TRANSCRIPT

Decoding the options Greeks for your trades

Nicholas Delisse: Good afternoon, everyone. At least good afternoon to those of you that are on the East Coast. Good morning to those either Central Time, like Cale and myself -- and further west. My name is Nicholas Delisse. Joining me is Cale Bearden. Both of us are with Fidelity's Trading Strategy Desk. And before we get too deep in the session, one thing I do want to mention about the Greeks is that this is a very, very weighty topic. And something that really stuck out to me is I remember I had a guest presenter, Peter Lusk with the Cboe. He mentioned, with this information, if you're only able to get 20 percent of what we talk about, you're only able to digest that and bring that in and apply that, we consider this session as a success. Because there's just so, so, so much information in this. And a lot of traders, they might consider the option Greeks to be more on the advanced side. But really, the option Greeks, in addition to volatility, they're foundational to any particular trader. And with that, of course, if you do have any questions, do strongly encourage you to explore some of our other coaching sessions that we have. That's in essence what the Trading Strategy Desk does, is we have a lot of those group sessions. We'd love to have everyone attend those sessions.

So today what really we're going to be talking about is we're going to start everything off with -- and have an introduction to the Greeks and kind of explain what they are, how you can use them, and kind of dive deeper into the Greeks from there. We're going to start with just kind of that brief overview and from there we're actually going to go deeper specifically into each of the Greeks. And we're, of course, going to talk about how they can help you plan your option trades. Because, you know, that's really important. And that's kind of where the power of the Greeks come into play, is how they can help you with your option trading, how they can help you take your option trading to the next level -- and also managing your trades. We then also are going to talk about some of the pitfalls, some of the things to consider with your option trading. There are many different models, of course, that, you know, address the Greeks, you know, where the Greeks come from. Sure, a lot of you heard about binomial or Black-Scholes. And really, which model that you use isn't really critical. Because they're going to be based off of, in essence, similar things, are going to be based off those constants of strike price, what the stock's trading at, you know, etc. We're going to dive a little bit into that. With that being said, though, Cale, why don't you kind of give us kind of a brief overview of what the Greeks are and, you know, why they're important.

Cale Bearden: Yeah. Appreciate that, Nick. And again, folks, Cale Bearden here, on the Trading Strategy Desk. Appreciate everyone spending a portion of your day here with us. And certainly, hope everyone had a nice long extended weekend. And, you know, Nick, you're certainly correct that the Greeks are a lot to take in, the very first time. I remember when I originally started learning about the Greeks. It took me a couple of times of going through, listening to someone just like myself and yourself explain what they are, before I was fully able to internalize it. There's a lot of moving parts. But certainly, the goal of Nick and myself today is to simplify a little bit and make sure that, you know, we're all going together at the same pace here. And we're going to cover five different Greeks today. And we're going to do a deeper dive into each one of these. But each Greek has their own unique purpose. And they're designed to help tell the story of why does an options premium change. And there's quite a few reasons why they do. And each one is going to peel back that onion just a little bit more, to make sure that we're aware of these different factors that go into what makes up an options premium.

Nick had mentioned that there's different pricing models that you can use. There's the binomial pricing model, that we use here at Fidelity. There's also that Black-Scholes pricing formula, as well. And as Nick mentioned, both of them are going to give you very, very similar information. And really, these

models are built off a few known variables and a few known constants, one of them being what is the current price of the stock or the ETF that you're trading. Easily accessible. All of us can pull up a quote and see what is the current price of the underlying itself. In addition to that, what is the strike price of the option that we're trading? On top of the strike price, we also have which expiration that we're picking and how much time is remaining in that given contract. And then lastly would be just what is the premium of that option? How much is that currently trading for? You take all that information, put it into a pricing model and it gives us these Greeks that we're going to talk about more and more today.

We're going to cover these each more, in additional detail, but want to give a couple of friendly reminders as well. So, with the Greeks, we do have to remember, for one, they are just simply an approximation of what's going to happen. They're not going to be the exact number that we would see our premium change by. Because at the end of the day, it's a model. And the model is trying to project what changes would be made but usually it's not going to be exactly down to the penny. Another concept that you'll hear both Nick and myself talk about today is looking at the Greeks in a vacuum, so we can isolate down to just one Greek and we can understand what its relationship is with these different changes. Now, it is important to note as

well, when talking about the Greeks, there's a lot of different factors that are coming into play. And all of these Greeks are going to be constantly changing. But we're going to try to make it a little bit simpler, just focus on one of the Greeks. And then certainly we'll add more complexity as we go along here, as well.

Want to just give a brief idea of the Greeks that we're going to be touching on here today and also just a little bit of helpfulness as far as what each Greek is looking at. So, we have five listed here. First one's going to be delta. And easy way to think of delta is it's telling us how much is our option going to change for directional movement in our underlying security. So, an easy way to remember is *delta* starts with a *d* and *direction* also starts with a *d*. So, when you think of delta, just think of directional movement. Next one here's going to be gamma. Gamma's a little bit more of a unique Greek, that we'll cover more and more. But it's telling us the acceleration of delta. So, with different price movements is our option accelerating or decelerating? Next one here is going to be vega. Vega deals with volatility changes. Same thing as with delta. With *vega*, starts with a *v*. So does *volatility*. Easy way to remember it. Then our last two here. Theta, really important. Theta's going to be telling us how does time passage affect our option. Once again, *t* for *theta* and *t* for *time*. Easy to remember. And our last one here, that we're going to touch on,

one that we're not going to go as in depth with, but rho, which is going to measure an option's sensitivity to interest-rate change. So, rates and rho both go together.

So, one more thing, before I pass it over to Mr. Delisse to talk to us about delta, in particular, is with the Greeks it is important to remember that they are only going to be affecting the extrinsic or the time value of the contract. Nick has probably heard me say this at least a hundred times but intrinsic value is what it is. It's simply looking at is the option in the money and does it have intrinsic value or is it out of the money and has no intrinsic value. But extrinsic value or time value is a little different. It is the negotiable part of the contract. It's the part of the contract that myself, Nick, everyone else out in the audience has an influence on. And that's what our Greek is trying to help us understand. When we do get these changes, where are these changes coming from? So, without further ado, Nick, I think we're going to start out with really one of our more complex ones but really a quite useful one for someone who's placing any type of strategy, being delta here.

Nicholas Delisse: And really, delta's one of the first Greeks that traders will look at. And I remember the first time, of course, when I was just getting acquainted with the Greeks, delta was the first option I actually added to my option sheet.

I remember thinking, "Oh, that's really interesting. That's nice to know. I'll add it to my chain. But, you know, probably won't change anything. I probably won't really look at it." And, of course, now, given current timeframes, I can't imagine an option trade and not looking at delta first. It's just so foundational, so important when it comes to actually placing option trades. Now, there are, of course, three big different definitions of delta that traders will look at. And the first is that textbook definition of delta. And that's what, you know, Cale was addressing, what Cale was talking about beforehand. Given a $1 price move in the stock, how much does the option change? What's the value of the option change? Now the examples we have here on the slides is with a delta of 50. Now you might have heard a delta of 50 or 75 or 25, like that, beforehand. But when you add a delta to your option chain, you're actually going to see something that maybe is a 0.5, 0.75, 0.25. It's done in a decimal. And the reason for this discrepancy is, a lot of traders, they'll multiply delta times that 100 multiple that options have. As you know, if an option is quoted at five cents or a dollar, well, it's not just five cents or a dollar that it's trading at. It's actually five cents times 100 or $5 or $1 times 100 or $100 that option's trading at. That same type of thought process, you have that multiple that applies to delta. And so, an option has a delta of 0.50. Many traders refer to it as a 50 delta.

Now, where does this apply and where are we going? Well, if an option has a 0.50 delta and the stock moves up by $1, well, the option value is going to change by delta or that 0.50 or 50 cents. Naturally, as you multiply all this out, your position is going to go up by $50. Because 50-cent increase in option premium times 100 is that $50 increase in your total position value for that one particular contract. Now, this works both ways. If the stock drops by a dollar, that -1, well, -1 times a delta of 0.50, your option is then going to drop by 50 cents. So, this is showing you, based on stock price movement, how the value of your position is going to go up or down. This is important to a lot of traders, because, a lot of traders, that's exactly what they're trading. They're trading directional movement. They might be trying to add a little bit of leverage to their position. And they might do that through the use of delta.

Now naturally, long calls have positive delta. And long puts have negative delta. So, with that, with a put having negative delta, well, now, for every $1 the stock price drops, your value's actually going to go up. And so now, as the stock goes up, well, that hurts you. And you actually then want the stock to go down. Now delta typically ranges from either 0 to 1 or, of course, 0 to -1. So, it's that range now. And you're not ever going to have a delta of 1.2, 1.5. That would of course mean, if the stock moves up by a dollar, option's going to change by, you know, $1.2, $1.5. So, it's ranged down between that -1 and

that +1. And delta's either going to be that 0 to 1 or 0 to -1. Because it's all reflecting what's the exposure direct-- as direction goes up, is this going to help or hurt your option? Or as direction goes down, is it going to help or hurt your option? Now again, this is just that textbook definition of delta, on how the value of your option contracts changed, based on a dollar move in that underlying.

The second big definition of delta that's important for traders, and this is especially as it comes to position management, is this is your share equivalency. In essence, what this means is how many shares of your underlying stock is your position behaving like? And where this becomes important is... Let's say you have more than 1 option contract. Well, if you have an option contract that has a delta of 0.75 -- that's a 75 delta -- well, if you have 4 of those contracts, that's going to be a 300 delta. And let's kind of take a look at what this would look like. Well, if the stock goes up by a dollar, each of your option contracts are going to increase by 75 cents. Times 100, that is $75. Times 4 contracts, that's $300. So, stock goes up by $1, your portfolio goes up by $300. Well, that would be identical to if you had 300 shares of stock that each went up by a dollar. And so, this is giving you your share equivalency. And so, the way that many traders will utilize this is, if they wanted to own 300 shares of stock, well, they'd take that 75 delta, they'd

divide 300 by 75, to then arrive at that total number of contracts. Well, if they wanted to have 500 shares of stock and they're doing with an at-the-money option with a delta of 50, well 500 divided by 50... If they were to purchase 10 contracts, that would give them that 500 delta. So, the stock goes up by a dollar, their portfolio would go up by $500, just like if they owned 500 shares of stock. Now, keep in mind direction works both ways. So, stock drops 1 dollar, that's the opposite way, that hurts that by that same amount of money, that same $500. Now delta doesn't always stay the same, with that. And we'll get into that next.

But I do, of course, want to address that third definition of delta. And this is where a beginner options trader can really get a lot of power out of delta. And what this is delta can also give you an approximation on probability, the approximation of the probability that an option contract will be in or out of the money. Now statistically, the way options are priced is, if an option has a delta of 50, an at-the-money option, well, there's a 50 percent chance the stock goes up, a 50 percent chance the stock goes down. And from a pure statistic standpoint, you know, option traders don't care if this particular company is about to go bankrupt. There's still a 50 percent chance it's going to go up. Likewise, they don't care if this is a new, latest and greatest company, they're just going to go for the moon. It's still going to price that 50 percent chance

it's going to go down. And that's how options are, in essence, being priced with that. So, with this, you know, that at-the-money option is showing that 50/50.

Now, if you selected an out-of-the-money option... Maybe you went and found a call had a delta of about 15. Well, then what that's going to relate is that particular call has about a 15 percent chance of being in the money, an 85 percent chance of being out of the money. And this can be incredibly useful for maybe a cover-call trader, that's looking to find that statistical approach to strike selection and you can very, very quickly look at an option chain, find that 15 delta, find that strike price, you know, within 20, 30 seconds, where, if you then pulled up a probability calculator, it could take you a couple minutes to actually arrive at that particular price. Now keep in mind this is a rule of thumb. This isn't hard and fast. It's an approximation. So, if you wanted to find that exact number, you would need to use a tool like the probability calculator. But using delta, it can get you in that ballpark. It can get you that close approximation.

Now we do have some other resources on delta. You know, I strongly encourage traders to take a look at maybe an article we did, "The Power of Delta." You can find that by simply searching "power with delta" on

fidelity.com. It was actually written by a member of our team. That can really go into better depth on some other uses-es of it.

But one thing I do, of course, want to come back to... You know, what I mentioned, you know, delta's going to show that probability. Delta's going to show your share exposure, given everything else stays the same. And actually, that's even given that the price of the stock stays the same. Because as the stock goes up, you know, yes, if you have a 50 delta, your position's going to go up, but that delta isn't going to stay at 50. And this is actually where that next Greek, gamma, really comes into play.

Cale Bearden: Yeah. And gamma's very important. This is where we start to understand that all of these Greeks are dynamic in nature. So, as we have outside variables that come into play, like price movement, time movement, volatility changes, these Greeks are not going to be stagnant. They're going to be just that snapshot in time. And very important here to realize that, with gamma, what is it trying to explain? So, one of the ways that Nick and I like to think of delta is it's like the speed of a car. How quickly or how fast are you going somewhere? Whereas gamma is telling us is there any acceleration or deceleration and, really, what is that acceleration or deceleration? So, the textbook definition here of gamma is gamma's telling us how much the delta

should change, based off of a $1 move in our underlying. Now what's important about gamma is all of our other Greeks, like delta -- we'll get to vega and theta here in a moment -- they're going to be measured in dollar amount. Gamma's unique in that it's actually measured in delta. And a good way to think of gamma, again, is going back to that car analogy, where we may be going 50 miles an hour right now but, if we start to accelerate, gamma's telling us how much that acceleration is occurring. So, it's telling us, when, delta, we make that move, what is our new delta going to be. Because delta only explains a $1 move up or down. But what about that second dollar up move or that third dollar up move or down move? What would our new delta be at that time?

And we have an example here in the top right, that's a really good example, that walks us through it here. So, we have an at-the-money call contract and it has a delta of 50. So as Nick had told us, if we have a 50 delta call contract, if we had a $1 up move, we would expect to make $50 on our option. If it went a dollar against us, we would expect to lose $50. But this option also has a gamma of 10. So, let's put all this together. So, if we have a stock and we own this option contract with a 50 delta and we get a $1 up move, now our option is going to have a 60 delta. So, we take our 50-delta option. We had a $1 up move. And we made $50 on that first dollar up move. But now our new delta

is going to be 60. That contract has gone in the money just slightly. And that has an effect on our gamma. Our gamma raises up our delta. And now we have new Greeks that we're working with.

Now, what's important with gamma is, whenever you buy an option, gamma's going to be positive. So, it's going to be working in your favor. Whenever you're a seller of an option, you're going to have what's called negative gamma. And what that means is, if we have negative gamma and we start to have price that's moving adversely against us, that is going to accelerate our loss at a faster and faster rate.

Now as a rule of thumb with gamma, gamma's going to be the highest for our at-the-money contract. So, on our example here, our at-the-money contract had a gamma of 10. And as we had that $1 up move, it was no longer the at-the-money contract. It went slightly in the money. And you'll notice, in our example, we were left with a lower gamma, of seven. So out at-the-money contracts will have that highest gamma amount.

But also, Nick, we come across, usually a couple times a month -- is what we call a gamma wake. And that's going to be for our options that are expiring within the week. So, think of weekly contracts that are expiring this Friday, for

example, or if we have a monthly contract that only has a few days left. Those are also going to have the largest amount of gamma, as well. Because any small movements to the upside or the downside is going to have a large impact on if that option is going to be in the money or out of the money come expiration.

Now with delta, Nick has mentioned something really important to us. With delta, it's always going to be between that 0 and 100 barrier. Think of gamma's goal as trying to push that delta either closer to 100, if it's moving in our favor, if we're a buyer, or closer to 0, where that gamma is having a toll taken on delta overall. But the big word here, for gamma, is just going to be *acceleration*. How quickly is it making our delta number change? And gamma can be a little bit of a hard one to understand. Because it's what we'd call a second-level Greek, where it's telling us what delta does, whereas most of our other Greeks are really trying to tell us what does the option do. So, this one does take a moment to capture. But certainly, as we go along and start looking at some examples, I think it'll be a little bit more clear.

But, Nick, we have a big one that's coming up next and it's going to be vega, which is volatility. And this is, you know, really a measure that... You know, we've spent some one-hour sessions just talking about volatility and really the

importance it has on options pricing in general. Do you want to share with us what vega is and how we can utilize it?

Nicholas Delisse: Absolutely, Cale. And vega is another very, very important Greek. And it, of course, is a little bit more on the advanced side, so to speak. And what I mean by that is generally traders, at first, are going to be more focused on delta and then, of course, a little bit on theta. Vega is going to be important for traders that are trading volatility. And where this becomes important is, of course, if you were to purchase stock and the stock goes up, you make money, it goes down, you lose money, but, if it doesn't move, you don't make anything, you don't lose anything. On the other hand, with options, you can make a lot of money or lose a lot of money, if the stock doesn't move. And this is explained through that Greek vega, either realizing a lot of volatility or realizing very little volatility. Now, vega's about that X factor in an option. And in that sense, vega talks about -- that textbook definition is, for a one-percentage-point change in implied volatility, how much does an option change in value how much does its premium change in value and so, if implied volatility, you know, goes up one point, well, if you have a vega of 0.05, your option's going to increase by five cents. Likewise, if vega drops down by that amount, well, your option's going to decrease by this.

And dealing with vega, vega becomes absolutely critical for something like if you're a trader around an earnings announcement. And this is a great example of where vega becomes important. So as such, a lot of traders out there might be familiar with that rush and that crush of implied volatility. Well, you might have a particular security where it's 30-day implied volatility, the implied volatility of a hypothetical option expiring in 30 days has increased from, you know, 20 to 40. And naturally, a lot of traders, and expect volatility to drop off right after that earnings announcement because that future expected move has already happened. It's no longer in the future. It's now in the past. And as such, implied volatility might drop back down from 40 to 20, if I had that really big move, so to speak, like that. Well, if that happens and you're a buyer of options, a 20-point move in implied volatility, well, 20 points times 0.05, you're going to get a $1 move in your options premium, just based off of implied volatility. Now as such, if you had a option that was at the money, with a 50 delta, and you expect the stock to go up by $1 and this particular kind of move happened, well, delta would have caused the option to go up by 50 cents. That $1 positive move, your value would have increased by 50 cents. But if volatility dropped from 40 to 20, that's a $1 negative move in just the option premium. So, a positive 50 cents because of delta a negative

$1 due to vega. If you're an option buyer and this happens, you actually would have lost 50 cents. And this X factor, of course, traders will forget about.

Now, with these different option pricing models, you have a lot of constants that go into these models, have strike price, you know, expiration date, that time to expiration, even interest rates, in addition to, you know, what the stock's trading at, are there dividends. With this, you put all these different constants into that model, you're left with two things, left with two unknowns. One, of course, is going to be the option premium. And the other is going to be the volatility of the security, that expected volatility now if you put your volatility expectation into this model, you're going to be left with a hypothetical premium on what you think the option should be worth. But if you do the flip, if you take the market's premium and plug that into the particular model and then solve for X, solve that remaining thing, you're going to get the volatility implied by the market. And that's where this comes from. And so, you see that direct relationship there between... Traders, if they expect more movement in a security, they might buy options, to take advantage of that. And that's going to bid up option prices, which then directly correlates to that volatility expectation through these models. And so, you're going to see implied volatility go up as traders bid up those particular values. You're going to see implied volatility as traders then sell options,

because they expect less movement. That's then going to push that implied volatility expectation down.

And something you really have to keep in mind, you really have to consider and look at is, of course, this is discussing and this is taking the hypothetical approach everything else stays the same, including volatility expectation, including time. And we will have a follow-up session on this, another webinar, where we actually talk about how changes in volatility impact the other Greeks. Because this is a big thing that could happen and becomes really important especially when it comes to those earnings announcements. But just, you know, keep in mind, a lot of traders, they might be specifically trading volatility and that's for some of these more complex strategies, of being delta-neutral, where, you know, if you're an option buyer you're buying volatility. And you might buy more than one option, to get that particular exposure, get that double exposure to volatility. And if you're an option seller, you're selling volatility, you're selling an expectation of maybe you expect the stock to go sideways. And this is completely independent of price. And when you then talk about that expected future movement, well, traders, they don't really care whether that up or down. It's more that magnitude of movement. And vega just relates a expectation of how much traders expect the security to move in the future and how that thing correlates with an option price. The greater that

expected movement, the greater an option premium's going to be. And this is just -- as Cale mentioned early on, it's just in relation to that time-premium component of the option. And so, if there's no expected movement, traders don't expect the security to move at all, well, then that's going to really crunch up and it's going to reduce the time component of an option to be virtually zero and it's just, in essence, going to behave like stock. You know, then the delta's going to be closer to one. The stock goes up five dollars, option's going to change by a dollar. And vice versa. That becomes really important, from that particular aspect.

But again, as I mentioned, vega is a very important Greek for a trader that's trading expectation of movement, that's trading something maybe around earnings like that. But it is almost one of the more complex of the Greeks. Another Greek that is really, really important, that I would actually put there on the level of, you know, delta, as far as the first Greeks you need to learn, is actually then talking about theta, is talking about that time decay. And, Cale, why don't you actually kind of step us through how theta is impactful and how it actually applies?

Cale Bearden: Yeah. It's certainly a lot to cover here, Nick. And a little bit more about vega. You know, we've been in a very volatile market here, for the past couple of months as well, where, you know, it wasn't only stocks that had

earnings but just the general market sentiment overall. We had a lot of volatility shifts. Especially in mid-February, early March, we had a huge rise in volatility, that was really inflating all the premiums of those options. And here more recently, we've seen volatility back off a little bit. So, it can have a really large influence on the profitability or lack of profitability in your trade.

But as Nick had mentioned, we also have theta here as well. And if we remember, back earlier I'd mentioned that theta's going to be dealing with time and time decay. So, we need to remember that an option is a wasting asset, that it is up against the clock. Because we have a set expiration date in the future that we chose as a period of time. And when we're looking at theta, the measure for theta is going to be in one-day increments. So, what theta's trying to explain to us as options traders is, if we had a one-day passage of time, how much would we expect our option to go down in value by? Now, this is important to note, because, if we're a purchaser of an option, we're buying a call or buying a put, then time is working against us. We pay a premium and, that premium that we pay, all else being equal and we just had time passage, we would expect that premium to go down in value, so we can't sell that option for as much as we originally purchased it for. And if we're a seller of this option, so we're selling a call or selling a put, then we have time actually working in our favor. So if we sell that option for, say, $2 and a couple

days passes by and nothing else occurred except time passage and we're able to buy it back at, say, $1.75, well, we have that ability to make money, just via time passage. And that's what makes options really unique. And also, really a great appeal for folks that want to trade options is you don't really have the ability to make money just owning stock and allowing to pass by. But with option, that's much different. We can use that leverage component of buying an option, like Nick had mentioned earlier, with delta. Or with theta, we can be a seller of those option contracts, take on an obligation. And since we're taking on that obligation, we're being compensated by time working in our favor.

Always like to use an analogy, when I'm trying to explain theta, that, I think it's a really good visual. So, if you could imagine that you have a really large chunk of ice that's sitting out in the sun. And as one hour passes by, our really large chunk of ice is certainly going to become a little bit smaller. It's going to sweat off a little bit. And our large chunk of ice is going to go down in size. But it's still going to be a relatively large chunk of ice but imagine that now our large chunk of ice is much smaller, it's closer to a cube size of ice and now we have one hour that passes by. Well, one hour is going to mean something completely different for our small cube of ice that could make or break the ice

cube. We may have a very, very small cube left. But likely, we're not going to have any cube at all.

And time decay works in the same fashion. So, time is going to start to accelerate as we get closer and closer to expiration. And generally speaking, the largest acceleration of time decay is going to start right around 30 to 45 days out with our option. It's not a magical number. It's not as if we hit that calendar day that's 45 days away and we start to accelerate. But general option theory tells us that usually, around that one- to two-month mark, we're going to start to see that increased amount of time decay taking place. And that's important to us. Because imagine if we're a buyer or a seller of that option and we're equipped with that knowledge and we know that, a couple of weeks out or a couple of months out, that this option is going to start to lose value at a quicker and quicker rate. Well, we can start to plan against that and start to imagine, "How is my position going to look in a couple of days" or "a couple of weeks down the road?" And it's also really important, too, which type of transaction or option strategy that you're going to utilize. Do you want time to be working for you or do you want time to be working against you? And a good analogy that, you know, some people like to bring up is think about theta as like renting out a house, where, whenever you're renting out a house and you're a landlord, you don't say, "Just pay me whatever." You pick

a price that you want to be paid. And that's what theta's trying to explain to us, is how much is this option going to go down in value, just because we had passage of time that took place?

So, an example of that would be here on the top right. So, if we have a theta of 0.05, our options price is theoretically going to lose about five cents for one day's passage of time, all else being equal. Now in our example here, five cents may not seem like a whole lot but, as Nick has mentioned earlier, we may not be trading just 1 option. Imagine you were trading 10 contracts or maybe 20 contracts. That can add up to really a significant amount of time.

We're going to move on here to our next one, being rho. And we mentioned a bit earlier that rho is not one that we pay as much attention to, as options traders, but definitely still one that we want to mention here. And rho is used to determine, if we have a one percent change in interest rates -- or a one percent change in interest rate, what will be the impact be of our option? Now, it is important to note here, as well, that we usually don't get a one percent change in rates in a short amount of time. Historically, we've had about one-quarter of one percent per quarter that's been happening. So, rho has a very negligible impact, most of the time. It's going to be more important for folks that are trading very long-dated options, like a LEAP contract, for

example, that's 12 months or longer, where we could experience quite a few rate changes during that period of time. Just be aware that interest-rate fluctuation can have an impact on our option, even though, for about the past 10 years or so, we haven't really experienced that just a whole lot. Nick, I know you always have an example that you like to give about rho, as well.

Nick Delisse: Yeah. And when it comes to rho, the example I like to use when I talk about it is... Let's say you had just over $5,000 in your account, you wanted to purchase 100 shares of stock, of a stock that's right at $100 a share. Well, you could use your $5,000 -- you could put it up. You could buy half of that and then borrow the other half on margin. This is Reg T, at 50 percent. You're putting up $5,000, borrowing $5,000 on margin to purchase the 100 shares of stock, valued at $10,000 total. Now as an alternative, you could buy a long call, buy a call that's maybe a 50 strike, it's way, way, way deep in the money. And that 50-strike option might cost, let's say, $51. Well, with that you can take your $5,000, spend $5,100, and buy that 50-strike option. And effectively, now, as the stock goes up, they're both going to make money. As it goes down, they're both going to lose money. But there's a trade-off here, of course, between buying the option and then borrowing on margin, leveraging yourself up. And mainly what that's going to be is, when you're borrowing on margin, you still have to pay a margin interest on that, on the money that

you're borrowing. Likewise, that time decay, you're going to lose a little bit of that time premium every day. And that's going to, in essence, equate to that margin interest that you might pay. So if this option was expiring in a year and the stock stayed right at $100, well, that $1 of time premium, which is about two percent of the $50 you didn't put up, that would equate to interest you might have to pay on the money you borrow. Where right now, you know, even though interest rates are very low, you might be paying a little bit more than that in margins. And this is kind of how rho then impacts option pricing, especially those deeper-in-the-money options, especially those options are way longer out, because there's this trade-off between do you borrow the money on margin and buy the shares of stock or do you simply buy the long call? And that becomes very, very important to take a look at.

And with this, do just want to hit on this again, that, the Greeks, they don't work in a vacuum and that anything changing changes everything. And, for example, you can't have time just stay still. So, you know, yes, we can look at it and go, "Well, how does everything happen when just the stock price moves?" But time goes by. And a lot of traders, they'll pull up something like our profit and loss calculator and they'll go, "Well, things didn't actually happen. I said, 'Stock price going from A to B,' and that happened but the option isn't actually there. Something else happened." Well, did you model

time passage? Did time go by like you expected it to? Or did this happen in fewer days, the stock price moved in less time or more time? Maybe implied volatility changed. Maybe interest rates themselves changed.

And one of those important things to keep in mind with interest rates is they don't change very much. And a lot of traders actually ignore rho. They don't really pay attention to rho. Because I know, virtually, it was almost 10 years where the Fed kept rates at near zero levels. And if interest rates aren't changing, well, then a change in interest rates aren't then going to impact the Greeks. They weren't expected to change. Likewise, of course, you know, if rho, the way that it's looking at the Greeks, if it's a one-point interest-rate change, well, you're then going to have the situation where, if the Federal Reserve only changes half a point at the time, well, yes, this option might change by 10 cents, given a full one-point change, but, if you only have, you know, a quarter that, you know, 2.5 cents... But maybe that might only happen every six weeks. Well, you can see, for very short-term options, it's really a negligible impact. What really becomes much, much more important is how stock price movement changes things, how time passage move changes things because you have one day that goes by, that theta can be so much more impactful than, you know, a full-point change in interest rates. We see this with this particular, you know, snapshot of an option chain, that one day

going by is going to reduce the premium of an option by a full penny. Where look at rho. It's, you know, a hundredth of a penny on that change. It's a huge, huge, huge, huge difference between the two.

Now as I said, it's important to keep in mind that, these Greeks, they're looking at the way options are with things not changing, everything else staying the same. You'll hear that a lot, when we talk about this. But it's important, as I said, to keep in mind this doesn't happen in the real world. And the way that you might utilize option Greeks to help you plan your trade is through things like we talked about with delta, that probability, that can be that rule of thumb. And keep in mind that's just a rule of thumb, to make that easier. And when you start to have a lot of different options in your portfolio, you start to have, you know, five different strikes and different expirations on the same underlying, well, your Greeks actually give you what your net exposure is. And so that becomes important to look at, that not only are they showing you what your exposure would be if you added something but it's showing what your exposure is to everything. And so a lot of times, when it comes to planning your next trade, traders looked at their portfolio and they might be placing a trade based off only want to take a way a little bit of their gamma exposure, they want to add a little bit of gamma exposure -- or, vega exposure, they want

to change direction. And that becomes really important to help with that, to minimize your direction exposure or maximize your directional exposure.

Now, something else is let's actually, then... We'll segue. We'll take a look at Active Trader Pro and the way that we can add all this, you know, on option chain. And from a screen-share perspective, Cale's pulling up his Active Trader Pro platform. But one of the biggest questions we get asked, when it comes to using the Greeks to help you plan your trade, is, a lot of traders, they might pull up an option chain and they don't have delta, they don't have any of the Greeks on their chain. And so, they kind of have that expectation that they're simply not available. And, of course, you can add all the Greeks to your option chain, whether you're looking at Active Trader Pro or whether you're looking at fidelity.com. You can add those Greeks to that chain. With that being said, let's go ahead and take a look at Active Trader Pro and see how you might, first off, add those Greeks to the chain. And then we'll kind of segue from there. We'll talk a little bit about, you know, position management, in addition to, you know, planning your trades.

Cale Bearden: Yeah. Perfect. And, Nick, just on an options chain here... So, folks that are following along, I got to this page by going up to Options, here at the very top, and going down to Options Chain, the very first selection. You'll type

in your symbol here, in the very top left of Active Trader Pro's options chain. And then you should get a screen that looks very similar, using SPY, for the time being. And currently have selected the May 29th expiration, which is three days away, and also have the June 19th expiration, which is 24 days away, and have both the calls here on the left-hand side and the puts on the right-hand side of the page. And when we add some of these columns for our Greeks, they're going to be mirror images to columns that we see here. So usually where I would put my Greeks would be to the right of Open Interest. So, I have four columns. I have the bid of our option, the ask, the volume, and the open interest. But as Nick had mentioned, really important that we put the Greeks on here, so we know what we're trading.

So, what we do is we're going to right-click here on this column header for Open Interest. You're going to get a drop-down. And we're going to go to Add Column. It'll be about halfway down the list or so. You're going to see the five Greeks we touched on today, delta, gamma, vega, theta, and rho. As Nick had mentioned, a lot of traders are going to leave off rho from their options chain. And I certainly fall into that camp as well. Some point down the road, I'm sure, Nick, we'll come to a point where rho will be beneficial and useful for our options chain. But for the time being, in this lack-of-interest-rate environment, it's not just -- clear up a little bit of screen real estate here, as

well. So, I'm going to go ahead and add these on here. We have delta gone ahead and added. We'll add gamma here as the second one. We'll add the third one, being theta. And then our very last column here we'll add as vega. And it doesn't matter which order that you put these in. But just be aware that, whenever we added it to the call side here, you'll notice that also here on the put as well. It's going to list the delta, gamma, theta, and vega here, in addition to that.

Now there's a reason that I added both the weekly contract for this Friday and the monthly contract, here in about three and a half weeks or so. As you look down at these different strike prices that are available for you on both of these expirations, you'll notice that the Greeks are quite a bit different, for each and every one of them. So one thing I would like to note here, before we get started, something Nick had touched on earlier, is, whenever we look at an options chain and we have these Greeks added, it's always going to be from the perspective of the options purchaser or the options buyer. And so, if we look at this 300-strike contract for May the 29th, you'll notice that our delta is a positive number. Because if we were to buy this options contract, we would be taking on positive delta, which means we're expecting an up move, if we were to buy that contract. Gamma, we talked about gamma. When you buy a contract, it's going to be positive. Theta, or time, is going to be working

against you. So, with this 300-strike contract that we're looking at, we're losing about 45 cents a day on our options contract, just with passage of time. And we've only got three days remaining right now.

Want to just compare and contrast that, real quick, to out in June. If we look at the June contract here and go over to the theta number, it's about 14.5 cents. So, it's about one-third the amount of the May 29th. And that goes back to that notion we had talked about. As we get closer and closer to expiration, we're going to start to see that theta or time is going to start increasing and working against us quicker, if we're a buyer of this option, or, if we're a seller of this option, working for us a bit quicker.

And then the last one here being vega. Now we don't see large differences in vega, here in the May 29th or the June expiration. All of these vega numbers are going to be relatively similar to each other. But certainly, as Nick had mentioned, when we get volatility moves it's not just 1 percent, usually. Sometimes it can be 5 or 10 percent. So, a small vega number of 0.11 could have a really large impact, if we get a 5 percent move or a 10 percent move. Now before we shift over to an example, just want to show real quick, if we look at the puts, you'll notice that delta is going to be negative here for our put contracts. Because it's from the perspective of the option buyer. So, if we

were to buy this 300 put, we would have -43 delta. Gamma, theta, and vega are all going to work the same, from the perspective. The only one that would shift over would be that delta number. Now, if we were to be a seller of these contracts, then we would need to change the symbol on all of these. So, if we were to sell this 300 put, it would be a positive-delta trade. Because remember, from the perspective of the buyer here, our gamma would change to negative, theta would be positive now. We sell that option contract. It's working for us. And then vega would be also negative.

So, it can be a little bit difficult, when you're just starting out, to understand this. So, Nick and I wanted to walk through an example here, and one that we commonly come across, which would be a covered call. So, I'm going to minimize my May 29th contract. And I want to give myself just a few more strikes to open up here. I'm going to go to 20 strikes. And now our June contract should show quite a few more here. And I want to walk through an example of, what if we were to go into a covered call and we were to sell the 310 strike price? Nick had mentioned a couple of things. And we're looking at using delta and how it can be beneficial for us. For one, this number's going to tell us, roughly speaking, the likelihood that this option expires in the money -- at expiration. So, the delta for this 310 contract is currently 0.28. So, what that means is about a 28 percent chance that this 310 contract is going to

be in the money at expiration, so about 28 percent that we are 310 or higher in the price of SPY. And that's really valuable information for us, if we're a covered call writer. That tells us what is our likelihood of this contract expiring out of the money. So, if there's a 28 percent chance it expires in the money and we take 100, subtract out 28... And that leaves us with the likelihood of expiring worthless or out of the money. So, it'd be about 72 percent chance that this contract expires out of the money, with the way we currently stand. And remember, this is just a vacuum. This is just the here and now. These numbers will change as we go along.

I want to loop in another tool, and one tool that's going to be used quite a bit in next week's or in part two of this session, which is the profit and loss calculator. So, if you go up to Options, at the top, down to the third the bottom, the profit and loss calculator. Already have a trade plugged in here for us. It's on SPY. Once again, type in SPY at the top. And I'm going to click on Summary, down here at the very bottom. So, what we're analyzing is a covered call. We own 100 shares of SPY stock and we sold that call contract we were just talking about, the 310 call. And what I want us to do is we're going to look at this summary view, down here at the very bottom. And we're going to go over to the right-hand side of the page and look at our Greeks for just a moment. So, you'll notice that our delta number is going to be about

71.5. We own 100 shares. We sold that call. So, the difference of those two is we're going to be net long about 71.5 shares. So as Nick has said, it's a way that we could use share equivalency. Gamma's going to tell us, if we were to receive price movement up or down, how is this delta number going to change? So, for every dollar move right now, gamma's going to change delta by about 2.27. Next one over here is telling us how much are we making, just with time passage -- remember, just a one-day period of time passing by. We're going to be looking to make about $10.46 per day that we currently have this trade on. Then our very last one here is going to be vega. With volatility shifts, that's how much we're going to make or lose with changes in implied volatility. And in part two, they're going to talk more about some of these different settings here at the very top and how you can analyze some different hypotheticals of "What if this were to occur? How is that going to change my position?"

But this is a really good tool to look at, for a couple of reasons. For one, it's going to give you all of your Greeks. And it's also going to be able to account for any stock positions you have, as well. But in addition to that, a lot of options traders just like to learn from a visual perspective. And these two lines that we see here is telling us what is our profit and loss now and also at expiration, as well. But really a useful tool. I would encourage everyone to go

ahead and put in some simulated positions here. All you need to do is click on Add Simulated Position, down here at that bottom right. It's going to give you a pop-up box. And you can add in some different hypothetical type of transactions here, and look at the Greeks, so how those Greeks are going to change over time and also if you start adding some additional assumptions. I think it's a little bit more logical and slightly easier way of learning how the Greeks are going to change. Because as Nick and I have mentioned, we're talking about it in a vacuum here today. But at some point, you know, we're going to put all the pieces together and how all of these affect each other, and in a market that's continually changing.

END OF AUDIO FILE

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