

## OPTIONS MARKETS - WHAT ARE THEY TELLING US

What a difference a few weeks can make to the market. After the sharp drawdown in the S&P 500 in the first quarter, a little over 3 months was spent in recovery. By mid-July the S&P 500 had regained the level it had at the beginning of the year. There has been considerable debate about the speed of the recovery given the state of the economy. However, a less debated but equally surprising fact has been the behavior of the VIX - the fear gauge. Fig. 1 shows the changes in the VIX and realized volatility over this year.



Source: RockCreek, Refinitiv Eikon - Thomson Reuters. As of 9/2/2020.

Figure 1: VIX and 20-day realized volatility in 2020

Uncharacteristically, the VIX that stood at around 12 at the beginning of the year, was at twice the level at 24 in mid-July when the S&P 500 finished its roundtrip on levels. In fact, the VIX at 26 is even higher now even as the S&P 500 is making new highs. To put this in context, post the tech bubble in 2000, the VIX peaked at around 17 or lower, every time the S&P 500 made new highs. Even during the tech bubble, a period marked more by greed than fear, the VIX peaked at about 24. The interesting question is what prompts the VIX to reach such high levels in a rallying equity market? This is not what one would expect from a fear gauge.

Historically, implied volatility cues off the current realized volatility of the equity

market. In fact, implied volatility levels tend to be a couple of volatility points higher than historical realized volatility – a difference attributed to risk premium needed to ensure investors are willing to sell implied volatility. However, annualized realized volatility (calculated on a 20-day lagged basis) is currently at 9%, and in line with realized volatility levels in January 2020. The difference of 17 points between implied and realized volatility levels is extremely high compared to the risk premium generally demanded by investors to provide insurance.

One explanation for the higher level of the VIX, a measure of implied volatility, is that there is increased uncertainty in market outcomes. More specifically, this relates to the uncertainty surrounding the Presidential election and its market implications, as well that related to the pandemic and vaccine and its economic implication. A look at the difference in strike prices for volatility and variance swaps (close to all-time highs) makes it likely that this is a plausible explanation. It is also quite likely, that seasonality has kept realized volatility low in August, making the risk premium look larger than it is. Whatever the reason, the implied and realized volatilities should eventually converge as uncertainties are resolved, with implied volatility going down even as realized volatility goes up.

A second explanation for a higher level of VIX is the lack of liquidity in the volatility markets. The sharp spike of implied volatility in March resulted in the exit of many of the traditional sellers of volatility in the market, mostly pension plans and hedge funds. The ensuing mismatch between demand and supply of volatility had caused the price of volatility to go up. While the demand for volatility is likely to stay up till some of the major uncertainties are resolved, it appears very likely that supply will remain constrained despite the higher VIX levels for an extended period. In short, high VIX levels are here to stay with us at least through the end of this year.

Even as we have witnessed high levels of VIX, we have also seen VIX index move in a manner that appears disconnected to the S&P 500 index. Traditionally the VIX moves down when the S&P 500 moves up, and vice versa. However, more recently the VIX has moved in sync with the S&P 500 index as shown in Table 1.

Table 1: S&P 500 and VIX indices. The days when both indices move the same direction are highlighted

Date	S&P 500	S&P 500 Change	VIX	VIX change
8/18/2020	3389.78	0.20%	21.51	0.70%
8/19/2020	3374.85	-0.40%	22.54	4.80%
8/20/2020	3385.51	0.30%	22.72	0.80%
8/21/2020	3397.16	0.30%	22.54	-0.80%
8/24/2020	3431.28	1.00%	22.37	-0.80%
8/25/2020	3443.62	0.40%	22.03	-1.50%
8/26/2020	3478.73	1.00%	23.27	5.60%
8/27/2020	3484.55	0.20%	24.47	5.20%
8/28/2020	3508.01	0.70%	22.96	-6.20%
8/31/2020	3500.31	-0.20%	26.41	15.00%
9/1/2020	3526.65	0.80%	26.12	-1.10%
9/2/2020	3580.84	1.50%	26.57	1.70%

Source: RockCreek, Refinitiv Eikon - Thomson Reuters. As of 9/2/2020.

In fact, over the period beginning mid-August, the S&P 500 has generated a positive return of 5%, and the VIX has moved up by 25%; although based on tradition, it should have moved down by 25%. This strange behavior of the VIX, raises the question as to whether the VIX cannot be counted on to be a fear index.

The VIX, as is well known, measures the implied volatility of all options on the S&P 500 index. In other words, it measures the implied volatility on put and call options. Generally, an increase in the VIX is associated with a rise in the implied volatility for puts - and therefore its nickname as a fear gauge. However, it is easy to forget that an increase in VIX can just as easily result from an uptick in call volatility. A quick analysis of the put/call ratio on the S&P 500 index over the past few weeks shows a clear downward trend, with the ratio currently lower than the average ratio by more than one standard deviation. This clearly suggests an increased demand for calls with the higher VIX levels attributed to the volatility of calls.

While the increasing demand for call options on the S&P 500 index is interesting,

an analysis of the demand for call options on the larger constituents of the S&P 500 is even more revealing. More specifically, a look at the open interest on call and put options of Apple, Amazon, Facebook, Google, Microsoft and Tesla provided some interesting takeaways. First, the open interest on calls for these stocks outnumbered that for puts across all strikes by orders of magnitude ranging from 2 to 20 as shown in Table 2.

**Table 2: Implied volatility and ratio of outstanding interest of Call to Put options expiring within the next three months with a strike price within 5% of the current stock price.**

	Oct		Nov		Dec	
	Call/Put	Implied Vol	Call/Put	Implied Vol	Call/Put	Implied Vol
Apple	3.94	54.65	5.73	55.27	8.5	51.54
Microsoft	6.81	39.85	4.06	43.79	9.94	42.89
Amazon	3.17	43.62	4.25	50.12	8.86	48.31
FB	5.13	48.7	14.03	53.22	4.77	51.13
Google	1.29	36.31	20.99	41.2	21.31	33.53
Tesla	2.07	126.01	17.23	116.17	1.38	107.89

Source: RockCreek, Refinitiv Eikon - Thomson Reuters. As of 9/2/2020.

This confirms our earlier observation that there is a lot more demand for calls than puts; it holds even more strongly for individual stocks than for the index. Second, the implied volatility on these stocks range from 33 at the lower end for Google to 126 for Tesla at the higher end. A closer look at the option prices resulting from these high levels of implied volatility is very revealing. A 3-month at the money call option costs 10% of the share price for Apple but is close to 20% of the share price for Tesla. In other words, unless holders of Apple and Tesla shares believe that their share prices will go up by 10% or 20% respectively in the next 3 months, they would be better off selling covered calls on their holdings.

This discussion raises two more questions - why an increased demand for calls and the implication of this demand on the prices of these shares. The first question has been partially answered by commentators like Mohammed El Erian, who assert the increased demand is from retail investors. That is not surprising as calls help retail investors obtain leverage, something they cannot obtain any other way. Moreover, they have been known to use options, when there appears

to be a disconnect between the price and the fundamental value of stocks. Retail buying is generally through large brokerage houses, who in turn partially hedge the risk associated being short the options using a process known as delta hedging. The delta hedging process reinforces price trends by purchasing shares when prices go up and selling shares when prices go down. In a market with sustained buying of calls, as it is now, the price appreciation resulting from delta hedging can be significant, but this can unravel quickly when the price of the stock starts going down. The current 3 month call option prices at 10% to 20% of the underlying stock price for some of the in demand stocks looks expensive by historical standards and can lead a sudden drop in demand for calls- a demand drop that could accelerate a price drop in these shares. This drop in prices could further be exaggerated by end of year tax induced selling or by issues related to the expected changes in capital gains tax rates following the Presidential elections. In any case, a drop in prices in the coming weeks cannot be ruled out.

Does the options market give us more clues about market expectations over the next few weeks? A good starting point to answer this question is to look at the VIX futures curve as shown in Figure 2.



Source: RockCreek, Refinitiv Eikon - Thomson Reuters. As of 9/2/2020.

Figure 2: The price of VIX futures expiring in 2020

The VIX futures contract that settles in November is trading at 35. This contract settles before the Presidential election – which is reflecting peak event risk. Given current levels around 26, a quick back of the envelop calculation suggests an attractive return of 25% over 2 months by going short the VIX futures if the VIX level stays unchanged (as indeed does the S&P 500 index). Is that a good risk-return tradeoff?

The answer to that question lies in our expectation for the future price of implied volatility. That depends, on the one hand, on the supply and demand for implied volatility. It is also be driven by increases in market uncertainty. For reasons already discussed, we can assume the supply of implied volatility will remain inelastic in the short run. It is also likely that overall demand for implied volatility will remain unchanged but be driven by demand for puts rather than for calls in the coming weeks. The current high price of calls will dent demand and result in a deleveraging drop in prices. That drop will be probably be exaggerated by tax induced year end selling, and investors will then head towards puts to lock in gains. It looks unlikely that the overall liquidity dynamics will be the driver of prices of implied volatility.

The other reason for a tick up in prices of implied volatility is increasing uncertainty in market outcomes. As we come closer to the date of the Presidential election or the availability of a vaccine, we should see an increase in the realized volatility of the market. Given the negative correlation between return and volatility, we should see a drop in the S&P 500 index. Over long periods, the VIX has moved up by 1.5 for every 1% drop in the S&P 500 index. This implies that the VIX would move from 26 to 34 for a 6% drop in the S&P 500. In other words, the VIX futures market is pricing a 6% drop in the S&P 500 over the next few weeks. Even if the actual drop needed in the S&P 500 is much higher than 6% to cause the VIX to increase from 26 to 34, the many likely reasons for the S&P 500 to go down makes going long VIX futures a relatively cheap insurance to buy.

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