

Real Men Don't Index ... But They Should

Fewer things are more embarrassing to both investors and active fund managers than the fact that each and every year an unmanaged (passive) portfolio designed to mimic the performance of some investment standard, such as the S & P 500, whumps the stuffing out of the vast majority of funds. Never mind that investment theory holds that active managers should, over time, underperform the index by the cumulative costs of active management, or the brutal statistical truth that one half of a normal distribution must by definition underperform: the humiliation of such painful inadequacy is sufficient to drive the wing-tip and suspenders crowd to seek the aid of products advertised in the back pages of magazines far less respectable than the one you're reading right now.

The second primal fear of investors is buying a market peak and then watching their holdings evaporate while some smug pundit drones on about the "correction." After all, the owner of any asset is fully exposed to the risks of the underlying market. This fear of standing in front of The Fan is so strong that most investors structure their affairs in avoidance thereof, even at the known cost of avoiding much of the upside.

No investment product can be proven to always match or beat its benchmark index and to avoid any and all downturns. However, we can place ourselves in the position to participate in favorable markets movements while simultaneously placing ourselves in the position to avoid the inevitable calamities. This, of course, can only be done through the use of options.

Position Structuring Methodology

A wise man once said, "If you have to explain your methodology, you better start updating your resume." However, a quant's gotta do what a quant's gotta do. Early attempts at option-based synthetic index products centered around the 90/10 concept; that is, investing 90% of available assets in Treasury Bills and the remaining 10% in call options. The results were disappointing, which should not be surprising: most gains in the stock market take place in short, sharp surges, and only by happenstance will the 10% call investment be sufficient to duplicate the behavior of the underlying index. During the long periods when a bull market is not making geniuses out of ordinary mortals, the call option premium has a nasty habit of disappearing.

Proper and systematic structuring of the option position is required. This is achieved through the use of the Dynamic Option Selection System ([DOSS](#), see "Using Options The Spec Way," [Futures](#), July 1994). DOSS constructs a synthetic option position that

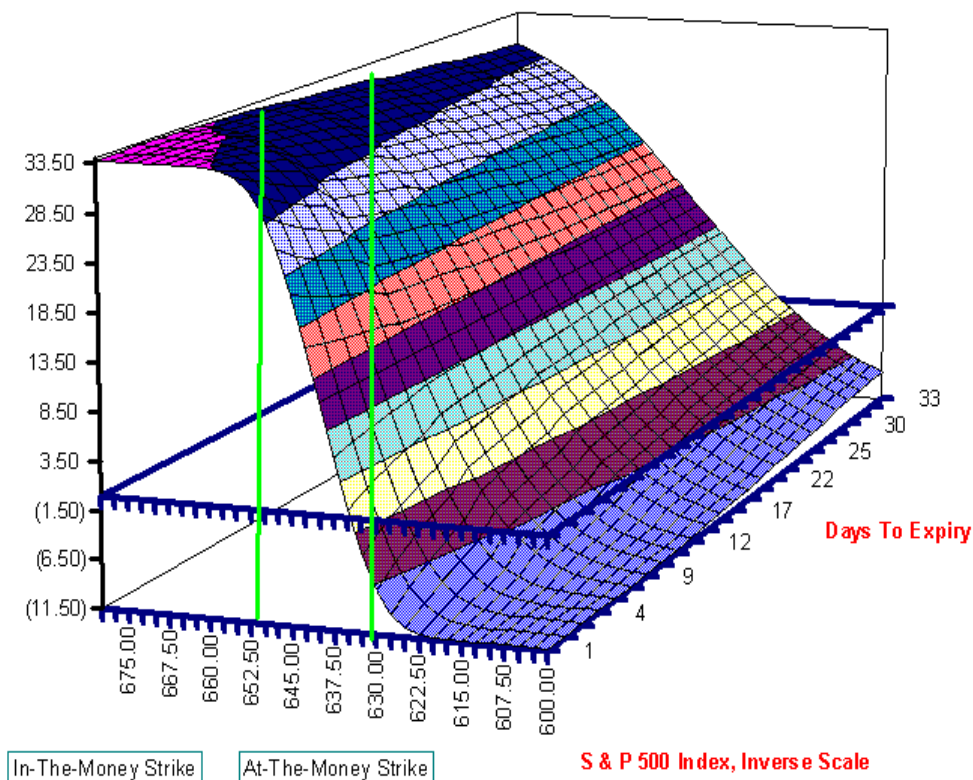
- Is gamma-positive at initiation, so that the loss potential is limited;
- Has the maximum expected return for a given level of cost and risk; and
- Can be expected to outperform its benchmark over a wide range of conditions at the cost of limited underperformance within a defined set of conditions.

The zone of underperformance for a DOSS position can be shifted in the dimensions of price and time since DOSS positions can be structured to accommodate a fund manager's views on price trend, support and resistance, interest rates, and volatility. However, it is best to run the system with no prior conditions imposed. Otherwise, we are falling back into the trap that has ensnared so many active fund managers, the belief that they can outthink the market through the adroit manipulation of cash positions, sector exposures, duration, etc.

The concept of relative performance zones is illustrated in the pair of graphs below. The first illustrates

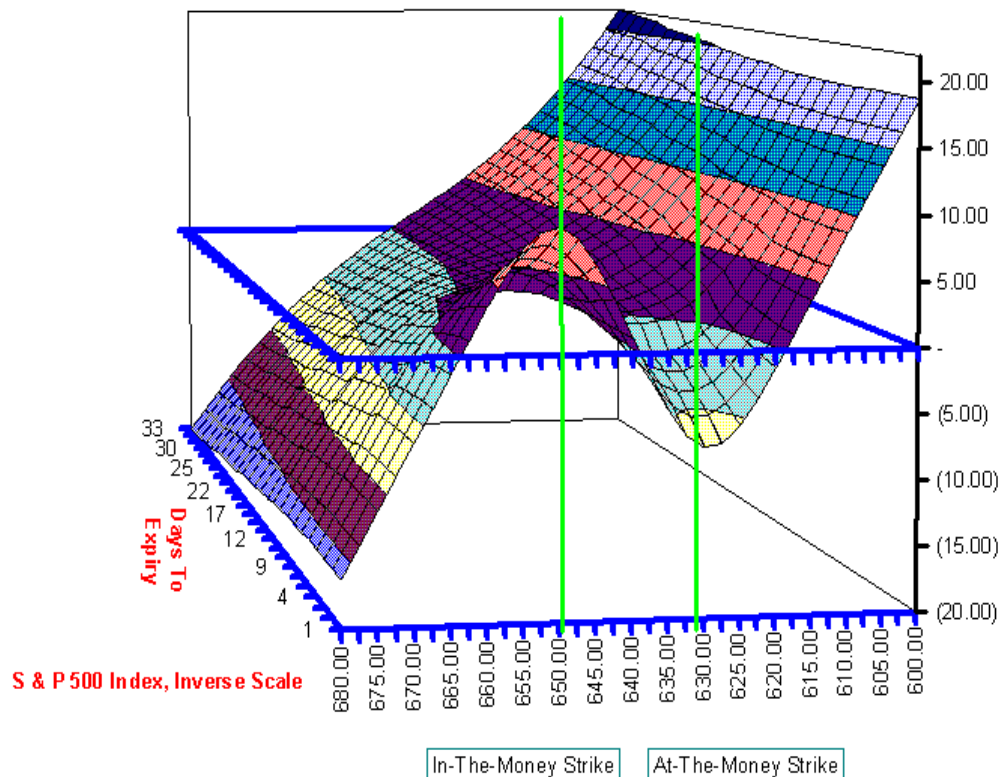
the net profit/loss profile in the dimensions of price and time of a bull put spread consisting of selling 2.25 S & P 500 \$650 puts and buying 2.25 S & P 500 \$630 puts at a credit of \$15 as an alternative to buying one S & P 500 future at \$630. The profile becomes increasingly S-shaped as expiration approaches, finally leveling off to a maximum gain over \$665 and a maximum loss below \$615.

Net Gain On Prototypical Bull Put Spread



The profit/loss profile relative to the underlying base case is quite different. Since both gains and losses are limited outside of the \$615/665 zone, the option spread outperforms the future without limit at significantly lower price levels and in a limited way at modestly higher price levels. Limited underperformance occurs as a function of time decay at modestly lower price levels, while unlimited underperformance occurs at significantly higher price levels. This last zone is extremely important, and is addressed below.

Relative Gain On Prototypical Bull Put Spread



Position Management Methodology

As Judge Samuel Putnam declared in the 19th Century, “Prudence is what prudent men do.” A glorious moment in American legal thought. While prudence cannot be quantified, risk can be, and therefore risk management rules can be emplaced. The first and most important of these is:

The net delta of the synthetic position must be less than or equal to that of the underlying benchmark portfolio position.

The practical effect of this rule is the systematic selling of excess delta in the position. For example, if the S & P 500 index is trading at \$630 with 33 days left to option expiration, a \$100 million fund would need $[\$100,000,000/(\$630 \times 500)]$, or 317 index contracts to cover its exposure. A call spread consisting of long 773 \$630 calls with a delta of .506 and short 317 \$650 calls with a delta of .234 would have this net delta ($773 \times .506 - 317 \times .234 = 317$). If, four days later, the index rose from \$630 to \$637.5, then the total position delta would be ($773 \times .623 - 317 \times .317 = 381$). The position is now overexposed by (381-317, or 64) index units, which means that (64/.623), or 103, \$630 calls must be sold in order to bring the total delta back to 317. This delta management also has the effects of defraying the original cost of the position and reducing its overall exposure to any subsequent adverse price move.

DOSS positions are designed, at initiation, to provide maximum expected return for a given level of risk and cost. Therefore, their structure is dependent – but not too finely dependent – upon the then-prevailing market conditions. As the price/volatility path advances over time, different DOSS positions will become optimal. Although continuous restructuring over positions is impractical, occasional readjustments are

warranted. In the case illustrated by the graphs above, the bull put spread originally emplaced will no longer be effective should the price rise into the \$650s. A new DOSS position will have to be substituted for the old one in order to maintain the gamma and profit potential of the synthetic index.

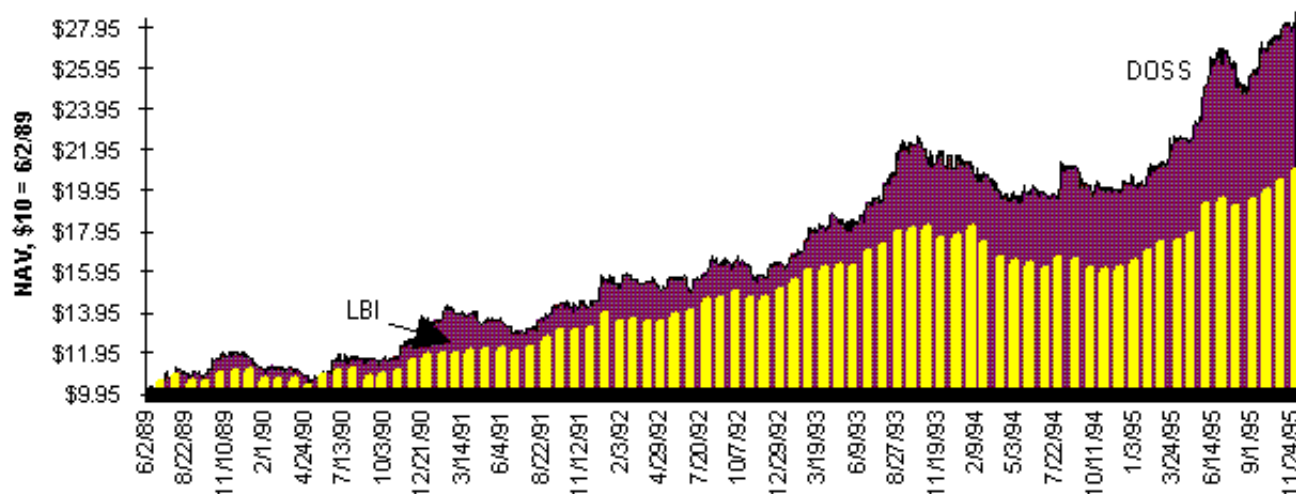
Case Studies: S & P 500 and Long Treasury Bonds

In order to test whether DOSS-based enhanced indices can indeed provide a superior investment product – greater return, lower variability, lower drawdowns in bear market conditions – two historical studies were run using daily data from June 1989 through the end of November 1995, one for stocks (S & P 500) and one for bonds (Treasury bond futures). The studies were “walked-forward” using only information that would have been available at the time. The initial portfolios were set at \$100 million, and the hypothetical fund shares' Net Asset Value (NAV) was set at \$10.00. All positions and executions were assumed at the settlement price.

The bond positions were set in the front future month (Mar., Jun., Sep., Dec.) and rolled forward three weeks prior to the expiration of the option. While options trade every month on bond futures, their data was too sporadic to be reliable. S & P 500 positions were set every month and rolled just prior to expiration. Excess funds, including funds received on credit positions, are credited with interest at either the prevailing Treasury Bill rate or 90% of that rate, if the funds are supporting the margin on a short option position. Position exposures for the bond portfolio were determined by dividing the available funds by \$100,000, the face value of the bond futures contract, and were reset each time the position was rolled forward. Position exposures for the S & P 500 portfolio were determined by dividing the available funds by (500 x the index) and were adjusted upwards to maintain uniform risk exposure.

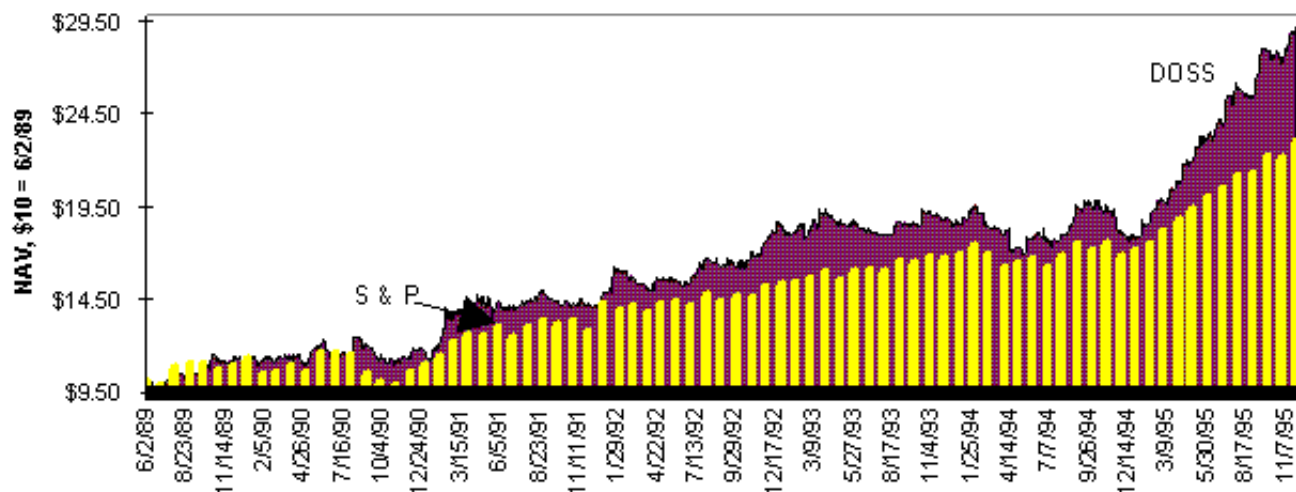
The performance of the bond portfolio is shown below. The annualized rate of return over the period is 17.46%; by way of comparison, the total return on the Lehman Brothers Long Treasury index over this period was 12.05%. The incremental gains derive from several factors. The first is that the DOSS index did not decline as much during the bear markets of the Persian Gulf War and 1994; this loss-avoidance is expected from any option-based product. Second, many of the spreads were emplaced at significant credits during periods when short-term rates were rather high. Third, the DOSS index was able to outperform the Lehman Brothers Index during the bull markets of 1993 and 1995 by virtue of 1) its ratio spreads, and 2) position management. Finally, it always helps to be lucky: bonds saw some rather major price moves in the 1993 - 1995 period, and we should expect option-based positions to outperform the base case during these periods.

DOSS Bond Index Vs. Lehman Brothers Index



The performance of the stock portfolio is shown below. The average annualized rate of return over the period is 17.89%; by way of comparison, the total return on the S & P 500 was 13.73%, annualized. As was the case with the bonds, the DOSS portfolio avoided much of the damage of the sharp bear markets, and was able to accelerate gains during 1995. Unlike bonds, however, the stock portfolio was hurt by the wide, directionless price action of 1994; the DOSS positions remained stuck in their zones of underperformance for much of the year. Indeed, by the end of 1994, the DOSS portfolio was only marginally ahead of the base index.

DOSS S & P 500 Index Vs. S & P 500 Index



Conclusion

The two studies above do not “prove” that DOSS will outperform the base case index over time. They only provide experimental evidence in support of the original hypothesis: over time, the combination of loss avoidance and gain acceleration should outweigh the cumulative effects of underperformance in quiet markets.