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"A ship is safe in harbor, but that's not what ships are for."
— William Shedd

Option investing is primarily used to hedge risk. Just as a farmer sells corn futures or buys corn puts to hedge the season's harvest, a pension fund may implement an index option trade to hedge a stock portfolio.

Hedging strategies typically involve both buying *and* selling options. The S&P 500 option volume data shows an acceleration of trading from the early 1990s through today, as shown in Figure 1. Investors have increasingly adopted new options strategies as part of their hedging programs. Lately, new exchange-traded volatility products have caused volumes to increase further.

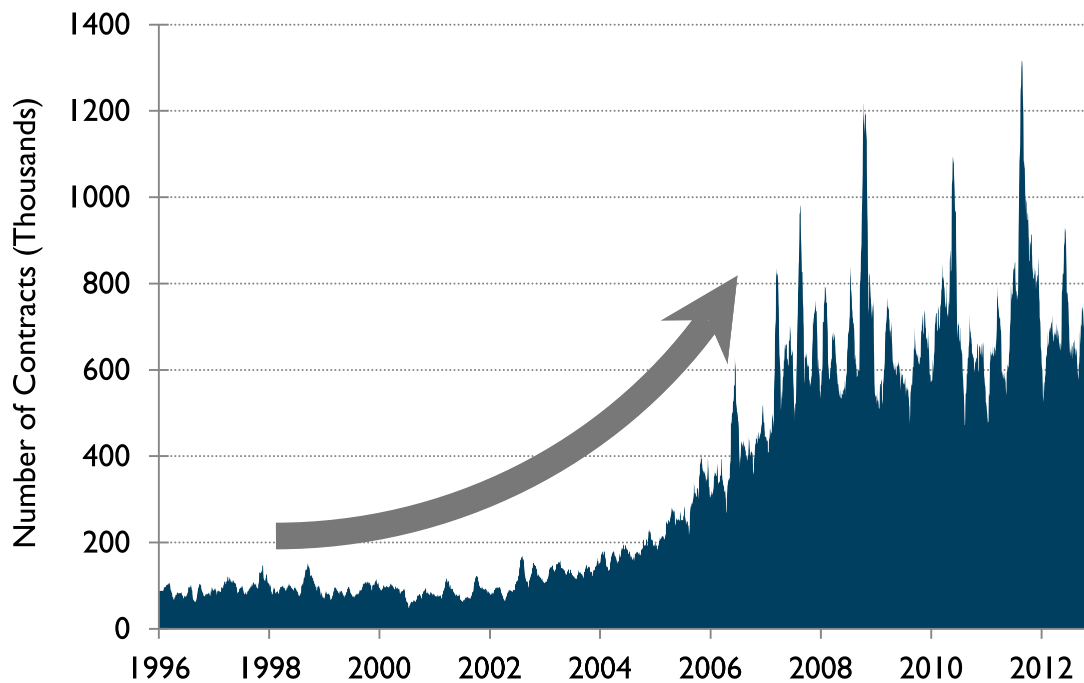

Figure 1: Total S&P 500 index option volume (1-month moving average).

While the open interest of S&P 500 options has grown in tandem with the surge in volume, the composition of the open interest (OI) has changed. In particular, a greater number of put options are being held in inventory relative to the number of call options. Figure 2 shows this gradual increase in the open interest of puts relative to calls.

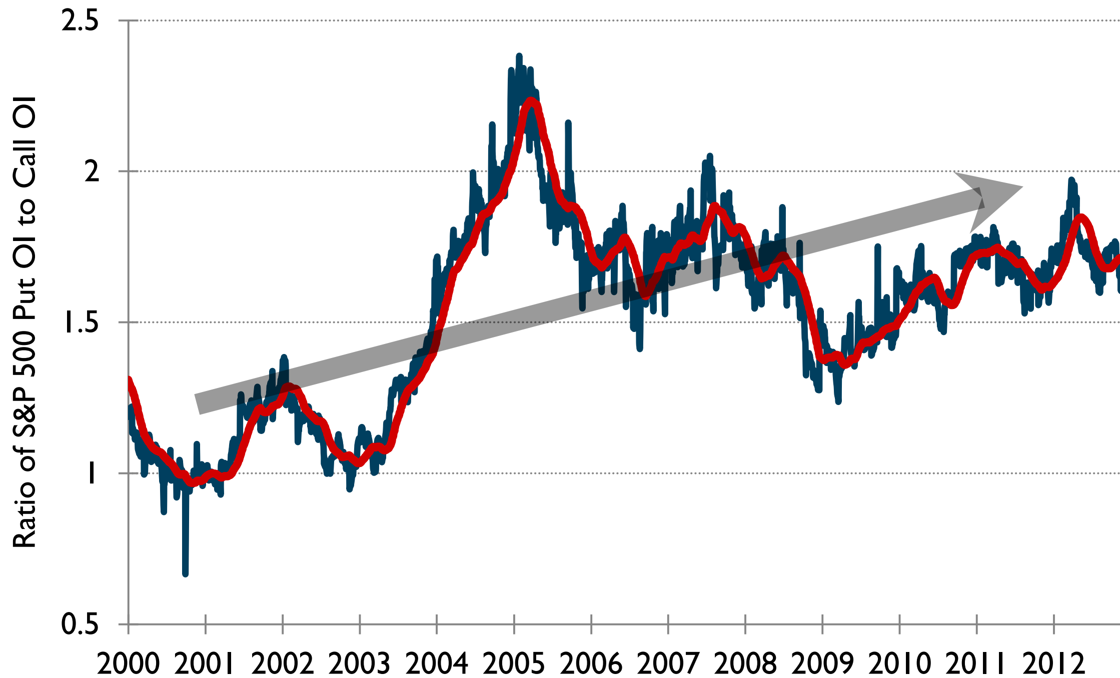

Figure 2: Ratio of S&P 500 put open interest to call open interest and 3-month moving average since January 2000.

The proliferation of natural hedging activity as well as new volatility products is driving these increased volumes and open interest levels. Participants use S&P 500 options to replicate and hedge a number of volatility products, particularly those derived from or related to the VIX. Consider the following trade examples between different market participants:

1. Hedge fund buys a VIX call option that is sold by market maker A
2. Market maker A is short the VIX call and needs to hedge it by buying VIX futures from market maker B
3. Market maker B is short VIX futures and needs to hedge by buying a strip of S&P 500 options from market maker C
4. Market maker C will warehouse the strip of short S&P 500 options and delta hedge them or work to cover them at a fair price

Market makers can choose other hedging mechanisms, but eventually the risk of all these new VIX products make its way back into the S&P 500 options, and many times the replication process requires a position in a strip of puts. This increased relative activity in put options is illustrated in Figure 2.

Hedging is typically used to protect against left-tail events (downside volatility). An interesting wrinkle in 2012 is that the S&P 500 is realizing higher upside volatility than downside volatility. This is somewhat counterintuitive and historically unusual, as illustrated in Figure 3. Despite implied volatility of downside options trading at a premium to upside options throughout this year, the realized volatility has been the opposite.

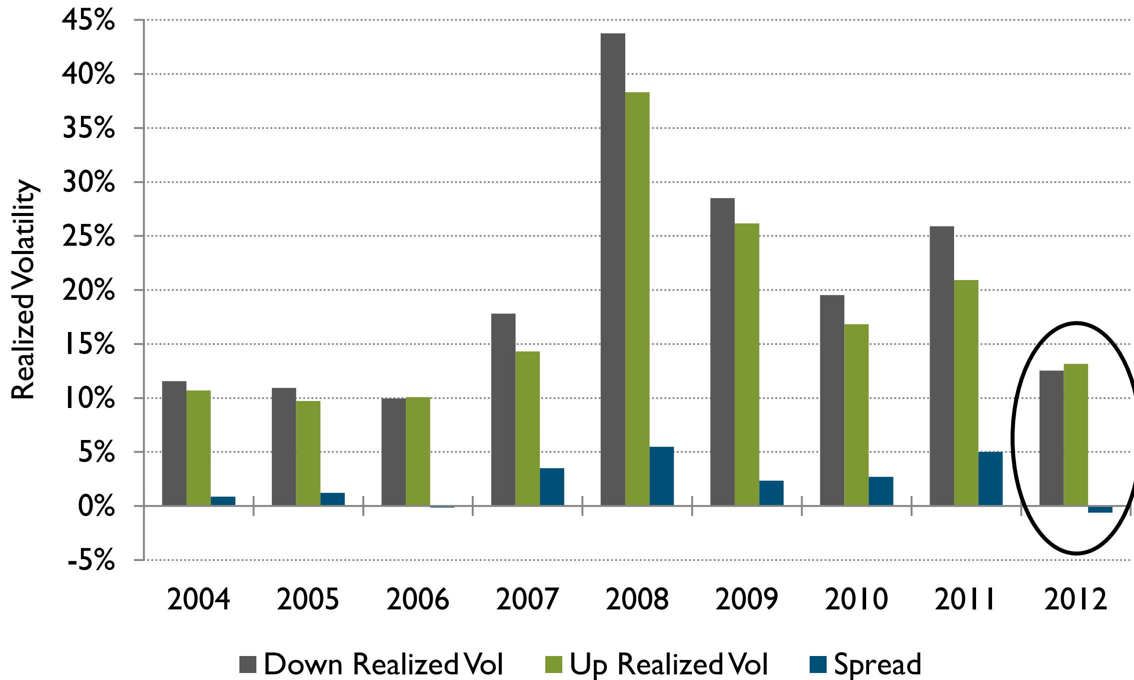

Figure 3: S&P 500 downside and upside realized volatility by year.

The market's recent tendency to be more volatile on positive return days can make hedging the left-tail difficult. It induces investors to unwind hedges more quickly than during prior periods. This creates a trading-like atmosphere around hedging strategies. This situation is a new phenomenon that also creates opportunities in liquidity providing.

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