TRANSCRIPT

Volatility's effect on the Greeks and options trading

Konstantin Vrandopulo: Welcome, everyone, to the presentation today. My name is Konstantin Vrandopulo. And I'm joined here today by my good friend and colleague of many years, Mr. Robert Kwon. We know, ladies and gentlemen, that your time is valuable. So, we'll do our absolute best to make sure that all of you regardless of your understanding of options level will be able to take something away from today's presentation.

Both Robert and I are members of the Trading Strategy Desk here at Fidelity Investments. Wanted to tell you a little bit about our team. We work with self-directed investors specifically on developing and implementing more informed trading decisions. And we do that through the use of Fidelity's tools and resources that are available to you as clients. We help investors with formulating really a trading process and creating a plan of action for its execution. We trade ourselves, so we recognize that it's not an easy task. It's definitely riddled with all sorts of complexity. So, I think a lot of our personal experiences are going to be coming through in today's presentation as well. So, stick around for that.

Now we host these webinars for large audiences, but we do these small interactive classroom style sessions as well where you get to interact with us and ask questions in real time. You can find us there at Fidelity.com/coaching. So, without further ado, let's get into the webinar today, How Volatility and Other Important Factors Affect the Greeks. This is really a part two to a two-part series of webinars that we put together. The first one was introduction to Greeks. Now we get to look at option Greeks through the prism of what happens to markets and market participants' actions and how they affect option Greeks.

So, the agenda very quickly today. We're going to review some of the option Greeks, the basics. We're going to really dive into the breakdown of implied volatility. And then we'll showcase some of the tools and analytics that we have screenshots from on our slides throughout the session.

All right. So, delta. First Greek, probably one of the most widely known ones. And most commonly used one I would say. Book definition. Well, it's measuring the options value changes based on one-point or $1 changes in the underlying's price that the option is deriving its value from. Options are derivative products, so we're tracking some sort of an underlying. Well, you could say that's good to know. If an underlying goes up $1 or a point how

much is my option value going to change by? Is it going to go up or go down based on whether you're long or short options? So, in my opinion it's a good way to think about delta as your directional exposure to risk. So, if you are long deltas or short deltas depending on which side of the equation, you're on, long calls or puts, or short calls and puts.

So, gamma. What is gamma? It is the first derivative of delta, and that's a fancy way of saying we know that direction can be changing. The stocks, the indices, currencies, commodities, they go up and down, and we know that Greeks are not staying constant throughout. So, gamma is the measure of the changes in delta given the one-point or $1 move in the underlying. So, it's the rate of change or the speed of growth in delta or destruction of delta. And more on that in the coming slides.

Theta. We know that when we're trading options there are three pillars effectively that we're having to handicap. One is direction, one is time to expiration, we know that we cannot stop the clock, and one is implied volatility changes. Well, theta is that value that is telling us that all things equal -- meaning direction is not changing, the stock is not going up or down, the implied volatility or the people's expectation of future movements of the underlying are not changing, and one day passing, how much is my option

value going to increase or decrease by, so it's the measure of time in dollar terms for us as options traders.

Vega. Measures the options price sensitivity to a 1 percent, one absolute percent, change in implied volatility. So, this is that last pillar. Volatility. Market's expectations of future movements. And vega is effectively the measure of that. So, remember that vega is presented to us in dollar terms as well and it's looking at 1 percent absolute changes in that implied volatility value, which we'll spend a substantial amount of time talking about today.

Implied volatility or commonly referred to as IV is the market's expectation of movement in the underlying security in the future based on the way market participants are currently positioning. These are real dollars that are being spent on calls and puts. They're being bought and they're being sold. And from that we deduce this reflection of their common actions.

Measure of how expensive or inexpensive options are relative to themselves in the past. So, this is a very important factor and I'm going to let Robert really break it down for us and talk to us about what causes implied volatility changes, what causes implied volatility to increase or decrease based on the type of actions that market participants take.

Robert Kwon: Yeah. So, the first thing to know is implied volatility is expressed as an annualized one-standard-deviation move. Now don't mean to bring up any memories from a math class. But what this really means in layman's terms is whatever number you're seeing -- for instance an implied volatility of 20 -- it means the option is pricing in movement on an annualized basis of up or down 20 percent about two-thirds of the time. And that volatility number is presented in a standardized format, so whenever you see volatility it's that annualized one-standard-deviation move. So just like the stock price, the premium of an option contract is determined in the marketplace. And as Konstantin touched upon, if we hold all other factors constant, we can assess a specific component of it. So, if we hold all other factors in this case, like the moneyness of an option contract -- and moneyness is just a term, it's the relation of the strike price to the stock's price. So, you may hear these referred to as at the money, in the money, and out of the money. So, assume the stock price doesn't change. And as Konstantin also mentioned the expiration date of the option also doesn't change. But as we all know time only moves forward as far as I can tell. Getting older every day. So, the option contract is always changing. It's always inching toward the end of its expiration. But when we're studying everything assume time is frozen. Therefore, if the premium that's determined in the marketplace is trading for a larger amount, we mathematically balance the option pricing model by showing it reflects a

higher implied volatility value. And conversely, holding all other factors the same, if the premium is trading for a smaller amount, we will reflect a lower implied value. So, for example referring to what's on the slide now, if a larger move is expected, options are bought to speculate and to hedge, which can lead to increased demand and willingness to pay higher prices, which leads to higher implied volatility and quote more expensive options. And a very common example of this, Konstantin, happens many times a year, couple times a month. Is when there's a known event with an unknown outcome. Like earnings or the numerous types of economic reports which have been highlighted on TV especially lately.

If smaller movement is expected, puts and calls may be sold, increasing supply and leading to less expensive options and lower implied volatility. Now one thing that's very important to remember as an options trader is option trader behavior is not necessarily the same depending on what the stock or the market does direction wise. So, this can actually influence supply and demand for options depending on whether the direction is up or down. And so, I think a great example for instance, the majority of equity exposure in the world is long or bullish, think about your own accounts, your retirement accounts, your 401(k), pensions, all that type of stuff. So, if we were to look at a broad index, say like the S&P 500, demand for options can definitely be directionally

biased. So, if the market is expected to go down or is going down, demand for put options as a method of speculation or very commonly as a method of protection can increase implied volatility. If the market is expected to go up or is going up, the majority of people out there may just watch their account value grow and be happy about it or feel better. The options traders may sell puts for income. They may sell puts they no longer need. And they may also sell calls for income. So, understanding if and what type of directional bias in the demand for options is absolutely critical when planning out your trades.

So how do traders determine if volatility is high, it's normal, low? When are options expensive or cheap or inexpensive? So, there are several things you can look at. So first we compare implied volatility to itself. Just like we might look on a stock chart and look at past price levels, we look at implied volatility to historical ranges for implied volatility for that specific underlying. As I'm sure everybody knows some stocks are more volatile than others. Some indices, some sectors more volatile than others. But in this case, we're comparing a stock's implied volatility to its own past implied volatility. So here we're showing the range for what's called IV30 for the past 52 weeks. Now IV30 is provided by LiveVol. It's part of the Cboe. And it's attempting to show a singular value for implied volatility for roughly a one-month-to-expiration option. Whatever the lowest IV30 over the past 52 weeks, that will be the floor

or the zero percentile. And whatever the highest IV30 will be the one hundredth percentile. And then we basically look at where the current IV30 is.

So below in the high IV example we can see IV30 is actually at the one hundredth percentile meaning it's at the highest level it has been at in the past 52 weeks. In the normal IV example we can see IV30 in the thirty-ninth percentile. It's not an ironclad rule but a lot of traders might use like the 50 percentile, right, Konstantin? Like the 50-yard line crossing midfield so to speak. And obviously we can get to varying degrees as we can see in the last example, IV30 is in the fourth percentile. And additionally, traders may also compare implied volatility to historical volatility. And what that is that HV on your screen. So historical volatility is how volatile the underlying actually was. So unlike implied volatility which is based off calendar days, roughly one month, literally one month out, obviously there's no trading on the weekends, historical volatility is based off of trading days, so in the example the furthest one to the left is HV10, that's the annualized one-standard-deviation move based off the last 10 trading days or roughly two normal nonholiday weeks.

So, something very quick to remember is that the option Greeks only affect extrinsic or time value. An option premium for an at-the-money and out-of-the-money are all extrinsic or time value. And then in-the-money options have

part intrinsic and they have additional value and that part would be the time or extrinsic value. And just as a quick refresh for call options strike prices below current price are in the money and strike prices above are out of the money. And for put options strike prices above the current price are in the money and strike prices below are out of the money.

So when assessing historical implied volatility one thing that's important is if you're going to use an IV range -- I believe some other places might refer to it as IV rank -- it's necessary to not only see the numerical highest and lowest value but how it got there. So, in this example we see periodic rises to varying degrees in looks like the 60-to-70-ish range followed by declines to roughly the 30-ish range. And since this example is a stock which reports earnings four times a year, this is not unexpected. Now not all charts look this clean, right, Konstantin? Some are all over the place, depending on what may have happened before and after a maybe typical earnings report or maybe something was revealed recently in the company that changed the trajectory of that company's future. However, what we are seeing here is there is increased demand ahead of an event, followed by a decline.

But the most important reason why you want to look at a volatility chart when you're using IV ranges is did something distort the range. And the reason why

I bring that up is we had a couple of recent great examples of this. The fourth quarter of 2018, if you remember, the market sold off quite sharply before bouncing back almost just as fast if not faster. And then of course I'm sure everybody's aware of the once-in-a-generation volatility spike we had in the first quarter of this year. So those broad sell-offs probably caused volatility spikes in a lot of individual securities as well.

So, the spike in 2018 represented a high-water mark that would influence the range for the next year. And in similar fashion the spike in the first quarter, obviously if you're bullish hopefully that was in fact the bottom. But that may also influence the range for some time to come, the next 52, in this case nine months or so. So that's important in factoring in where we are in those ranges if you just look at the numerical low and high value. So, I always encourage you if you're going to use an IV range make sure you're using a visual chart as well. And you can use the IV index on Fidelity.com. That's the screenshot we're seeing here. And then more recently we've added an IV indicator from LiveVol on the Active Trader Pro charting. And Konstantin will demonstrate that towards the end of the session.

Vrandopulo: Perfect, Robert. So now on to delta. And implied volatility changes affecting delta. So, Robert indicated to us that of course with calls, in-the-money calls are below the current price of the stock. The out-of-the-money

calls are above the current price of the stock. And of course, at-the-money calls are going to be as close as you possibly can get to the current price. We're not always going to have a perfect strike right at the money. But as close to as we possibly can get to the current price of the stock would be an at-the-money option. Now let's think about this. We mentioned that of course deltas are not stagnant, they're constantly changing. What is also true is that the underlyings are moving around as well.

What I want to say is that you need to understand that towards an end, towards the end, of an option's life, the option is either going to become long or short stock or it's going to expire worthless. So, it's either going to have a positive 100 delta or a negative 100 delta or it will be 0. So, let's think about this from the perspective of where we are right now. Let's imaging that we're looking, we're in May of 2020 right now, we're looking at August expiration options. We have a 65 strike, a 75 strike, and an 85 strike. And the stock is trading at 75 bucks. So, it's equidistant effectively to the downside as well as to the upside, $10 away.

The one that's at $65 is in the money. If you have a $65 strike you have the ability to buy the stock at 65 bucks come the expiration date if you're long that call. Now it should be pretty obvious that you have a much higher probability

of that strike at this current moment in time of becoming 100 delta or becoming long stock at expiration than an 85 strike would. Because it's already in the money. So, a 65 strike has that high value of delta of 95. The at-the-money option is going to be roughly give or take 50 or 0.50. And then the out-of-the-money option is going to have that lower delta or lower probability of becoming stock -- long stock in this case if you're long that call based on where the stock currently is.

Now we have to think about it through the prism of market expectation. Now imagine that the market expectations currently -- and notice that each individual strike by the way has its own implied volatility values highlighted on this left screenshot here, 36, 30, and 31. Now this is the current view of the market's expectations of what is going to happen in the future. And Robert talked to us about the fact that implied volatility is presented to us in an annualized format representing one-standard-deviation expectation. So, imagine if the volatility expectations or the range for future expected move is actually increasing in the marketplace. Market participants expect larger movement in the underlying. So, what used to represent one standard deviation is actually expanding both to the upside and the downside. What happens to our delta?

Well, it should make sense to us of course that an in-the-money delta should be decreasing. Because now that in-the-money delta of 95 that had a very high probability of becoming 100, because of this increased volatility range, has a lower probability of becoming 100. So, the in-the-money deltas are going to decrease.

The out-of-the-money deltas are going to increase because the out-of-the-money strike at 85 now all of a sudden has a greater potential of becoming in the money at expiration. So, in this case the delta moves from 6 to 16. The at-the-money deltas will not change. They're not going to be affected. And this is our way of saying -- this is the market's way of saying -- what? Implied volatility expectations are not necessarily directionally biased based on where the stock is right now. Notice that we are keeping the underlying's price the same. We're just saying if implied volatility changes what will happen to these deltas. So, at-the-money options are going to stay approximately the same.

So, a quick recap here. When implied volatility is increasing, we should be expecting our in-the-money contracts for both puts and calls to be decreasing or contracting. The out-of-the-money contracts, those deltas should be rising in an increasing implied volatility environment.

The opposite is true of course for declining implied volatility values. The exact opposite is true. And at-the-money contracts are going to be relatively unchanged. Now in order to display this on the screenshots here we had to increase the implied volatility value by 50 percent. So, I don't want to beat around the bush and say this is what you normally should expect your deltas to change by. Implied volatility moved from 36 for a 65 strike call to 55. And so forth and so on on at-the-money and out-of-the-money as well. So, it's a pretty dramatic and drastic increase in implied volatility value. Now Robert, as the first quarter, March specifically, of 2020 has shown us, a 50 percent rise in volatility is not anything unprecedented. It could rise by hundreds of percent at a time. And we certainly have seen that in that March decline in the broader markets.

Now Robert is going to tell us a little bit more about the changes in delta. What is getting delta towards becoming either one or negative one or zero? And that's gamma.

Kwon: Yeah. So just to reiterate, gamma is how delta changes. So, it's basically a second derivative. And remember hopefully if you attended part one on Tuesday or are familiar with the Greeks a little bit, gamma is going to be highest for the at-the-money strike.

The biggest takeaway you should have gotten from part one or intro to options is that long options have positive gamma and short options have negative gamma. So how does gamma change as implied volatility changes? So, in the example we have here we can see that if implied volatility increases, at-the-money gamma decreases, while deep in-the-money gamma and deep out-of-the-money gamma increase. So, let's talk about why. So, Konstantin, if we switch over to the next slide, at-the-money options, even though the at-the-money delta roughly stays the same, without bias, stock can either go up or down, so fifty-fifty. If implied volatility increases and the stock is expected to move more, then gamma has less to do, so it decreases. And conversely if implied volatility decreases while delta will stay the same at the money, gamma has more to do, and will increase.

For deep in-the-money options the delta is already going to be closer to the absolute value of one whether it's a call or put. Meaning it's tracking close to long or short the underlying. So, there's not much for gamma to do. Gamma will be closer to zero. So, if implied volatility increases that may introduce more time value back into the contract and as Konstantin mentioned in the delta section it will lower the delta because that in-the-money option has a

lower probability of getting to absolute value of one. So, gamma has work to do again. Therefore, it will increase.

For the deep out-of-the-money options the delta is going to be closer to zero and the gamma will be closer to zero. So, if implied volatility increases the option has a higher chance of becoming in the money, so the delta will be larger and the expected rate of change of delta will be larger.

So, to summarize gamma, remember long options have positive gamma, short options have negative gamma. Gamma will always be highest at the money. But another thing to remember is that in relatively low implied volatility situations the difference between the at-the-money gamma and the deep in-the-money and deep out-of-the-money gamma will be more dramatic, and that's because the deep in-the-money and deep out-of-the-money strike prices will have a gamma that's closer to zero whereas the at-the-money will have its highest relative value, whatever that is.

In a higher implied volatility situation, the difference between the at-the-money and the in- and out-of-the-money gammas will be flatter. And that makes sense given the description of the behavior of the at-the-money strike versus the deep in-the-money or deep out-of-the-money strikes.

So, let's go on to theta. This one is a lot more straightforward I think, Konstantin. So as Konstantin summarized theta is the theoretical change in an option premium for one day passing if theoretically nothing else changed. So literally if you removed one day from your option pricing model and didn't touch anything else your theoretical price would change by roughly the theta value. So, in this example we see that if implied volatility increases all levels of moneyness, in the money, at the money, and out of the money, will show increased theta. So why did I say this one makes a little bit more sense?

Konstantin, if we flip over to the summary page. Well, implied volatility is a reflection of demand for the option as represented by the premium provided all other factors are constant. Therefore if implied volatility rises the time value component, for at-the-money options and out-of-the-money options it's all time value and for in-the-money options the extra part that's beyond intrinsic value will typically be greater, and therefore more time value means there's more to decay. So, theta will increase if implied volatility increases and theta will decrease if implied volatility decreases. I feel like that one is one of the more straightforward ones, Konstantin.

So, let's move over to vega. So, remember. Vega quantifies the change in premium for one absolute percent change in demand for IV or implied volatility. Now in the example Konstantin demonstrated that 50 percent was a relative percent change. So, the 30-ish to the 45-ish area. So vega is quantifying, imagine that 35 went to 36. Or 45 to 46. Or 46 to 45. That's what the vega is quantifying, that one nominal or absolute change.

So, we can see here that for increasing implied volatility at-the-money vegas, they will have the largest value. So, it shares that characteristic with gamma. At-the-money gamma is the highest value. At-the-money theta is the highest value. At-the-money vega will have the largest value compared to the other strikes.

But here it actually will roughly stay the same if implied volatility increases. However, the in-the-money and the out-of-the-money will roughly increase if implied volatility increases.

So that's all well and good, but I think the more valuable information is why. So, Konstantin, if we go to the summary slide, if implied volatility rises, the in-the-money and out-of-the-money strikes now have a greater chance of becoming the at-the-money. So, their vegas rise. And conversely if implied

volatility decreases, the in-the-money and out-of-the-money vegas will decrease.

So, I think to wrap it up, Konstantin, because there's a lot of moving parts here, so while I think it's important to understand these relationships, absolutely, it can be incredibly difficult to juggle all of the moving parts. I know when I first started this, probably the first 15 times I went to it, it really wasn't very clear. And then slowly as you try to read and then understand, the part that helps you understand is using some type of pricing tool.

So, I think it's incredibly helpful for all of you in the audience if for some reason you have not already used Active Trader Pro's profit/loss calculator, use that to model your scenarios. And what you want to do is you want to input your outlook for price, time, and implied volatility, which Konstantin will demonstrate in just a moment, basically is your theoretical price that the model gives you, is it anywhere close to your rough guesstimate that was in your head? Did the Greeks change roughly how you expected? If they did something dramatically different it's going to be beneficial to take a step back and go back to the academic part of it. Like what you're doing today. What is this? Like going to class, doing your homework.

So, what you want to do is you want to study the Greeks well enough so that the profit/loss tool is not replacing your understanding of the Greeks and what your situation is, it's simply doing the work for you. If that makes sense. You can obviously do this by hand if you're dedicated enough and maybe you really love math, right, Konstantin? But fortunately, we have computers, we have software, so it's just no different than a calculator. You can do addition and multiplication and division in your head if you want to or you can do it on a piece of paper. But why bother if you have a tool that can save you a lot of time and effort? But it doesn't replace your understanding of what that tool is doing for you.

So hopefully what you're taking away from not only today's class but part one on Tuesday is if you have not been thinking about your risk, what your exposure is in terms of the Greeks, it can be tremendously beneficial. I know a lot of times when you're first starting you start thinking about oh, I'm a covered call writer. Right, Konstantin? I sell puts. Or I'm a spread trader. And you think about your positioning in terms of their nicknames basically. But it's more beneficial to think about what's helping or hurting me at any given time. And today's class hopefully enlightens you that what that picture looks like changes as time passes, as the stock price moves or the index moves, and as implied volatility or the demand for your options changes.

So, it's very nuanced. But I think it's well worth putting the time to learn about it.

Vrandopulo: Perfect, Robert, and this is a great segue into the screen sharing portion so we can actually put some of this knowledge that we've learned today to good use and you can continue to do so on your own time after today's session is over.

First, I wanted to talk about the options chain of course. I have an options chain pulled up here in Active Trader Pro on ticker symbol SPY, that's the SPDR State Street ETF tracking the S&P 500. Probably one of the most liquidly traded ETFs in the world. We're looking at the options chain and you're probably recognizing that there's a whole host of expirations which is quite a bit different from many underlyings that you normally follow. So, SPY is unique. It has intraweek expirations, those would be Monday, Wednesday, as well as Fridays. It participates in expanded weekly contracts, monthlies, quarterlies, and LEAPS as well. So, plenty of expirations to choose from.

The reason why I brought this up is I'm going to focus on these upcoming June 19th monthly expiration options and we're going to pull up 20 strikes here to

display. You would notice that I have a pretty bare options chain on my screen right now. I have a percent change from yesterday's close obviously, the bid offer, volume, open interest, and the strike, and those are the only things that are being displayed. Now I want to make sure that I'm showing you how you can actually add the Greeks to your options chain. So, we're going to go up to settings. Click on the options chain. Select the Greeks that we want to display in the order that we want to display them. And then we're going to select this implied volatility min value. And you know what, I'm going to move up my min value for implied volatility to display right behind my open interest. So implied volatility, delta, gamma, we talked about theta next and then vega last. Why don't we do it in the order that we talked about it? Go ahead and apply. And now all of a sudden, we have all of our Greeks for individual options. We have each individual implied volatility for each strike. And along the options chain we go.

Now let's utilize the tool. And build out a hypothetical scenario. So, what I'm going to do at this moment in time is use an at-the-money option. And let's look at the call side of the equation. So as close to at the money as possibly could get, 306. I'm going to hover of this little menu bar on the left, click on it, hover over options analytics, and go to my profit and loss calculator. This is going to pull up a tool that allows you to simulate a hypothetical trade without

you having to put real money at risk. And we certainly encourage you to use this evaluation tool before you enter into any transactions.

So, I'm going to mockup a buy to open order as if I'm going this call option long. I'm paying $6.67 for it. I'm going to go ahead and apply. So, notice that we have this call option populated at the bottom of the tool. I am long. And let me delete these other ones out of here. Go ahead and get them out. All right, perfect. Test account gets a little bit busy. So, 306 call. Displaying my P&L graph. I pay $666 for this option. The higher it goes the more money I can potentially stand to make. That's my P&L graph. The most I can lose is the amount that I paid for it.

Now you would notice that throughout the presentation on the screenshots we've actually looked at not just your P&L graph in and of itself but also graphs of the individual Greeks. So, the way this tool works is that it's going to aggregate your position size and multiply out the deltas for your net position size. What I mean by that is if I own one contract of an at-the-money option, and that call option should have a delta of roughly 50, it will show me that I am long 50 deltas. If I go into the simulator and I change my quantity to two, I will have an aggregated position delta that the computer calculates for me. So, it

increased twofold, 103 deltas for two contracts, versus roughly 51 or 52 for one contract.

At the top here you have the inputs of those three pillars that we talked about. The price moving, the time passing which we cannot stop no matter how hard we try sometimes, and the implied volatility change drop-down. You will also notice that underneath we can switch the view from the profit and loss diagram which is displayed here right now to let's say a diagram of delta or a diagram of gamma. And what I'm going to do is let's say that I'm changing my implied volatility parameter, I'm saying it's going to decrease from the current level of 22 by maybe 15 percentage points. So negative 15, I hit the enter button, and all of a sudden, my gamma dynamic changed. My gamma values are redisplayed here as to what would happen if I was the wizard and I was to change that value in the marketplace. It is telling you what your deltas, what your gammas, what your thetas will be based on that change that you've put in.

Now if you own positions in your account already, the computer would recognize them, and it will display them for that underlying security without this sim button to the right of it. Now this is one tool as a tool of five actually in Active Trader Pro. You can see at the very top we have profit and loss

calculator. I wanted to hop over to the option statistics tab to display to you that original screenshot that we kept hovering over in the implied volatility discussion piece. We're providing you implied volatility values provided by LiveVol for 30-day-, 60-day-, and 90-day-to-expiration options. As well as historical volatility based on those real-life volatility values. Based on actual trading days and closes for the underlying right below. We provide you with a range for the past 52 weeks. And if we hover over the value it gives us the percentile view and, in this case, right now SPY implied volatility for 30 days out is in the twentieth percentile. What we notice is that that range is really wide. It's been as low as 9 and has been as high as 76.5. Now that's quite a range for a very broad market capitalization-weighted index like SPY.

So, Robert made a few good points. It's important not to just pay attention to the percentile but where are we right now, where have we come from, and maybe where we're trying to get to. So, looking at this value in terms of maybe a chart pattern is also going to be useful to us. I'm going to go ahead and click on my tools in use here and pull up my implied volatility index that can be brought up by clicking on options, options research, and then selecting the IV index.

Type in the symbol as I did here, and you can see that the range was very tight at the bottom of my screen and then it exploded. So that range expanded dramatically in the first quarter, specifically in the month of March, where we went from that lower value of around 9, 10, 11 to a value of close to 80. And now with the market recovery right back down we went.

So, in terms of a chart we want to keep in mind what the most recent ranges have been. Has there been a dramatic shift of sentiment of sorts that is actually skewing our percentiles dramatically?

Now Robert mentioned that we could also of course chart the implied volatility indicator. And you can certainly do so. This is a chart of SPY going back six months. And what I've done here is clicked on indicators and pulled up the indicator called VOL. VOL. That is the volatility HV IV indicator down below here. So, I've added that on and you can see that the same chart that was compressed for me in the Fidelity.com view that I just pulled up for you, you can actually look at that implied volatility value right below your chart here. And again, representing the same exact value as we saw on the other chart but much more clearly.

Now Robert, I want to mention that in my opinion -- and we talk to these tools every single day in our coaching sessions -- I want to point out how important or maybe how expensive an education lesson has been for many novice traders that were maybe paying attention quite a bit to directional price movement, maybe they had a pretty good take on how much time something is going to take in order to get to where they thought it was going to get to in price terms, but maybe weren't really paying attention to or handicapping the implied volatility parameters as well, did not have a lot of risk management techniques in place, and got caught tremendously off guard by maybe this like Robert mentioned once-in-a-generation type of a move. You can bring up any underlying that makes up the S&P 500, the 500 stocks that make up this index, and the implied volatility charts are probably going to look very similar to what you see down below here in SPY. Because many investors institutional as well as retail got caught off guard practically at the same time and behaviors really changed dramatically very quickly.

Kwon: Yeah, let's leave it on this chart, because I want to walk through. And we've had a lot of calls about this. So, let's examine the consequence of what volatility can do if you're not paying close enough attention. So, imagine before all this happened. Basically, before the ramp-up in high volatility. Imagine you're somebody who sells out-of-the-money puts. And that's all you

do. Well, what were you doing? Well, maybe you were collecting that premium 9 out of the past 10 times, who knows? But what would be the consequence if you sold an out-of-the-money put in a very in hindsight low implied volatility level and did not have a disciplined exit strategy obviously through actually exiting the trade or position size. What would have happened to a short put? Well, not only would the significant decline have hurt. The explosion in volatility would have magnified how bad that situation might have got.

Conversely if you bought a put there, anybody hedging for instance, you may not have needed that hedge over and over and over again. But if you had the hedge on before the volatility exploded not only would the downward move have helped the hedge part of it, the inflated implied volatility might have made it even more effective.

Now let's flip that over to the bounce. What was it, March 23rd, I believe, from memory, right, Konstantin? Imagine you're bullish and you're somebody who only buys options. So, you either buy calls or buy puts if you're bearish. If you were going to buy calls at the height of volatility, you have to understand what did volatility do. It started the waterslide down. So, you would have needed a

massive move up in many cases to compensate for the significant decline in demand for the option.

If you bought a put here that might have hurt twice. Now volatility didn't come down right away. But if you had maybe a longer-dated contract, the upward move would have punished your position, if it was a bearish bet, and the decline in implied volatility, because you were buying basically the contract at the peak of the storm in other words.

So those are just some real-world examples of conversations that I've had recently that if you are not making a realistic expectation of what's going to happen to the demand for your option you could be right on certain components of your outlook, namely price and time, but because of that third important variable, the demand for the option, the situation may look dramatically different than what you were expecting in many cases. It's usually hey, I bought this call option, the stock went up, I made some money, but I barely made anything, where's the rest of my profit. So that's why I emphasized earlier in the webinar you have to recognize is there some type of directional bias to demand for options once the thing starts moving. That's where it comes into play. And that's also the danger of not having a disciplined exit strategy and disciplined position sizing if you are selling way

out-of-the-money puts trying to build in safety through probability at least at the time. Remember probability is based off a volatility assumption. And in hindsight something dramatic happens. Because you can never hit a home run selling those way out-of-the-money puts in a low volatility environment. You can only make the premium. Again, this may not happen often. The last time we saw something similar to this was maybe 2018, maybe the financial crisis, but not even to this magnitude.

It only has to happen one time for the trade -- you could potentially have a devastating result. Maybe wipe out, 10 trades wipe out the past year of trading. So, you always want to make sure that you're understanding not only what your outlook is, but if you are wrong what does being wrong look like. When you sell way out-of-the-money puts the disaster is a market or stock basically crash and it's not just the direction down that's going to hurt you, it's the surge in demand.

So hopefully everybody attending didn't have to learn too painful any lessons. Konstantin and I, we've been there, that's why we know. You have to understand what being wrong looks like. And the Greeks can help you do that.

Vrandopulo: Yeah. And Robert, using the profit and loss calculator tool to model what that pain potentially could look like if you were wrong in your assumption, if the underlying goes down, if implied volatility rises, so doing all that analysis, modeling it out, figuring out what that's going to mean to you in dollars lost or dollars gained, adjusting your position size accordingly, and maybe even contemplating what steps are you going to take ahead of time to make adjustments to the trade based on that new information that's coming at you.

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