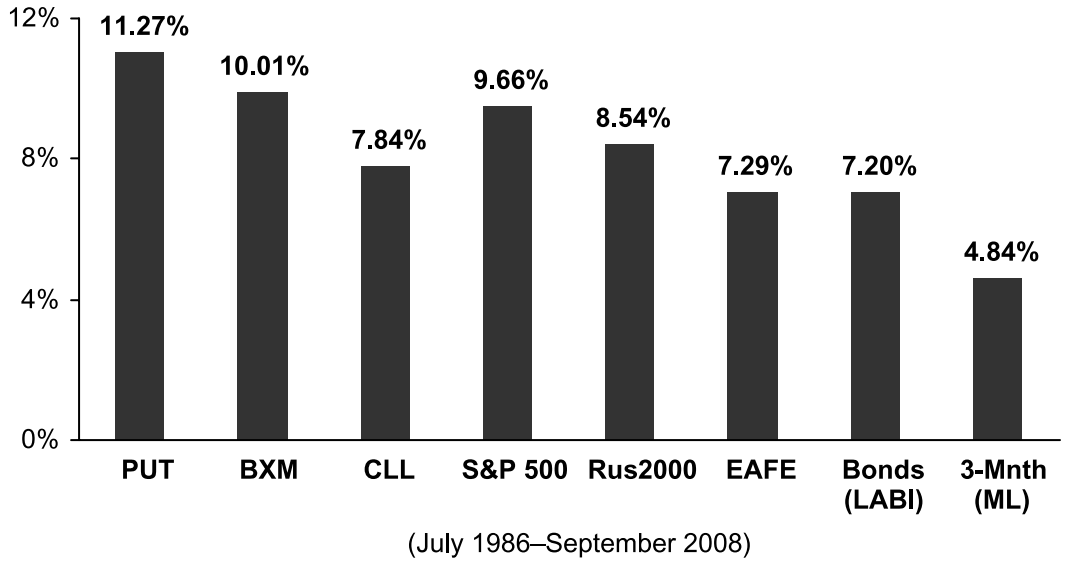
Bear Market Performance (June 2007–September 2008)



Sources: PerTrac and Bloomberg.

EXHIBIT 9

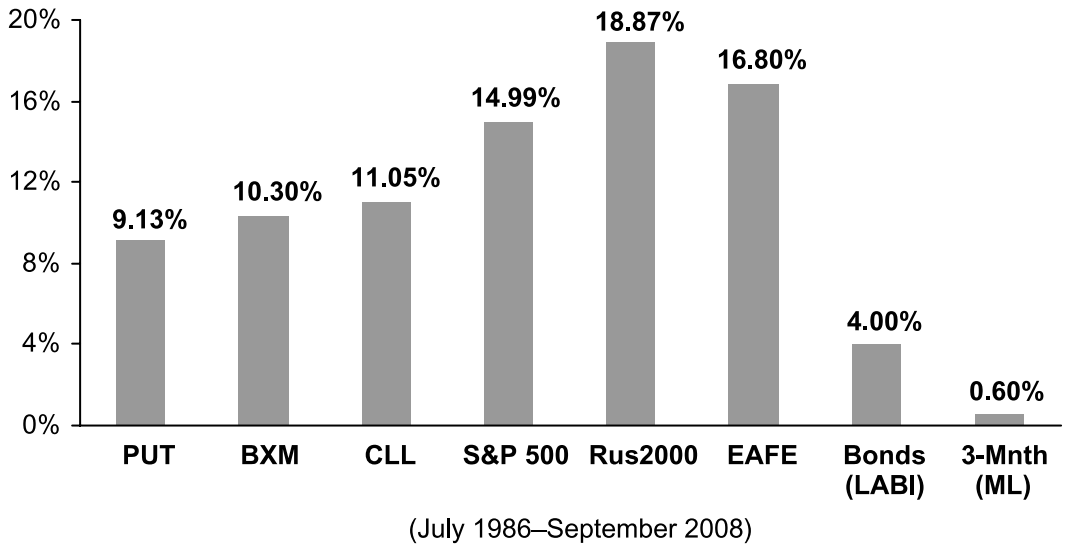
Annualized Returns for Total Return Indexes



Sources: PerTrac and Bloomberg.

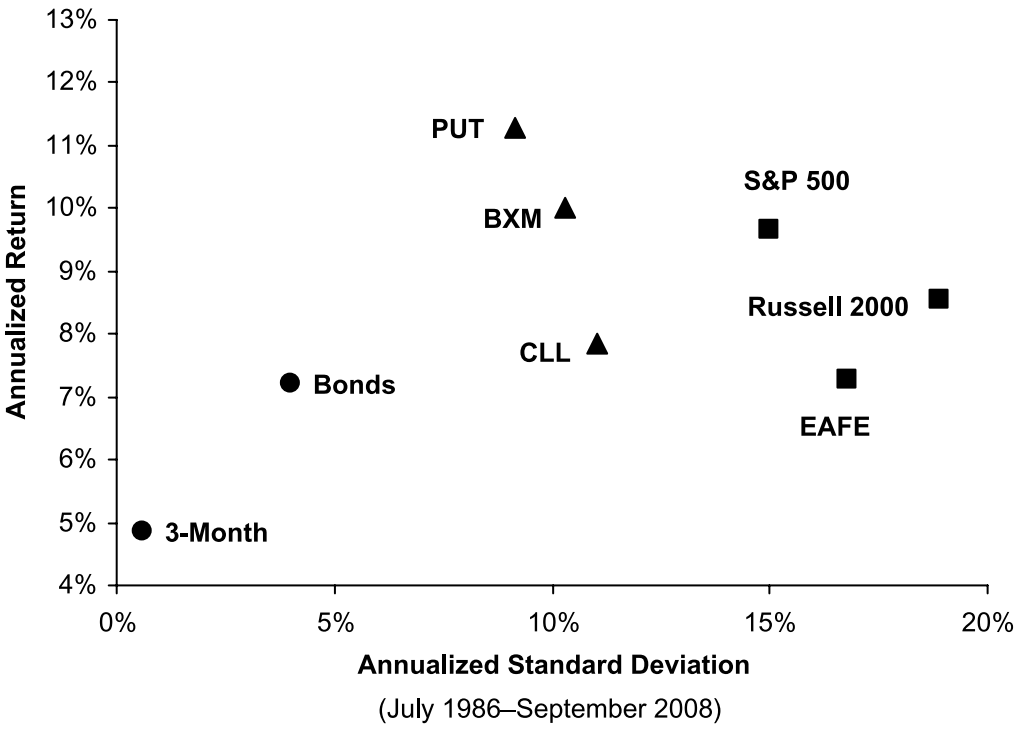
EXHIBIT 10

Annualized Standard Deviations for Total Return Indexes



Sources: PerTrac and Bloomberg.

EXHIBIT 11
Efficient Frontier Graph



Sources: PerTrac and Bloomberg.

IMPACT OF ADDING PUT TO A "TRADITIONAL" PORTFOLIO

Now that it has been shown that the PUT Index has had relatively strong risk-adjusted returns, the next issue to explore is: how would an allocation to PUT have impacted a "traditional" asset allocation? Modern portfolio theory suggests that the real benefits of an investment are derived not from their stand-alone characteristics, but from their impact in a portfolio context. Note the annualized returns and standard deviations over the past 268-month period for various allocations as shown in Exhibit 14. It is useful to compare 1) a "traditional" allocation of 60% stocks and 40% bonds, which had a return of 8.8% and a standard deviation of 10.8%, and 2) a new "option-added" allocation of 50% stocks, 30% bonds, and 20% PUT Index, which had a return of 9.5% and a standard deviation of 10.3%. The "option-added" allocation showed an improvement over the "traditional" allocation in that the options-added allocation had an annualized return that was 1.3% points higher, and a standard deviation that was 0.5% points lower than the traditional allocation.

SOURCES OF RETURN AND OUTPERFORMANCE

Taking another look at the efficient frontier graph in Exhibit 11, note that the "traditional" assets of cash, bonds, and S&P 500 stocks line up so that there is a tradeoff between risk and return. However, even though the PUT Index had 39% less volatility than the S&P 500 Index, the PUT Index also had higher returns. A key explanation for the strong relative risk-adjusted performance for both the PUT and BXM Indexes is the fact that both indexes engage in the systematic selling of one-month S&P 500 call options. A number of studies have found that index options tend to be "richly" priced, in that their implied volatility usually is higher than the subsequent realized volatility of the underlying index, and that investors who are consistent sellers of index options have had the potential to generate relatively strong risk-adjusted returns (see, e.g., Stux and Fanelli

EXHIBIT 12

Comparative Statistics for Total Return Indexes

	CBOE S&P 500 PutWrite Index	S&P 500 Index	Russell 2000 Index	MSCI EAFE - Gross	CBOE S&P 500 BuyWrite Index	CBOE S&P 500 95-110 Collar Index	Lehman Aggregate Bond Index	ML 3-Month Treasury Bill Index
	PUT	**SPTR**	**R2000**	**EAFE**	**BXM**	**CLL**	**Bonds**	**T-Bills**
Annualized Statistics								
Compound Rate of Return	11.27%	9.66%	8.54%	7.29%	10.01%	7.84%	7.20%	4.84%
Standard Deviation	9.13%	14.99%	18.87%	16.80%	10.30%	11.05%	4.00%	0.60%
Semi Deviation	12.14%	17.40%	21.87%	18.06%	13.33%	11.38%	4.27%	0.65%
Gain Deviation	4.52%	8.53%	9.98%	10.12%	5.48%	7.04%	2.60%	0.60%
Loss Deviation	11.01%	11.46%	14.76%	11.12%	10.73%	6.42%	2.37%	
Downside Deviation (5.00%)	7.03%	10.66%	13.88%	11.82%	7.77%	7.36%	2.60%	0.46%
Sharpe Ratio*	0.69	0.37	0.27	0.21	0.51	0.30	0.54	−0.25
Sortino Ratio*	0.83	0.41	0.24	0.18	0.60	0.36	0.80	−0.33
Skewness	−2.26	−0.79	−1.04	−0.30	−1.68	−0.06	−0.25	−0.01
Excess Kurtosis	10.43	2.79	4.16	0.61	7.11	0.28	0.41	−0.43
Maximum Drawdown	−29.0%	−44.7%	−35.5%	−47.5%	−30.2%	−24.2%	−5.2%	
Months to Recover	21	49	18	29	27		8	
Comparisons to S&P 500 Benchmark								
Annualized Alpha	6.07%	0.00%	−0.19%	1.28%	3.83%	1.40%	6.86%	4.82%
Beta	0.50	1.00	0.99	0.69	0.61	0.65	0.04	0.00
R-squared	0.69	1.00	0.61	0.38	0.79	0.78	0.02	0.00
Treynor Ratio (%)	12.43%	4.66%	3.58%	3.31%	8.20%	4.36%	56.81%	−69.27%
Jensen's Alpha (%)	0.29%	0.00%	−0.02%	−0.02%	0.16%	−0.03%	0.16%	−0.01%
Information Ratio	0.18	0.00	−0.10	−0.17	0.05	−0.25	−0.16	−0.32

**Assumes a 5% annual risk-free rate of return. Also, please note that the PUT Index and some other indexes have negative skewness, a factor that can impact comparisons made with the Sharpe Ratio amd other measures of risk-adjusted returns.*

Sources: PerTrac and Bloomberg.

[1990], Schneeweis and Spurgin [2001], Whaley [2002], Feldman and Roy [2004], and Hill et al. [2006]). See Exhibit 15 for a graph with a comparison of S&P 500 options' implied volatility and the subsequent realized volatility for the S&P 500 Index.

Many explanations have been offered for this disparity, but the most sufficient is that it is due to the huge buying pressure in index put options by investors who use them to insure their equity portfolios. Correlations between individual equities tend to rise significantly during market pullbacks, so index puts offer an effective way to insure diversified portfolios. Unlike with either commodity or fixed-income indexes, the vast preponderance of investment in equity indexes is long, and the consistent demand for portfolio protection by these investors represents an almost unlimited market for the far smaller number of natural put sellers.

Equity index put buyers are insuring their portfolios against an unlikely event, not hoping to turn a profit on the trade. Put writers, on the other hand, tend to be speculators who receive a fixed amount of money—the premium—in return for providing portfolio protection to put buyers. Regardless what happens later, the writer of a put option keeps the premium received but can never make more than that amount on the position. However, if the S&P 500 Index falls far below the strike price of the put option, the option writer could lose a much greater amount than the premium received. Therefore, as with anybody who provides insurance, the put writer can demand a premium for offering this protection.

Index put buyers tend to be hedgers who spend a relatively small premium to insure a much larger investment against precipitous loss. They do not seek to profit

EXHIBIT 13

Calendar Year Returns for Total Return Indexes

	CBOE S&P 500 PutWrite Index	S&P 500 Index	Russell 2000 Index	MSCI EAFE - Gross	CBOE S&P 500 BuyWrite Index	CBOE S&P 500 95–110 Collar Index	Credit Suisse/ Tremont Hedge Fund Index	Lehman Aggregate Bond Index	ML 3-Month Treasury Bill Index
Year	**PUT**	**SPTR**	**R2000**	**EAFE**	**BXM**	**CLL**	**HedgeFd**	**Bonds**	**T-Bills**
1987	−2.5%	5.3%	−8.8%	24.9%	−3.0%	12.3%		2.8%	6.7%
1988	19.7%	16.6%	25.0%	28.6%	21.0%	6.1%		7.9%	6.9%
1989	24.6%	31.7%	16.3%	10.8%	25.0%	26.0%		14.5%	9.0%
1990	8.9%	−3.1%	−19.5%	−23.2%	4.0%	0.0%		8.9%	8.4%
1991	21.3%	30.5%	46.0%	12.5%	24.4%	13.6%		16.0%	6.4%
1992	13.8%	7.6%	18.4%	−11.8%	11.5%	4.3%		7.4%	3.9%
1993	14.1%	10.1%	18.9%	32.9%	14.1%	6.2%		9.8%	3.2%
1994	7.1%	1.3%	−1.8%	8.1%	4.5%	−2.0%	−4.4%	−2.9%	4.2%
1995	16.9%	37.6%	28.5%	11.6%	21.0%	39.0%	21.7%	18.5%	6.0%
1996	16.4%	23.0%	16.5%	6.4%	15.5%	24.6%	22.2%	3.6%	5.3%
1997	27.7%	33.4%	22.4%	2.1%	26.6%	38.9%	25.9%	9.7%	5.3%
1998	18.5%	28.6%	−2.5%	20.3%	18.9%	18.8%	−0.4%	8.7%	5.2%
1999	21.0%	21.0%	21.3%	27.3%	21.2%	9.0%	23.4%	−0.8%	4.9%
2000	13.1%	−9.1%	−3.0%	−14.0%	7.4%	−9.1%	4.8%	11.6%	6.2%
2001	−10.6%	−11.9%	2.5%	−21.2%	−10.9%	3.8%	4.4%	8.4%	4.4%
2002	−8.6%	−22.1%	−20.5%	−15.7%	−7.6%	−11.1%	3.0%	10.3%	1.8%
2003	21.8%	28.7%	47.3%	39.2%	19.4%	17.9%	15.4%	4.1%	1.1%
2004	9.5%	10.9%	18.3%	20.7%	8.3%	4.9%	9.6%	4.3%	1.3%
2005	6.7%	4.9%	4.6%	14.0%	4.2%	2.0%	7.6%	2.4%	3.1%
2006	15.2%	15.8%	18.4%	26.9%	13.3%	11.7%	13.9%	4.3%	4.8%
2007	9.5%	5.5%	−1.6%	11.6%	6.6%	0.9%	12.6%	7.0%	5.0%
*2008**	*−4.3%*	*−19.3%*	*−10.4%*	*−28.9%*	*−9.6%*	*−19.8%*	*−9.9%*	*0.6%*	*1.8%*

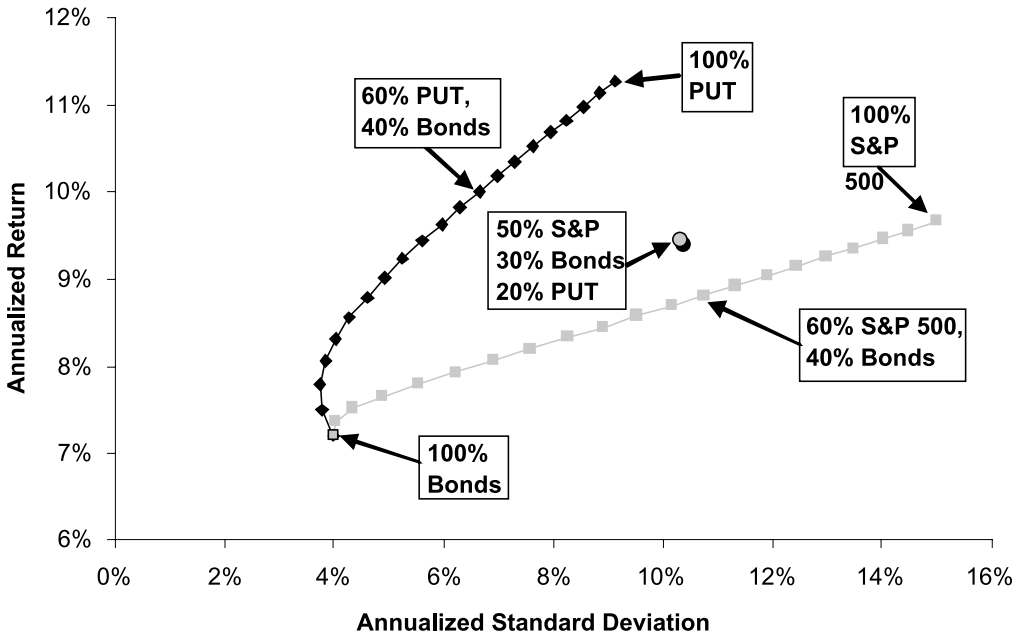
**Through September 2008.*

Sources: PerTrac and Bloomberg.

from their purchases and are usually better off not having to rely on the hedge at all. In this they are comparable to flood-insurance policy holders, who are willing to renew policies ad infinitum without ever filing a claim. Buyers can never lose more than the premium paid; writers can never gain more than the premium received. This unequal relationship is compounded by the fact that the buyer can forget about his position, but the writer often incurs significant costs to hedge his book, typically in the futures market, a fact that further limits the pool of put writers.

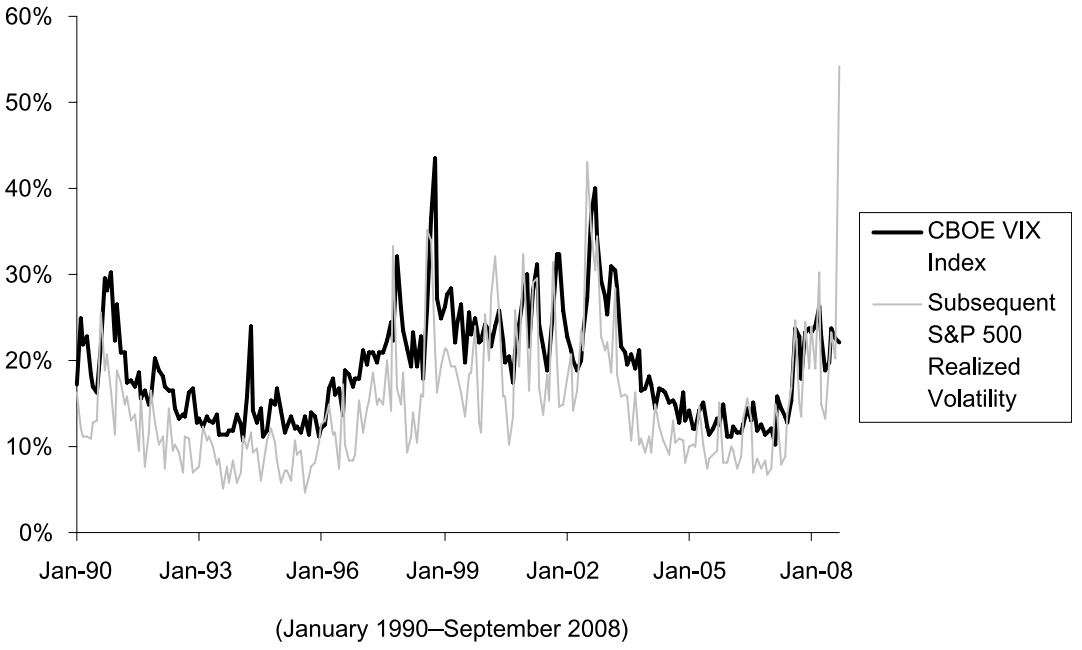
When the goals and risk/reward parameters of both parties to this transaction are understood, it is clear that there will always be a far greater number of put buyers than writers, and that buyers will always be far less price sensitive. Writers will continue to successfully demand a premium well above the expected value of the puts for the protection they provide. Widespread knowledge of this premium over the past 18 years (see, e.g., Stux and Fanelli [1990], Schneeweis and Spurgin [2001], Whaley [2002], Feldman and Roy [2004], and Hill et al. [2006]) has done nothing to weaken it, and skeptics would do well to look at property- and causality-insurance providers, which continue to be extremely profitable despite numerous players and policy owners knowing for centuries that they pay a premium for their insurance.

EXHIBIT 14
Impact of Adding PUT to "Traditional" Asset Allocations



Sources: PerTrac and Bloomberg.

EXHIBIT 15
Implied Volatility and Realized Volatility



Sources: PerTrac and Bloomberg.

EXHIBIT 16

Case Study—Comparing PUT Index Returns to PUT Manager's Returns

The PUT Index was announced in mid-2007, and in May 2007 Ansbacher Investment Management began to invest a small amount of money in a program designed to track the PUT Index.

Monthly Returns (May 2007–September 2008)

	PUT Index	Ansbacher PUT Investment	S&P 500 Index
May-07	1.92%	1.92%	3.49%
Jun-07	−0.23%	−0.21%	−1.66%
Jul-07	−1.33%	−1.37%	−3.10%
Aug-07	2.04%	2.12%	1.50%
Sep-07	1.66%	1.49%	3.74%
Oct-07	2.79%	2.74%	1.59%
Nov-07	−1.06%	−0.83%	−4.18%
Dec-07	1.24%	1.39%	−0.69%
Jan-08	−5.38%	−5.07%	−6.00%
Feb-08	1.72%	1.74%	−3.25%
Mar-08	1.25%	0.92%	−0.43%
Apr-08	2.25%	2.29%	4.87%
May-08	1.76%	1.76%	1.30%
Jun-08	−4.95%	−4.80%	−8.43%
Jul-08	0.56%	0.33%	−0.84%
Aug-08	1.40%	1.42%	1.45%
Sep-08	−2.59%	−2.71%	−8.91%

Comparative Statistics (May 2007–September 2008)

	PUT Index	Ansbacher PUT Investment
Annualized Statistics		
Compound Rate of Return	1.82%	1.89%
Standard Deviation	8.55%	8.32%
Skewness	−1.32	−1.25
Kurtosis	0.82	0.62
Calmar Ratio	0.33	0.33
Comparison to S&P 500 Benchmark		
Annualized Alpha	0.10	0.10
Beta	0.52	0.51
R-squared	0.74	0.74
Information Ratio	1.67	1.67

Sources: PerTrac, Bloomberg, and Ansbacher Investment Management.

CASE STUDY—COMPARING PUT INDEX RETURNS TO RETURNS OF A PUT PORTFOLIO MANAGER

While the PUT benchmark index has generated relatively strong risk-adjusted returns, another issue to be raised is whether the returns of the PUT Index are achievable. In May 2007 the money management firm Ansbacher Investment Management began to invest a small amount of money in a program designed to track the PUT Index. As shown in Exhibit 16, the Ansbacher PUT investment was able to achieve slightly higher returns and lower volatility than the PUT Index benchmark while maintaining a very low tracking error.

CONCLUSION

The put-write strategy of selling cash-secured S&P 500 put options has the potential to appeal to investors who wish to add income and attempt to boost risk-adjusted returns, in return for risking underperformance during bull markets. Over the studied period of more than 22 years, the CBOE S&P 500 PutWrite Index (PUT): 1) generated compound annualized returns in excess of the S&P 500 Index, 2) had 39% less volatility than the S&P 500 Index, and 3) had better risk-adjusted returns than the other seven indexes studied. If one took a "traditional" 60/40 stock/bond portfolio, the substitution of a 20% allocation to the PUT Index would have increased the portfolio's annualized returns by about 1.3% and lowered the standard deviation by 0.5% over the period of more than 22 years. In addition, the PUT Index significantly outperformed the S&P 500 Index during both of this decade's bear markets. A key factor in the superior performance of the PUT Index was the fact that the S&P 500 options were richly priced—the implied volatility for the S&P 500 options usually was higher than the subsequent realized volatility of the S&P 500 Index.

ENDNOTE

Options involve risk and are not suitable for all investors. Prior to buying or selling an option, a person must receive a copy of *Characteristics and Risks of Standardized Options*; this publication and supporting documentation for any claims, comparisons, recommendations, statistics or other technical data in this article are available by calling 1-888-OPTIONS, or visiting www.cboe.com/PUT. The indexes in this article do not take into account significant factors such as transaction costs and taxes. Past performance does not guarantee future results. These materials contain comparisons, assertions, and conclusions regarding the performance of indexes based on backtesting, i.e., calculations of how the indexes might have performed in the past if they had existed. Investors attempting to replicate the indexes should discuss with their advisors possible timing, liquidity, and tax issues. The views expressed in this article are the views of one or more of the authors and do not necessarily represent the views of Chicago Board Options Exchange, Incorporated (CBOE) or Ansbacher Investment Management, Inc. The methodologies of the BXM, PUT, and CLL indexes are owned by CBOE. CBOE does not provide endorsements for products of money management firms. Many of the indexes and names in this article are protected by trademarks and other intellectual property rights. The authors thank Catherine Shalen of CBOE for her valuable work on the PUT Index.

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