TRANSCRIPT

Making more informed decisions: Understanding Greeks

Presenters: Konstantin Vrandopulo and Ed Modla

Konstantin Vrandopulo: Hello, everyone. Welcome back to those of you who joined us for session one. This is, of course, session two of today special event. We're talking Making More Informed Decisions, Understanding Option Greeks, an area that is a little bit more complex. But we have plenty of know how to demystify that stuff for you today. Without further ado, who am I? Well, I'm Konstantin Vrandopulo. I work on Fidelity's Trading Strategy desk.

I'm excited to be here very much for this big event. I always like to be humble, always like to continue learning. And who not better to learn from here than Ed Modla himself, the Executive Director of Investor Education at OCC. And it's awesome to see you. Great to have you back. Tell us a little bit about yourself. And tell us what we're here to discuss today.

Ed Modla: Sure, yeah, thanks Konstantin for the introduction. Great to be here with you and the Fidelity team. My name is Ed Modla. I started in the options business back in 1997.

So it's been a journey for me, seeing the industry from a multitude of different areas and different sides of the fence, from being on the trading floor and the trading pits to being a broker to trading electronically in the options, the stock

and futures markets. And now with the Investor Education team at OCC, that's the Options Clearing Corporation, all we do is teach options through educational courses such as this one, webinars, written material-- nine years of doing these types of presentations and talking to anyone that wants to learn more about options.

As Konstantin said, this session is about Options Greeks. We are likely going to be keeping it more or less high level definitions and slight interpretations, just to make sure everyone understands what the various Greeks are and what they represent. I often say that even if you're not familiar with the Greeks, if you're analyzing options premium and you're thinking it through with respect to how much it costs or how much you will receive and how much time there is left and what kind of stock move might there be, on some level, you're probably incorporating the Greeks without even knowing it.

So we'll unmask what those Greeks are in session number two. And then please stick around for session three. One of the fun things we'll do in the final session is take some various strategies. And as part of that discussion, what we learn here in session two, we'll translate. And we'll discuss what the Greek exposures are of some of those strategies that we'll get to into session three, so taking what we learn here and applying it in the final hour once we get there.

First, the disclaimers. And now to our outline. Greeks overview is where we'll start, just defining what it is we're going to be talking about and then getting into the specifics of various Greeks, the more well-known measurements of delta, gamma vega, and theta. All in between, we'll be discussing them from an educational perspective and then viewing them on Active Trader Pro just to see, where do you find these metrics? And how do you interpret and evaluate the numbers that you are observing?

As I said, we're talking about Greeks. Many people might interpret them as pricing measurements or risk measurements aimed at forecasting what type of exposure is risk when you have a position on. And the various Greeks that we're going to walk through today for the most part will isolate a particular pricing factor, keeping all of the others constant and then try and interpret, if that one pricing variable changes, what might that change mean for the price of the options contract that we are scrutinizing?

More or less, that's what the Greeks are going to do. We say the five Greeks. Well, of course, there's many more than five. These are just five popular ones that seem to get discussed most often: delta, gamma, theta, and vega we'll walk through today. Rho is also a popular Greek, certainly a little more visible today than in years past, reflective of interest rates. And with our current environment, a little more attention is being given to rho than it had been

before. We'll leave that aside just for today. There's other Greeks. These are more or less the first order Greeks-- gamma with a slight exception here. There's second order Greeks. There's third order Greeks, many of which I don't even know. But just so you know, there's a whole universe here in the Greeks space. And we'll isolate a few of those for you in the session today.

These are theoretical measurements, similar to theoretical values. But Greeks don't tell you what is going to happen. They forecast an interpretation of, given a change in one circumstance, what might or what could occur? It helps investors forecast what price changes might be in the options that they own or have sold and then further can help them identify a risk. I've heard Greeks equated to looking at a dashboard on a car.

And you have all these different things that can go wrong under the hood. And it's hard to really grasp all of that at once. But your dashboard might light up when something needs attention and poses a risk to the functionality of your vehicle. And then you can pay attention to it. The Greeks might serve a similar function for some who evaluate what their Greek exposures are. And then when one jumps out at them, they give it attention and try to mitigate that risk from an isolated single pricing factor.

So conditions change always in the marketplace. And the Greeks, in their measurements, are an attempt to look at changes in stock prices or volatility

levels or time to expiration, days till expiration, and see how that might be reflected in the options price. Let's start with perhaps the most talked about and well-known Greek that we get asked about, which is delta. There are several definitions for delta. We'll keep them to a high level here today.

Delta, first of all, is defined as an option value's sensitivity to stock price movements, the expected or anticipated-- again, not guarantee, but expected potential change in the options price given a 1-point move in the underlying stock price expressed as a decimal. The delta will tell you, if the stock were to move up by $1, the delta is an estimation of how much the option value might change-- calls, inputs might change in different directions. More on that in just a bit.

One distinction here to make is the moneyness of an option and its delta, moneyness meaning, is it in the money? Is it at the money? Is it out of the money? For call options, it's a refresher on moneyness-- call options. At the money is when the strike price is equal to the stock price. That's also true for put options. For calls, it's higher strike prices that are out of the money and lower strike prices that are in the money.

And when you're thinking about delta-- and where is delta going to be greater, for in the money or out of the money? If this is new to you, if the Greek discussion is new to you, first of all, the learning options is a matter of

repetition. So stepping away from the slides for a second, any new topic that you're going to be introduced to the first few times you hear it, just absorb the information. Understand it as best you can.

But you might have to hear it three times, five times, it starts to make sense. Once you've heard something eight or 10 times or more, now you've started to learn it. That might be the case if this is your introduction to Greeks. And one, I'll call it a trick that I had learned or been taught when I first started learning options back in 1997 for Hull Trading Company, that was the trading group owned by Blair Hull.

Some of you may know that name, a legendary market maker who started back in the 1980s, a former poker player turned options market maker. Go figure. But he owned the firm that I started with back in '97. And the senior traders who were teaching us soon-to-be pit traders all of these various concepts had a question they would pose to us. When certain concepts were being taught and it was hard to absorb or hard to instinctively or more or less intuitively know what the answer was, and the room would go quiet, the traders would say, pushed to an extreme.

That's the phrase that I always have in mind. Think of an example that relates to the question you're being asked. And then push that example to an

extreme, even unrealistic extreme. And then the answer might become obvious.

If you're first hearing about deltas and call options here today and I asked you, are deltas going to be greater for in the money or out of the money call options? Right away, you might not know the answer. But pushed to an extreme, and think that through. If the stock is at $100 and we're looking at the call option with a strike price of $300, extreme, and the stock moves from $100 to $101, is the option value going to change much? The answer pretty clearly is no. Those are going to be low-changing price movements, low deltas.

On the other hand, stock at $100. And if we're looking at the 20 strike call option, that's $80 in the money. It's worth $80. And the stock moves from $100 to $101, we would fully expect that option value to move lockstep from $80 up to $81-- so those high deltas for in the money options. And as we walk through the Greeks and these concepts, that idea of pushing to an extreme may be helpful in your understanding.

So calls and puts both have deltas. I'm going to start this discussion by clarifying this term, short. I always find it useful to outline the dual definitions here. Long and short in the market are often known as, say, being bullish. If you're long in the market, you're bullish. You'll profit if prices in the market rises. And you will suffer losses if the market sells off.

Being short the market means the opposite. You have a short position to benefit as prices decline. And if the market rallies, you would suffer losses. That's the most classic definition of long and short. In the options world, there is another definition where long means you've owned the contract. If you buy a call option and you own it, you're long the call. It has nothing to do with market direction. It's the position that you have, long call.

If you sell a call to open, you're short the call option-- again, short meaning the position you have, not market direction. If you own a put option, you're long the put. If you sell to open a put option, short the put. Long and short attached to deltas are related to market direction. Here, calls have positive long deltas. A positive correlation exists to stock price changes and the direction of the call price. Higher stock prices leads to higher call prices and vise versa.

Puts have negative or short deltas, this opposite correlation. As the stock price rallies, put prices go down. And as the stock price sells off, put prices go up-- negative correlation, short deltas. Now, think about this in terms of trading outright positions. If you buy a call option, you're long the call. You own it. And you have purchased long deltas. So long call equals long deltas. You benefit as the market rallies. And that makes sense.

If you sell a call option, you're short the call. And you sold those positive deltas to somebody else. So a short call position is short deltas. You've sold the long

call, long deltas to the buyer. Puts are the opposite. And it takes a little more maybe mental capacity to understand puts. If you buy a put option, you're long the put option. As a position, you're long the put.

But you've purchased short deltas, meaning you gain as the market sells off. Stock prices down, put prices go in your favor. So you have captured short deltas. A long put position is short market deltas. A short put position is selling those negative short deltas to somebody else. Short puts equals a long delta position.

Or short puts would benefit from market prices rallying that market direction of being long deltas-- a lot to absorb there, looking at delta by definition, by a correlation to calls and puts-- and then those four outright positions, long call and short call, long put and short put and their associated deltas. As I said, that's a lot to take in. That might be a consistent theme here in session two.

But try and absorb it and take with it what you can. The more you hear, the more you learn. Konstantin, what do you think about this concept of deltas, the definitions, maybe looking at this a little deeper?

Konstantin Vrandopulo: Ed, I do agree with you. It might be a lot to take in. But hey, we're here to use technology. That's what we try to lean on, on the strategy team. Use the tools at your disposal to make these things clearer in your mind. Don't get overwhelmed or confused. Of course, download the deck. You're

probably going to be looking over it a few times. But effectively, utilize-- Active Trader Pro is the answer here.

So very quickly, in the first session that we ran, we focused on Spider, again, for the fact that it has a very good liquidity traded a significant amount of volume today and underlying's with a lot of volume, generally speaking, have substantial liquidity in the options markets as well. So what I'm going to do here is I'm going to pull up the options chain. Now, there was a lot said about delta. You pull up the options chain for the first time.

And Ed knows, we usually call it the board, the most important thing to an options trader. We have calls on the left, puts on the right. I'm going to scroll down here. And what you would notice right away is that there is some shading, some gray shading here and some gray shading over here. What do those shadings represent? Those shadings represent or differentiate in the money options from out of the money options.

So again, you don't need to know all this stuff right away. You can visualize it. And the computer does the work for you. I like to think about it, Ed, taking something to an extreme, that's a great example. What's another way of thinking about it? Well, what does an option give me the right to do? Or what sort of an obligation do I take on if I'm a seller of an option-- so a buyer of an option versus a seller of an option.

What I'm going to do here, Ed, is I'm going to add the delta column to my options chain right here. So right click, Add Column, Add Delta. Now, you mentioned that options on the board or on the options chain are provided to us with the signage of Greeks from the perspective of being long an option contract. So effectively, you're a buyer of a call or a buyer of a put.

If your initial position is the opposite, if you are shorting, you have to take the signage of the Greek and flip it. So if I'm short and positive delta contract, then it takes on a negative sign. If I'm short and negative delta contract, then a negative and a negative makes a positive. So you're effectively flipping them if you're short. But for all the option Greeks, they're provided to us on the option chain from the perspective of being long options. Now, Ed mentioned a few things.

In the money call options have higher deltas. Out of the money ones have lower deltas. Remember that each individual contract is representative of 100 shares at the end of its life. And reality is, Ed, is that every single one of these contracts, especially in the Spider, having a deliverable SPY shares at the end of their life, these contracts are either going to become long stock, long exchange traded product shares. Or they're going to expire worthless.

Speaking of calls, speaking of puts, they're either going to become short stock or they will expire worthless. To present that to you from the perspective of,

OK, my longer dated contracts deeper in the money deltas at the end of their life are going to get closer and closer to 1. And the out of the money ones are going to get closer and closer to 0. Conversely, the in the money deltas for puts are going to get closer and closer to negative 1.

And out of the money 1's are going to get closer and closer to 0. We can take a look at an options expiration that just transpired today on the close. You can see that all of the in the money deltas for calls are at 1, 1.0. All of these options are expired in the money. Therefore, if exercised, they will become stock. All of these ones out of the money effectively are expiring worthless. Conversely, -1 to 0-- so just be thinking about it.

Let the computer do the work for you. I mean, again, delta, at the end of the day, measures your directional exposure to the underlying securities movement. We're thinking about it in isolation. If the stock goes up a point or it goes down a point, how much in dollar terms do I gain or lose with the appropriate signage? And again, Ed, to earlier commentary from session one, don't over-complicate things.

If you're gravitating towards a 400 call option, click the little Menu icon here. Go to Option Analytics. Select the Profit and Loss Calculator. Build this thing out. Hey, I am buying to open one call at 8. Apply it. Let me take a look at what

my actual delta is for it. Well, my delta is 54. How about that? The computer is doing all the work for me.

If I am doing two contracts instead, it's multiplying my net deltas out for me. It's 109 delta. So if I am long 400 call expiring March 17th and the stock goes up one point or $1 and everything else is held equal, volatility, time, and interest rates are held equal, what is going to happen? Well, I'm going to gain $109 or thereabouts. That's the way I think about it. Use technology to the best of your ability.

And remember, you cannot break the Profit and Loss Calculator. The more you play around with it, the more comfortable you're going to get. Or the more on first name basis you're going to get with these Greeks, for sure. Ed, back over to you. How about that second order Greek that is presented to us, not in dollar terms, but in delta terms? Let's talk about gamma.

Ed Modla: Yeah, let's get to gamma. And I like the way you outline that. Active Trader Pro just makes it so easy. It does the work for you and showing the numbers and showing how strike prices in relation to each other really formulate. It makes it a lot easier for investors to grasp. Let's look at gamma. I'm going to kick it back to you pretty soon here, Konstantin. So gamma is actually one of those second order Greeks that we had mentioned at the top.

Now, first order, maybe you could think of it as, if you change a variable, how does the option price change-- more of a direct connection there, first order Greek. Second order is not going to measure changing a variable. And then how does the price change? It might reflect how does something else, how does another Greek change? And that's really what gamma is doing. So by definition, gamma is measuring delta's sensitivity to stock price.

As the stock price changes by $1 up or down, how much is the delta going to change? You can think of this as the acceleration of changes in the options price. A 50 delta call as the stock moves up by $1 in theory would change by $0.50. But as that delta creeps higher, maybe the delta, as the stock rallies, become 60 and then 70. Now for each dollar move, the option price as forecasted by delta is moving by $0.70. It's how much is this option price change going to accelerate due to changes in delta?

So yes, that second order nature is what gamma represents, only existing in options. And when you buy options, you are buying gamma. So you're taking advantage of those price movements more and more frequently and to a greater extent as the stock continues to move. Option buyers want movement. Option sellers generally do not. So right back to you, Konstantin, as we go to the chain. We now maybe add the piece of gamma to see where we're at.

Konstantin Vrandopulo: Very good. Gamma, I think, obviously, is more-- nowadays, we hear more about it, especially with the introduction of shorter duration options, and then becoming or gaining in popularity. We talked about the explosion of volume and clearing that the Options Clearing Corporation is having to do, year in and year out. We'll talk about this.

So again, the idea of the security moving up and down directionally in value, we were gauging our delta exposure, our directional exposure. Now, remember that at the end of an option's life, the delta either is plus 1 or minus 1 or at 0. Now, what is getting delta towards this destination? What's either creating deltas or destroying them? That's the way I like to think about it. And that is gamma, OK?

We've been hearing a lot about gamma explosions. And what does that really mean? Well, think about it. If I'm looking at an expiration that is 22 days away and I am looking at the money options, I know that when the stock goes up in value, my options value is going to change approximately by the amount of delta at the time. Now, as the stock moves up, my now at the money option or slightly in the money option, let's say a call at 400, is now more in the money.

So delta is going to be changing or is going to be increasing for calls as the stocks go up. And it's going to be decreasing as the stocks go down-- the exact opposite for puts. Gamma is by how much my delta is going to change for

every one point move up or down in the underlying security. Now, Ed, talk about the explosion of popularity of shorter duration options. Think about it.

At the end of an option's life, as the security is gyrating and moving around, especially if it's moving around violently against a particular range, let's say, or it's single directionally just being pushed lower by sometimes what feels like an elephant sitting on the bid when we're talking about the market, or when it's being pushed higher by offers being lifted and the market keeps going higher, what is happening to these deltas towards the end of an option's life? Well, now, gamma has a much larger job to do.

So if we're looking at an option contract that is expiring tomorrow in SPY versus 22 days from now, its gamma values are going to be much larger because they have a bigger job to do. They have to either destroy deltas or create them as the stock is moving up and down around the level of observance. So that's the way I would think about it. Ed, back over to you, volatility, one of probably key components of analysis when you're an options trader, one that is often overlooked. But we want to put some emphasis on that one today. Let's talk about vol.

Ed Modla: Absolutely, volatility being one of the key measurements of an option's price and some would say one of the more misunderstood concepts as we go through our definitions here. Eventually, we'll get to the fact that the Greek

associated with changes in implied volatility is known as vega. Before we get there, let's just make sure we have a firm grasp on volatility measurements and what it is we mean when we say implied volatility.

So there really are two types of volatility that we'll define for you here today, the first being historical volatility. You might see the shorthand, HV. And this is looking back in time from today to what has already occurred with stock price movements in the past. These are observed. These are factual numbers that we have already witnessed with stock price fluctuations up and down over a given time frame, where those fluctuations are then translated into an annualized volatility percentage.

The time frame used for an analysis of historical volatility is up to each investor to decide for themselves. A 10-day historical volatility would of course capture the past 10 days of stock price movements, more of a short term momentum analysis. You can go out 90 days. You can go out 30 days. A lot of options users that we talk to reference to us 30 days, capturing a bit of short term momentum with a bit more of a sample size attached to it.

Whatever it is that you choose, that decision might come down to your time frame on the trade that you're investigating. Also, you would want to incorporate any knowledge you have about what's been on the calendar, particularly earnings or major economic announcements that may have moved

the market during the historical period that you're looking at. That may not exist moving forward or vise versa.

Historical volatility, stock price movements looking backward in time, captured, factual, and realized. In contrast, implied volatility, shorthand IV, only exists in options. And the definition I'll use here today is it's the implied. Or the implied volatility is the volatility level that justifies a given options price. Many of you may have used an options pricing calculator that incorporates various pricing models that you can choose from.

If you were to insert all of the variables, all the inputs into a pricing calculator, stock price, strike price, days to expiration, dividends if any, risk free interest rate, and insert an options value-- maybe this is a price you paid when you bought an option or a price you received when you sold it or the midpoint of an option that you're evaluating on your options chain, insert the options price. You can then solve for what volatility level justifies that given options price.

And it's a nice reflection of what volatility represents from a definition perspective. Now, as the option price moves higher or lower as a function of supply and demand in the open marketplace, volatility is going to change. Keeping everything else constant, if you raise the option price, you then raise the implied volatility level needed to justify that same or that higher options

value or options premium level. If you lower the options price or options premium, all else equal, implied volatility levels would fall.

They would lower themselves to justify that given, new, lower options price. Those changes in options prices come from changes in the dynamics of supply and demand, which are the result of bids and offers from everybody. All market participants, you, me, and everybody else putting in bids and offers have an influence on where option prices settle and therefore influence changes in implied volatility. So maybe this takes some mystique out of when you hear volatility levels are going higher, volatility levels are going lower.

You're having a hard time asking why that's happening or what's going on. There really is a further question you can ask. If volatility levels are rising, you can further ask yourself, why might there be more option buyers today than yesterday driving prices up? Why might there be more uncertainty looking forward today than there was yesterday? And those are deeper questions you can ask in an effort to understand and interpret changes in implied volatility levels.

Now, there's a positive correlation between changes in implied vol and options prices. As implied vol levels increase, again, implied volatility looking forward and without a bias on direction, increases in these levels would result in a wider range of expected potential future stock prices in both directions

top to bottom. Therefore, both call and put prices increase as implied vol goes up.

And conversely, if implied vol is decreased, then the future potential range that the market is expecting for stock prices top to bottom shrinks. And therefore, call and put prices decrease as well as a result of shrunken or lowered levels of implied vol. So Konstantin, let's take a look at implied volatility and where investors can use Active Trader Pro to find that.

Konstantin Vrandopulo: Yeah, Ed, one of my favorite subjects to be honest with you, we do a ton of work on this subject on the strategy team. We discuss it every chance we get, have dedicated sessions for it. So if you're wanting to dive in deeper and learn more, remember fidelity.com/coaching. Click on that Options link. And sign up for as many as you would like. Ed, here are a couple of thoughts.

So what my takeaway is here, historical volatility may or may not affect options market price. So naturally, if we're trading the future expectations for the underlying, its behavior or its personality as it has traded in the past is going to be influencing our views on how it might behave in the future. So it is going to be a part of it. But you're making a forecast on how it's going to trade in the future because that's what we trade when we're trading options.

So we're trading future expectations. Now, when I was in college, both in undergrad and master's, by the way, they used to, in the finance classes, used to drop a test in front of us and say, well, here's a bunch of information. Here's where the stock price is. This is what the dividend environment is like. This is what an interest environment is like. This is what the volatility is. Well, what is the price of a put or price of a call using sold for price of call or price of put, using the binomial option pricing model or using the Black-Scholes option pricing model?

I always used to kind of scoffed at that and think, OK, that's fine. I know how to do this. I can solve for it. But why am I doing it if I can just look at an options chain, and it's going to tell me what the bid and offer is for that call or put? So I think more at my master's level, it clicked that if implied volatility is an input to figure out what an option value should be, whether it's a call or a put, then effectively, during regular trading hours, it is an output, isn't it?

So we have a bid and an offer for every put and a call. And we have all of these other things that are moving around: time to expiration, interest rates, dividend environments, and the stock price that is gyrating up and down. So effectively, the implied volatility value that we're getting is the output out of the marketplace. And to your point earlier, Ed, what is determining volatility increases or decreases?

Again, it's not like the market is rigged. All you have to understand is that for every buyer of an option, there is a seller of one, OK? So the question is not, are there more buyers than sellers? Or are there more sellers than buyers? They're equal. The question is, what is the driving force of initiating transactions that are brand new?

If the demand for options is higher, i.e., primarily, market participants are looking to buy options, to establish brand new positions or buy back the ones that they shorted before. So they're demanding to buy calls. They're willing to pay the offer price for the puts and calls. That drives the prices of options higher. Why? Because the supply is there, but only at incrementally higher prices.

Conversely, the opposite is true. If market participants are hit in the bid and they are sellers of options and they are the driving force, then the demand is there. The buyers are there, but only at incrementally lower prices. So understand that dynamic-- and again, complicated subject. But there is a lot more to it. And very quickly, I wanted to screen share and show a few tools on Active Trader Pro that would help you visualize implied volatility in chart type format and a few tools that I find helpful myself.

So I've got a chart of SPY here at the top. What I've done is I went to Indicators at the top. And into the search or type to search, I typed in volatility. Now,

when you do that, you're going to select the indicator that is called Volatility HVs and IVs. That's historical vols and implied vols. And that plots it right underneath here-- so implied volatility in orange, historical volatility in blue. You're getting a glimpse of what these things look like on different time frames.

And you're saying, well, I can now correlate what happens to volatility or implied volatility, the price of options, when the price of SPY is going higher and it's trending versus when it's going lower and it's trending. So that's very helpful. You can manipulate the implied volatility time frames by clicking on Modify and changing that around. And then the last thing I'm going to show, Ed, is you can also pull up the Option Statistics. Again, very quickly, Options, Option Statistics-- type again SPY.

You can look at volatility in line format as well. What are my implied volatilities for 30 day to expiration options 60 to 90? What has it been looking back at actual trading days-- and then of course on, what was the range for the last 52 weeks? Are options cheap or expensive relative to themselves? So right now, implied volatility 30 day is at 19.27.

It is in the 27th percentile of the range that it has been in the past 52 weeks. So determining cheapness or expensiveness of options by looking at these

mechanics, trying to make a judgment call on what you think is going to happen next. Ed, back over to you. Let's talk about theta, or time decay

Ed Modla: Yeah, and again, Active Trader Pro makes it so easy when you visualize the HV and IV metrics-- really are slick to look at. If you're looking at a stock, one thing comes to mind is that as I'm seeing the comparison of HV and IV, you would also want to know and plot, where are those earnings announcements at and seeing what was the comparison of historic and applied vol levels prior to and after earnings?

And that's something that professionals might use as they forecast volatility levels looking ahead to future earnings announcements. So with theta, time decay, the last one we're going to talk about here in this session today, it speaks to that natural erosion of an option's value over time. Konstantin has said a few times, at the end of the day, at expiration, options are going to be with a delta of 1 or 0, or negative 1 if it's a put.

The extrinsic value once you reach expiration, the time value with no time left is going to be zero. Prior to that with days left or weeks or months left till expiration, time is worth something. So there is a natural decay from one day to the next. And theta is an attempt to measure that and quantify it. It's the option prices or option value's sensitivity to the passage of one day expressed in decimal form, which we'll take a look at in just a second.

It is expressed as a calendar day, not a trading day. I always like to leave the comment here when investors think that selling options on a Friday means they can get a quick three days taken out over the weekend. That is true. Some investors say they like to do that. I just throw up a word of caution. It's not always that easy.

When I was on the trading floor, it was common practice at some point in time on Friday, whether it be late morning or early afternoon, later afternoon, depending on the movement of the market on that day to already start taking out theta decay over the weekend. And it was not uncommon on Friday afternoon as a professional market maker to be establishing my bids and offers based off of option values that were reflective of the days until expiration left on Monday morning rather than on Friday afternoon when I was actually making those trades. The professionals don't want to be buying options all day long on Friday either.

So they compensate themselves that way, just a word of caution since we are talking calendar days and not trading days. Those weekends do come out. But options market makers might be taking out those days with their bids and offers that they're making. And also, it can't be discounted that a weekend does have several days for news to come out anywhere in this world from an

economic or military or political perspective that could change the dynamics of the market come Monday morning.

Calls and puts both have negative theta amounts, meaning they both are decaying each and every day. There is one exception to this, which we won't get into here. But for those of you who might be curious to look into it, deep in the money, European-style put options actually do have a reverse theta element to them. But for our purposes today, talking equity and ETF options and the bulk of what everyone's going to be dealing with, calls and puts both have negative theta amounts.

This means buying or being a net buyer of options is attached to a negative or a position that will suffer from the passage of one day to the next. And short option positions, short calls or short puts, would be giving that negative theta dynamic to the buyer and have the short position attached to positive theta or gaining value benefiting from the passage of one day to the next. Konstantin, back to you as we go back to the chain. We're wrapping this up and putting a bow on what we're looking at with the Greeks and how nicely it is presented on Active Trader Pro.

Konstantin Vrandopulo: Very good, Ed. Let's go ahead and throw in theta in here. There are a few questions that I guess we might as well start answering here. We've got about seven minutes to go. So again, to Ed's point, theta,

remember, all Greeks on the board are presented to us from the perspective of being long options If? I'm a buyer of a call or a buyer of a put in this context.

So is time decaying or passing by our friend when we are buyers of options? The answer is no. It's our foe because in order to buy an option, we're paying a premium. In most cases, I would say the vast majority of cases, if you're buying an option prior to its expiration date when it has some time to live, it's going to have a time value component to it.

Now, you as an options buyer are realizing that that is the component that you need to overcome by the price appreciating or depreciating in order for you to break even or potentially to stand to make some money. So as a buyer of options, you are a buyer of time. And as time expires, that naturally hurts you. So it is a headwind for you. And there's no way to stop it. So that's something to be thinking about.

As an options seller, of course, you have the opposite view. It is your asset. Time value is your asset. You want time to decay. You want the security not to do a whole heck of a lot at all. In fact, you would want it just to sit there and tread water. And that is effectively how you're going to be gaining or keeping more and more of that credit you were originally brought in for being a seller of a put or a seller of a call in your pocket.

Now, Ed, we talked about vega. We talked about implied volatility here. I wanted to bring vega back into the picture. Vega, of course, is presented to us from being long volatility positioned as being buyers of calls and puts-- so volatility expanding. Buyers of options being the driving force behind the market action is a benefit to us because likely, implied volatility will be expanding in that event. Conversely, sellers of options are going to be suppressing volatility, right?

Sellers of options, demand is there but only at incrementally lower prices. Think about at expiration here, let's take that thing to the extreme as Ed mentioned a little bit earlier with delta. I mean, at the end of an option's life, is there any theory to it? No, at the end of an option's life, it's either in the money or out of the money. So implied volatility or theoretical movement for the underlying security ceases to exist. And what else is true? There's going to be no time left until expiration of that contract.

So think about option premiums being made up of two components, one being the intrinsic value component and the second one being what we call time value or the extrinsic value component. Now, option-centric risks generally affect extrinsic value only. So if implied volatility is increasing and demand for options is rising, what does that effectively do? Well, it is

increasing the extrinsic value component in your option contract because intrinsic value is either there or it's not.

If I own a call option at 380 strike, I know that I can exercise my right to buy stock at 380 if I'm an owner of that call. So that call should be worth at least the difference between 380 and the current price of the stock in the market. So intrinsic value is either there or it's not. It's an out of the money option or an in the money option. There's no argument about that.

But the extrinsic value piece, the options-centric risks are interesting-- and this creation of time value versus destruction of time value with the implied volatility component moving up and down versus the time in and of itself, passing each and every second of the day as we're getting closer to expiration. So those are interesting ways to be thinking about it. And again, I want to elaborate for everybody, don't feel overwhelmed by this stuff.

Use the tools appropriately. Let's say you wanted to buy an at the money put contract. And you were thinking the market is going down. How do I evaluate my potential profit and loss scenarios? And what do the Greeks tell me?

So if I'm a buyer of this put option, the computer is going to calculate out my Greeks for me. If I'm buying a 400 strike put out to March 17th expiration, I'm short 48 deltas. I want the security to be moving down in value in order for this delta to grow and get closer to -100. What is going to get it there? My gamma.

Gamma is moving my delta around, either creating additional negative gammas or destroying them. Those are your directional exposures.

Theta is by how much my option value will change if one day effectively goes by, all else held equal, the security doesn't move. The implied volatility doesn't change at all. The interest rates don't move at all. What would happen to my option value if one day went by? That is either negative or positive depending on whether you're a long or short contract. And then of course, vega is, hey, if implied volatility is moving up or down, what is transpiring with my option values? Is it going up or down?

And again, paying attention to where we are on the chart, and you can see, especially in broader indices, what transpires when markets rally, what happens to implied volatility? Versus what happens to where markets fall? Implied volatility rises. So you can make these judgment calls-- appropriate evaluations on volatility and where you think it's going.

Again, Ed, one question as we're wrapping up here, if you had to share any thoughts about books, classes, additional recommendations or where you can gain greater understanding about option Greeks, where would you go? Talk your book a little bit more. What do you guys do? And I'll wrap up with what folks can learn from us.

Ed Modla: Sure, well, to be a bit self-serving with this, again, our entity doesn't sell anything. We're strictly educational. We actually are-- the timing here, pretty well done. Twice in the month of March, we will be conducting a part one and part two webinar series on a couple of Wednesdays in March on the Greeks. And we'll get into some second order Greeks and some interpretations of the Greeks we walked through today. So if you're looking to back this up with something right away, go to the OIC website. Sign up for those two events, I believe March 8th March 15th, two back-to-back sessions on the Greeks taught by one of our instructors.

Konstantin Vrandopulo: Super, Ed. That's fantastic. We do a bunch on them as well-- second order Greeks, discuss implied volatility at length every Wednesday and the vol primer. So we welcome anyone who is interested. You don't have to be a Fidelity client to sign up. Go to fidelity.com/coaching. And get in there. We'll be glad to have you. All right, well, that wraps it up here, Ed. Time flies when we're having fun. We appreciate everyone attending.

END OF AUDIO FILE

Before investing in any mutual fund or exchange-traded fund, you should consider its investment objectives, risks, charges, and expenses. Contact Fidelity for a prospectus, an offering circular, or, if available, a summary prospectus containing this information. Read it carefully.

The third parties mentioned herein, and Fidelity Investments are independent entities and are not legally affiliated.

Past performance is no guarantee of future results

Views expressed are as of the date indicated and may change based on market and other conditions. Unless otherwise noted, the opinions provided are those of the speaker or author, as applicable, and not necessarily those of Fidelity Investments.

Greeks are mathematical calculations used to determine the effect of various factors on options.

Technical analysis focuses on market action - specifically, volume and price. Technical analysis is only one approach to analyzing stocks. When considering which stocks to buy or sell, you should use the approach that you're most comfortable with. As with all your investments, you must make your own determination as to whether an investment in any particular security or securities is right for you based on your investment objectives, risk tolerance, and financial situation. Past performance is no guarantee of future results.

Any screenshots, charts, or company trading symbols mentioned are provided for illustrative purposes only and should not be considered an offer to sell, a solicitation of an offer to buy, or a recommendation for the security.

Fidelity Brokerage Services LLC, member NYSE, SIPC, 900 Salem Street, Smithfield, RI 02917.

1076898.1.0