

Evolving trends in the US equity derivatives market

Dean Curnutt and Phil Rapoport discuss the changing use of derivatives and the factors affecting volatility levels in US equity markets over the past several years.

A market matures

The volatility landscape in the US equity market has changed dramatically over the past several years. The days of 'Nasdaq 5000' tech volatility are well behind us. So too are the volatility levels associated with the summer of 2002, when large-scale fraud and bankruptcies created a volatility and credit storm in old economy stocks. Replacing uncertainty has been relative calm where equity volatility has been both low and stable. Figure 1 shows that, while the Volatility Index (VIX) has gradually trended lower over the past several years, it has become increasingly stable. This trend – towards both lower vol and lower 'vol of vol' – has gradually reduced arbitrage opportunities and instances where option prices stray from fair value. The increase in market efficiency has spurred confidence among investors and has led to an increased usage of options. During the past five years, the number of listed options traded on US exchanges has grown by nearly 150%.

In the past, the risks associated with trading mispriced options

were a barrier to entry for many players – a large component of the investing community had avoided options since a correct fundamental view implemented through options might not have been rewarded due to pricing inefficiencies. This is changing. As the market has matured and volatility continues to meander at a historically low level, option volume has trended away from volatility arbitrage strategies and towards directional and catalyst-driven trades. Option trades among institutional investors are now more often motivated by a directional view or focused on stock price reaction to an earnings announcement, a legal decision, a merger, or other specific catalyst.

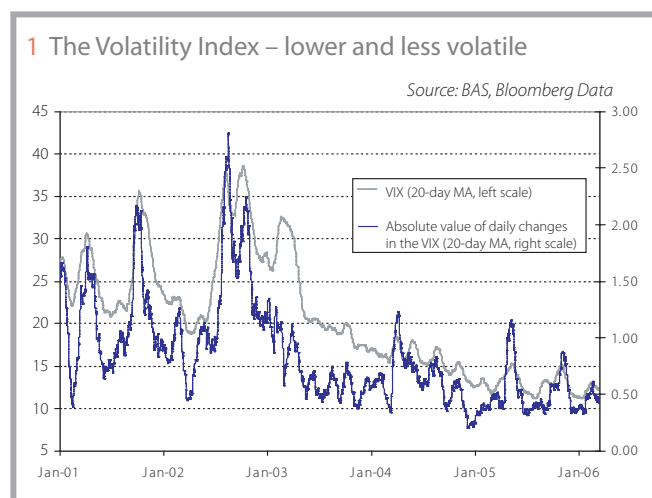
This trend is readily visible in changes in single-stock option volume. Table A ranks securities by top option volumes in 2005 and also shows their 2004 option volumes and ranks. PFE volume revolved around the patent rulings, MO around tobacco litigation, GM around credit uncertainty: these are all event-driven trades. On the heels of this trend, there has been a shift towards shorter-dated option maturities as these can be more effective in capturing catalyst events. Figure 2 shows the term distribution of US-listed options traded with Banc of America Securities.

Where has all the vol gone?

Whereas 1999–2002 was extremely volatile relative to historic averages, the 2003–2006 period has seen a range-bound market with few outlying returns. Figures 3 and 4 plot a histogram of daily NDX returns for two periods: 1999–2002 and 2003–2006. The more recent distribution is much tighter, with all data points lying between -4% and 5% and the bulk falling between -1% and 1%. This is a radical departure from the previous period where we saw frequent moves of 3% and 4%, with extremities such as a 17.2% up move on March 1, 2001. A similar such contrast would be visible in a histogram of SPX returns.

What has caused this significant decline in volatility levels? The strength of corporate balance sheets has had a significant effect. US businesses have prospered over the past few years, reporting 14 consecutive quarters of earnings growth amidst easy monetary policy which has helped bring EPS to multi-decade highs. Corporate leverage¹, which peaked in early 2003, has since cascaded downward. On the whole, predictability of cash flows has increased and risk of default has decreased – two volatility-dampening traits. This is in contrast to the environment of higher leverage in the earlier part of the decade.

The breakdown of stock-to-stock correlation has also played a



A. Securities ranked by top-option volumes

2005 rank ^o	2004 rank	Underlying security	2005 option volume	2004 option volume
1	1	QQQQ	98,066,598	116,932,843
2	n/a	SPY	42,261,450	n/a
3	6	IWM	34,954,357	15,319,236
4	32	GOOG	28,299,038	5,694,932
5	7	AAPL	27,305,559	15,153,974
6	15	MO	24,287,162	9,519,311
7	48	GM	21,885,172	3,979,178
8	11	PFE	19,626,291	11,177,684
9	43	VLO	18,289,642	4,407,808
10	2	MSFT	17,511,859	20,280,025

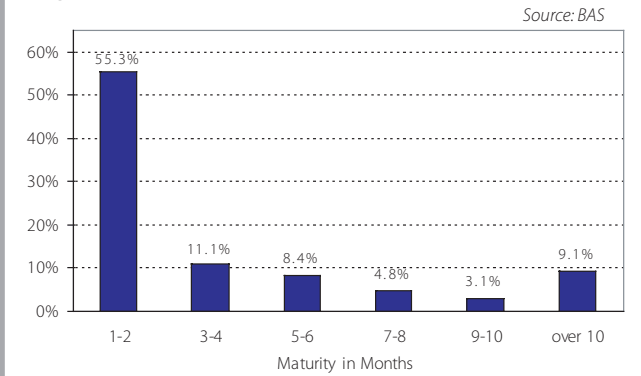
Source: BAS, Bloomberg Data

role in the decline in volatility. The volatility in an index is the result of two factors: the movement of the stocks that comprise the index and the correlation among those names. Over the past several years, we have experienced a low level of correlation as stock returns have been driven more by fundamental, idiosyncratic factors than by macroeconomic forces that impact the market at large. With the co-variation in stocks low, the overall movements in indices are lower. There is no better example of this than in the NDX where a shift in its composition from a purely tech index to a mix of tech/biotech has lowered realised correlation among the stocks. For example, AMGN, GENZ and BIIB are all heavily weighted in the NDX but have little in common with MSFT or INTC (they are uncorrelated). Correlation is also lower, partly because tech as an asset class has just become a looser concept. CSCO, EBAY, and MSFT are less likely to all move sweepingly together now than they once did when they were regarded as new-economy stocks. Individual stories, performance and earnings have come to have greater influence over technology sector equity prices than they did a few years ago.

Sector trading is correlation driven

Within popular sectors, there is an empirical relationship between volatility and volume. As volatility spikes, exchange-traded fund (ETF) volume increases. As previously discussed, changes in volatility are frequently the result of changes in correlation. Traders tend to find opportunities in sectors where volatility is high, generally the result of an increase in correlation among the stocks. We observe that volume tends to be concentrated in ETFs where the stocks are highly correlated. Figures 5 and 6 show rolling one-month trading volume for

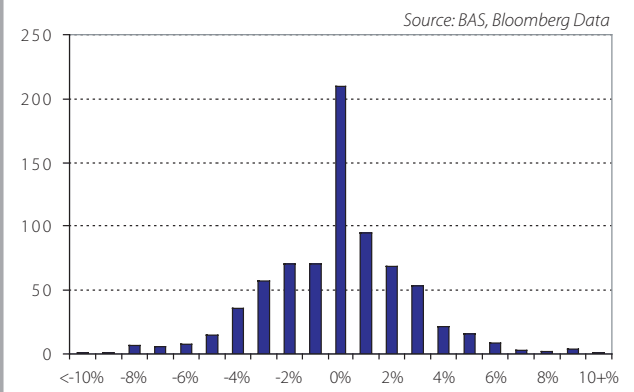
2 2005 term distribution of Banc of America Securities flow



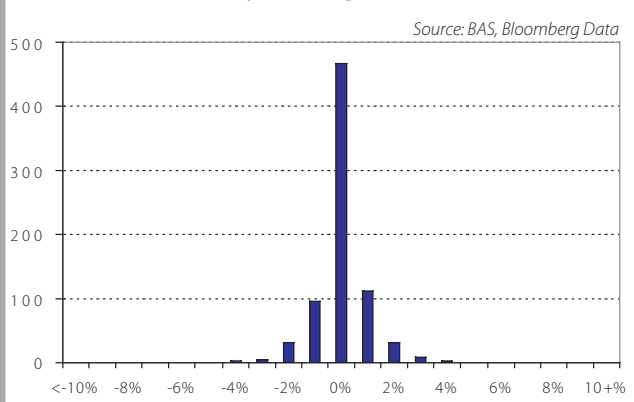
¹ This refers to net debt/earnings before interest, taxes, depreciation and amortisation, a popular measure of leverage.

² HOLDRS and HOLDing Company Depositary Receipts are service marks of Merrill Lynch & Co., Inc.

3 Distribution of daily NDX log returns (1999–2002)



4 Distribution of daily NDX log returns (2003–2006)



both low and high correlation ETFs. We index the volume to the average volume observed for each ETF for the month of January 2005.

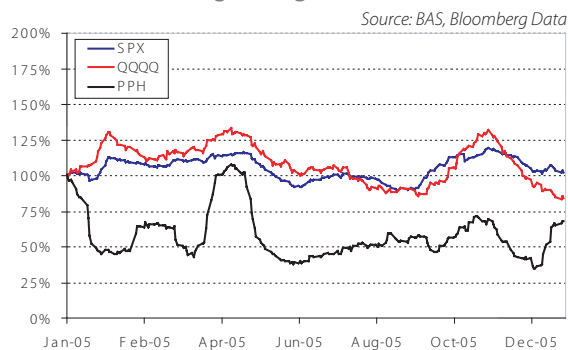
Figure 5 shows the SPX, QQQQ, and PPH (Pharmaceutical HOLDRSSM)². These are all relatively low correlation baskets. In the NDX, we discussed the low level of realised correlation among the stocks. Likewise, in the pharma sector, most of the volatility comes from individual company news relating to product pipelines, Food and Drug Administration decisions, etc. The change in trading volume for these three 'low correlation' ETFs is insignificant throughout the year.

Figure 6 shows volume in the OIH (Oil Services HOLDRSSM)², XLF (Financials Select Sector), and RTH (Retail HOLDRSSM)². These ETFs were moved by sector-specific factors in 2005 that resulted in a high degree of correlation among the stocks. The OIH, for example, was heavily leveraged to the price of crude – the names in the basket all reacted together and in the same direction from supply shocks such as Hurricanes *Katrina* and *Rita*. Similarly, XLF constituents reacted in unison to the credit derivatives uncertainty in April 2005 and interest rate-related news coming from the Federal Open Market Committee. As can be seen in figures, the deviation in volume from the initial 100% strike is much greater in these correlated indices as there was more potential for movement and profitable opportunities.

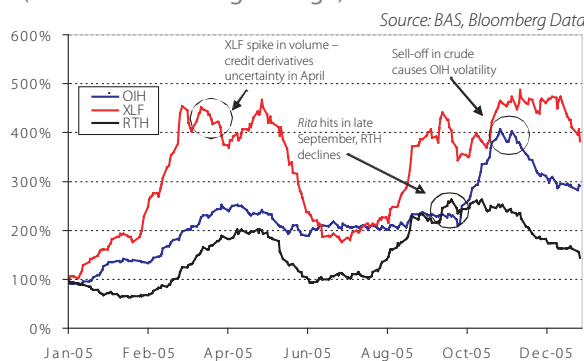
The buy-write gets big

As the broad-based indices have exhibited low correlation and volatility over the past few years, investors have struggled to find returns by going long stock alone. Against this and the backdrop of low fixed-income yields, the buy-write (selling out of the money calls against a long stock position) has seen a surge in popularity.

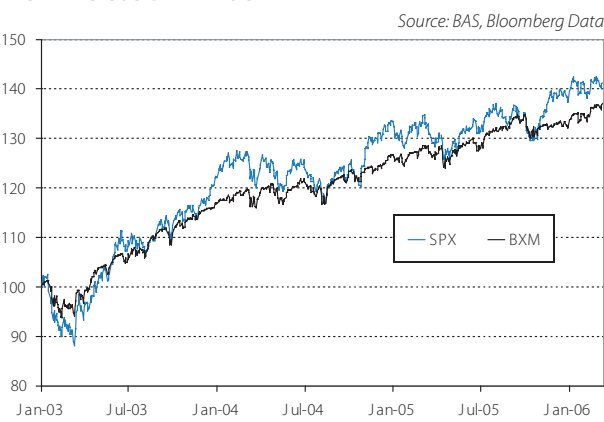
5 'Low correlation' ETF trading volume 1 (one month moving average)



6 'High correlation' ETF trading volume 1 (one month moving average)



7 SPX versus BXM index



The additional premium taken in via a buy-write can reduce the initial average purchase price of stock and, if the short-call position expires month to month, supplemental yield can be achieved by selling another call against the existing position (it should be noted the covered-call writer still bears the downside risk of owning the stock, less any premiums and dividends received). This strategy has proven both popular and successful in the range-bound market of the past few years. Investment in funds dedicated to this strategy has surged: over \$11 billion has been invested in covered-call funds in 2005, a sizeable increase from the previous years. In April 2002, the Chicago Board Options Exchange launched the BXM, an index

that reflects the performance of overwriting the S&P 500. Figure 7 illustrates the relative performance of the BXM and the SPX since 2003. While the SPX has outperformed, it has done so with a higher degree of volatility than the more defensive BXM. In sideways or down markets, the BXM will likely outperform the SPX.

Conclusions

In this note we highlight changes in the use of equity derivatives by institutional investors over the past few years. As volatility levels began a steady descent in early 2003, opportunities to capture option mispricings declined and the market gradually became more efficient. The growth in volume has been driven largely by investors using options to express directional views on catalysts such as earnings, regulatory decisions, and mergers. The decline in volatility levels owes to several factors, one of which is the decrease in risk and leverage at the company level. Another factor, low-realised correlation, dampens index volatility as stock price movements are often in opposite directions. It is in the sectors where stock-to-stock correlation is especially high – for example, the energy sector – where trading activity is concentrated.

With implied volatility at low levels, a large component of the option flow has been to the buy-side where investors have found options an efficient vehicle for expressing long or short views with a defined premium outlay. Balancing this increased demand for options has been the ongoing source of volatility supplied to the market by overwriting accounts, a group that has grown significantly in size recently. This 'equilibrium', along with other factors such as the growth of electronic options trading, paves the way for increasing participation from the broad institutional community as the market continues to grow in liquidity and efficiency.

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