

Right-Tail Hedging: Managing Risk When Markets Melt Up

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In this LongTail Alpha Research paper, Vineer Bhansali, CIO and Founder of LongTail Alpha, challenges the conclusions suggesting that on average it does not make sense to buy call options. Under certain market conditions the purchase of both put and call options can result in superior portfolio outcomes due to the additional convexity that only the options market can provide.

Summary

- Since 1950, the maximum drawdown on the S&P 500 has been 50% while there have been multiple drawups exceeding 50%
- Despite this, large drawdowns are sharper, get more publicity, and are more damaging to portfolios so are more salient in investor's psyche. That is why premiums are higher on equity put options than on call options.
- This paper does not address the debate of whether as a speculative strategy it makes more sense to buy or sell options, since this is a very complex topic and the controversy lies at the heart of normative and descriptive theories of investing.
- This paper postulates that under certain, not necessarily abnormal economic and market conditions, the purchase of both put and call options can be optimal for investors and the additional convexity that only option markets can provide result in superior investment outcomes.
- Since the US Presidential election in 2016, the benefits of convexity in a portfolio are apparent. We believe that one reason most studies have ignored this value added from the purchase of call options is that most empirical back tests of option strategies have relied on a sample data set that has not experienced major market melt-ups such as the one we had recently.
- In a world of tightly coupled markets, instant news-feeds and the presence of technologically advanced trading "bots", both left and right tails will become a permanent fixture of investment markets.
- When an investor thinks of buying an option he is making a conscious tradeoff between limited loss and the possibility of time decay on the one hand and unlimited gain as well as benefit from rising perceptions of risk on the other hand. The purchase of an option instead of the underlying is an implicit bet on volatility mispricing, which tends to get larger when there are jumps, uncertainty and the possibility of new regimes
- As an example, on September 1, 2017, with the S&P 500 trading at 2471, the price of a 5% out of the money call, with a strike of 2594 with one year left to expiry was 2.67%. This option had a theoretical Black-Scholes delta of 0.33, and the implied volatility for that strike at that time was 12.14%. Compare this to an outright exposure to the underlying at the same time. In order to equalize the linear exposures approximately 3 times the options would have to be bought. On January 2, 2018, the price of the same option, after accounting for time decay, was 6.45% with a reference S& 500 index value of 2691 and an

implied volatility of 14%. Even as the market rallied, the implied volatility of the fixed strike put increased due to the put-call skew, since by put-call parity, in the money calls inherit the volatility of the out of the money puts of the same strike. The index thus returned 8.91% over the 4 month period. The option lost 4 months of time value, but despite the time decay, on an equal delta basis delivered 10-88% marked to market return, handily beating the linear equivalent on a risk adjusted basis

- The reason the call option outperformed the underlying index was because the ex-ante probability distribution as implied by the options market was incorrect in pricing the probability of such a large move in the underlying. And when large market moves happen, the inherent non-linearity of an option magnifies returns
- A key point of this paper is that when major economic and market forces are at work and there is a possibility of large, non-linear jumps, using the implied probability distribution from traded option prices can be erroneous.
- There are a number of reasons by upside hedging might be more relevant today than at any time in recent memory
 - The move from active to passive investment management makes it likely that a significant amount of investment capital will continue to flow into low cost ETFs and mutual funds that are more price and valuation insensitive
 - Capital is cheap in a low yield environment (or negative yields in Europe) and seeking return it will flow into risk assets where the prospect of a possible loss looms less risky than a certain inflation-adjusted loss
 - The need for yield in a yield-starved environment has resulted in a proliferation of short volatility strategies. Many of these volatility selling strategies are symmetric in their exposure to calls and puts. A lower implied volatility of call options requires a larger notional sale of call options, making the call options volatility depressed
 - The cost of equity replacement using call options is relatively low. First, the level of implied volatilities are very low and second, the skew (difference in volatility spread between put options and call options) is elevated which makes call options relatively cheaper than put options on a volatility normalized basis. One driver of the elevated skew are costless collar strategies, where investors sell call options to finance the purchase of out of the money put options. As upside risk becomes more visible, it is likely that investors will increasingly look to finance the purchase of upside calls from the sale of put options
 - Credit markets, such as high yield, cannot keep up with large rallies in the equity markets. Since many credit investors track popular benchmarks, as credit lags equity they will likely look to enhance total return by using upside convexity strategies. Similarly, "alpha" strategies such as long-short equity hedge funds are unable to keep up with the rally in equity markets, and the only way to recapture "beta" is via synthetic long positions.
- Consider an investor who is invested in high yield credit. Credit risk, as measured by credit spreads, is negatively correlated to the equity of the issuing firm and positively correlated to the asset volatility of the firm. In other words, one can locally (but not globally) replicate a long position in corporate bonds of a company by buying an appropriate amount of equity in the company. To replicate larger moves in the corporate bonds requires the purchase of options. As the value of the underlying assets rise, credit spreads compress as the implicit put option in the bond price is now worth less. If the

uncertainty or volatility in the company's financial prospect's decrease, the value of the put also falls, compressing spreads. This suggests that in addition to the indirect exposure to the equity price, an investor holding credit also has an exposure to the volatility of the underlying equity which reflects the uncertainty in the asset prices of the company. When spreads are neither too large nor too small and the volatility of the underlying asset is not too high, credit can thus locally be replicated using only the underlying equity. But when either asset prices fall (which is accompanied by rising volatility) by larger magnitudes, or vice versa, the replication of credit requires that the investor supplement the equity with explicit options. To participate in the upside, call options overlaid on credit are required.

- A credit investor would need to keep up with the equity markets because the financial markets are a competitive ecosystem for allocation of capital. A credit investor can perform better than his peer group by owning a small amount of additional convexity that contingent on a large event can result in outperformance. By adding closely related sources of convexity that are not available within the credit markets, the credit investor can thus exploit the mispricing of the fundamental risk factors across the credit and equity markets
- When option volatilities are low, call options can provide an ability for an investor to keep up with risky asset returns when they widen versus safe returns, to meet a required rate of return when the difference between the required rate of return and safe return widens, when the variance in risky assets fall, and when the prospective variance of the environment rises. This can be done with a finite risk of loss limited to the premium spent.
- Another important motivation for upside tail hedging emerges from the role that option markets play in enforcing investment discipline and time consistency for risk management purposes. The "disposition effect" documents that unless there is a mechanism to enforce time-consistency in investment decisions, an investor who initially plans to let his profits run in the event of a large, low probability gain, is very likely to change his mind before the full gain is realized. If an investor has a stop-loss threshold, when confronted with a small loss, investors tend to change their mind and stay with a losing position in contradiction to their initial plan. Entering a long position through call options does not completely eliminate the tendency to take profits too early, but by building in a finite loss at the inception of the trade (premium paid for the option) this provides one mechanism by which large losses cannot accumulate.
- While assumptions of the ability to dynamically hedge were found to be flawed in the market crash of 1987, the dearth of equity market melt-ups still provides many participants the comfort that they can hedge their upside risk by continuous trading, which has resulted in an asymmetric index option skew. The put-call pricing asymmetry is reflected in the relative pricing of options, and hence the implied volatilities corresponding to different strikes. The volatility of the skew can be interpreted as the extra premium a seller of the option requires in order to mitigate the risk that he might not be able to hedge his risk by trading the underlying.

IMPORTANT DISCLOSURES

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