

After the Volpocalypse

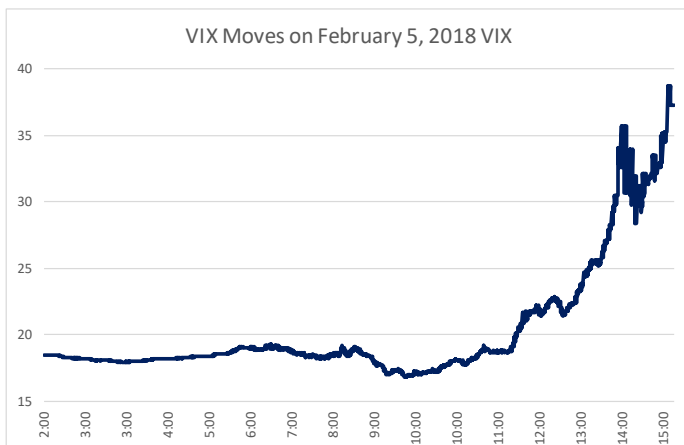
Executive Summary

- The week of February 5, 2018 was historic. First, the Dow Jones Industrial Average experienced its two largest one-day point declines in history, falling 1,175 points on Monday and then following up with a 1,033-point-decline encore just three days later. Additionally, on February 5, the VIX (Cboe Volatility Index) experienced its largest daily increase on record, rising 20 points from 17 to 37, or 115%.
- Unwind of a large and “crowded” short position in the VIX futures and options complex appears to have been the catalyst for the broader market selloff. In the seemingly tail-wags-dog event, at least \$280 million “permanent” Vega supply was likely removed from the market.
- Notwithstanding the VIX increase and related market dislocations, trading in “vanilla” exchange-listed S&P 500 options remained orderly.
- Traditional option-writing strategies represented by the Cboe BXM and PUT Indexes performed largely as expected given the environment, while catastrophic losses were experienced in highly leveraged short VIX/volatility strategies like the XIV and SVXY.
- After the events of last week, higher implied volatilities and a reduced number of volatility sellers should provide an excellent opportunity for option-writing strategies going forward.

What happened to volatility on Monday, February 5th?

On Monday, February 5, 2018, the Cboe Volatility Index (VIX) experienced the largest one-day rise in its history. As shown in **Figure 1**, the VIX vaulted over 20 points from its previous day’s close of 17.31 to settle at 37.32, representing a 115% increase. Interestingly, the VIX movement was muted during the first part of the trading day, and then rapidly increased with no apparent catalyst towards the end of the day, experiencing significant gains around the market close. Not shown, but worth noting, is that the VIX spiked even further, to over 50, in after-hours markets on the evening of the 5th.

Figure 1 (Source: DGV; Bloomberg)



A 20-point, 115.6% day-to-day move in the VIX is highly significant and represents by far the largest one-day move on record since the inception of the VIX. In fact, the next largest move in the VIX occurred in early 2007, and was only 64.2%. To further put this into perspective, **Figure 2** illustrates the magnitude of Monday’s move in comparison to other one-day VIX jumps. Historically, volatility regime changes have occurred more gradually and been largely related to changes in the business cycle rather than technical corrections in the market.

Figure 2 (Source: DGV; Cboe)

Biggest One-Day Move for the VIX			
Point Moves		% Move	
5-Feb-18	20.01	5-Feb-18	115.6%
22-Oct-08	16.54	27-Feb-07	64.2%
8-Aug-11	16.00	15-Nov-91	51.7%
15-Oct-08	14.12	23-Jul-90	51.5%
1-Dec-08	13.23	8-Aug-11	50.0%
24-Aug-15	12.71	24-Jun-16	49.3%
29-Sep-08	11.98	21-Aug-15	46.4%
24-Oct-08	11.33	17-May-17	46.4%
18-Aug-11	11.09	24-Aug-15	45.3%
20-Jan-09	10.54	10-Aug-17	44.4%

The large move in the VIX appeared to catch off guard traders who had been betting on continued calm or a “roll down” in the VIX futures curve. This roll down trade had become highly popular in recent years as the market experienced few drawdowns and those that did occur were quite shallow. In the end, the market witnessed an unraveling of the crowded short in the VIX complex and what many believe ultimately caused the gap lower in global equity markets.

Over the past few years, shorting volatility had delivered robust returns. Wild equity market swings have been infrequent, leading investors to bet that the VIX (as a proxy for market volatility) would stay low, or even decline further. Investors would short volatility and continuously profit as calm markets prevailed. The advent of and growth in VIX futures and

options enabled investors to employ highly focused positions that would skip the “vanilla” S&P 500 options market and invest directly in the VIX, which is itself a derivative of the S&P 500 options market. As the VIX curve became very steeply upward sloping, the short bets not only benefitted from low and declining volatility, but also the “roll down” as the futures traded lower to ultimately converge with the spot VIX, which closed at an all-time low of 9.14 on November 3, 2017.

The popularity and success of these short volatility trades led to the development of investable products that would allow retail investors to take views on the movement of volatility. Leveraging the ability to trade VIX Futures, several exchange-traded products (ETPs) were created to bet on the movement of the VIX. These included ETPs that bet on both long or short volatility. Long volatility products were used to hedge against market dislocations, while short volatility products were used to bet that the markets would remain calm. One of these products, VelocityShares Daily Inverse VIX Short-Term ETN, which traded under the ticker XIV (cheekily, VIX spelled backwards), rose from \$6.51 at the end of 2011 to \$134.44 at year-end 2017 – a 20x return or 65% annual IRR over the six years.

With market conditions remaining historically calm over the past several years, these products attracted capital like moths to flames. The XIV was but one ETP launched. Others included ProShares Short VIX Short-Term Futures (SVXY) and a series of mutual funds offered under the LJM brand. In fact, approximately \$3.7 billion in assets had accumulated in short volatility products over the last few years (based on January 31, 2018 estimates). That is only the observable vehicles. It is speculated that over-the-counter instruments were created that were multiple times the size of these products. Additionally, there were a myriad of hedge funds and proprietary trading shops also deploying capital in the short VIX trade. Even day traders got into the act as the story of a (former) manager at Target who made millions of dollars was published by Business Insider in the summer of 2017. What could possibly go wrong?

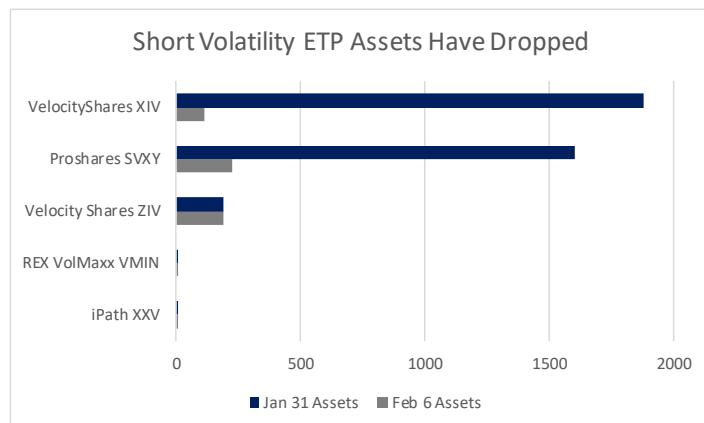
Murphy’s Law

XIV and SVXY were two of the largest products designed to capture the one-day inverse return of the VIX (that is, short volatility). Each of these ETPs were systematically short VIX futures – and resulted in a short Vega position in derivative parlance. Vega is a “Greek” risk for options that is defined as the profit/loss expected from a 1-point rise/fall in implied volatility. Since VIX futures are a direct bet on implied volatility, and each contract has a multiplier of \$1,000, short 1 VIX future would be short \$1,000 Vega and a 1-point rise in the VIX future would result in a \$1,000 loss. XIV and SVXY shorted the near-term VIX futures, betting that volatility would remain calm, and exposing themselves to significant losses in the event of a sharp upward movement in volatility. Because of the inherent unpredictability and potential for unlimited losses that accompanies shorting volatility, these products had stop-out/liquidation triggers if the funds were to experience an 80% drawdown. The 80% trigger was set to provide time to unwind losing positions and hopefully ensure that the funds did not experience a loss greater than 100%. Such stop-out/liquidation triggers were likely to occur if the VIX increased by more than 80% in one day.

Together, these circumstances made the markets ripe for a volatility event. On the February 2, 2018 close, XIV and SVXY were short approximately 280,000 VIX futures combined (or, \$280 million Vega). The more than 100% VIX rise on Monday February 5th, 2018, forced these products to cover their respective shorts, incurring significant realized losses. Both funds lost over 90% of their respective value. As a fall-out from the VIX move, XIV is to be liquidated (as allowed per the fund documents) and SVXY continued to trade, albeit, at a fraction of its previous value.

As the following **Figure 3** illustrates, post the events of last week, short volatility exchange-traded product assets dropped from \$3.7 billion to approximately \$525 million.

Figure 3 (Source: DGV; Bloomberg)



Further, although there is less transparency around the execution of the VIX “roll down” trade, we believe many hedge funds and proprietary trading desks were running this trade. That is, a trade that shorts VIX futures, with the view that volatility will remain the same or decrease as the contract moves toward expiration, and monetizing the difference between the front month VIX futures and VIX spot. It is likely with the significant and rapid increase in volatility that many of those who were short VIX futures were wiped out or covered their positions at a significant loss. In fact, over this past weekend, it was reported that a

volatility fund manager, LJM Partners, sent a liquidation notice to its investors, noting the adverse effects the rapid rise in volatility had on its funds. The assets of the firm were said to be over \$500 million prior to last week (Source: [CNBC](#)). All in all, the number of short volatility players in the market – and associated assets behind the short volatility trade – should be significantly reduced.

How did S&P 500 options hold up during this period?

Notwithstanding the increase in the VIX, whose calculation is derived from a strip of S&P 500 options’ prices, the actual “vanilla” S&P 500 options did not experience any significant disruption. Although equity markets declined significantly, the selloff was mostly orderly outside a couple hours during the afternoon of February 5th. Equity markets experienced a roughly 12% correction over two weeks from their all-time closing high on January 26th, compared to a 115% one-day increase in the VIX.

While bid/ask spreads for S&P 500 options widened during the sharpest portions of the equity market decline, trading was orderly, positions remained liquid, and we did not witness any notable market disruption. As we would expect with an increase in market volatility, option premiums rose versus levels observed before the event. To put into context, we rebalanced a sizable portion of our Enhanced U.S. Equity Fund on Monday, February 5th, selling S&P 500 Index options with premiums over three times higher than we received just the prior week.

Given the rapid rise in the VIX and the sharp downward movement in the S&P 500 Index, traditional option writing strategies such as those tracked by the Cboe PUT and BXM Indexes performed largely as expected. These strategies have exposure to the underlying market in downturns, but do not utilize leverage or “derivatives on derivatives” and thus did not experience unexpected behavior. In fact, the traditional option writing strategies – through receipt of the option writing premium – cushioned the decline in the S&P 500 Index. The Cboe BXM Index PUT Index declined -4.66% and -4.76% respectively during the week of February 5th compared to the S&P 500 decline of -5.10%. Going forward, these strategies should benefit from higher market implied volatilities and the receipt of larger option premiums for writing S&P 500 options when they rebalance.

Looking forward

This week's events have set-up an excellent opportunity for option writing strategies. Many structural short volatility market participants (such as XIV and SVXY) have been effectively eliminated from the market. Removal of this volatility selling supply should reduce downward pressure on the VIX and, by extension, S&P 500 Index option premiums.

Further, like writing catastrophe insurance just after a major storm or natural disaster, one of the most opportune times to write options occurs after a major volatility event. Market participants are often willing to pay significantly higher premiums after events like occurred last week. To underscore these points, **Figure 4** shows current SPX Index at-the-money put option premiums for one-week and one-month options along with premiums available over the previous weeks. As the table shows, current premiums are significantly higher than what was available just two weeks ago.

Figure 4 (Source: DGV; Bloomberg)

Trade Date	SPX Value	Premium (\$)	1-week SPX Option Premium as Percentage of SPX Spot	Premium (\$)	1-month SPX Option Premium as Percentage of SPX Spot
2/9/2018	2,619.6	\$34.65	1.3%	\$63.70	2.4%
2/2/2018	2,762.1	\$24.25	0.9%	\$43.45	1.6%
1/26/2018	2,872.9	\$12.90	0.4%	\$27.75	1.0%

Conclusion

We believe last week's "volpocalypse" sets up well for option writing strategies going forward. Due to fewer participants selling volatility and more uncertainty in the marketplace, volatility levels and option premiums should remain elevated. The ability to capture these increased premiums should enable traditional option selling strategies to cushion down market participation in the event of continued equity declines. And, higher premiums should also position option writing strategies to participate in more of the upside in the event of flat or upward trending market.

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