

Understanding the Greeks

Measuring risk when trading options

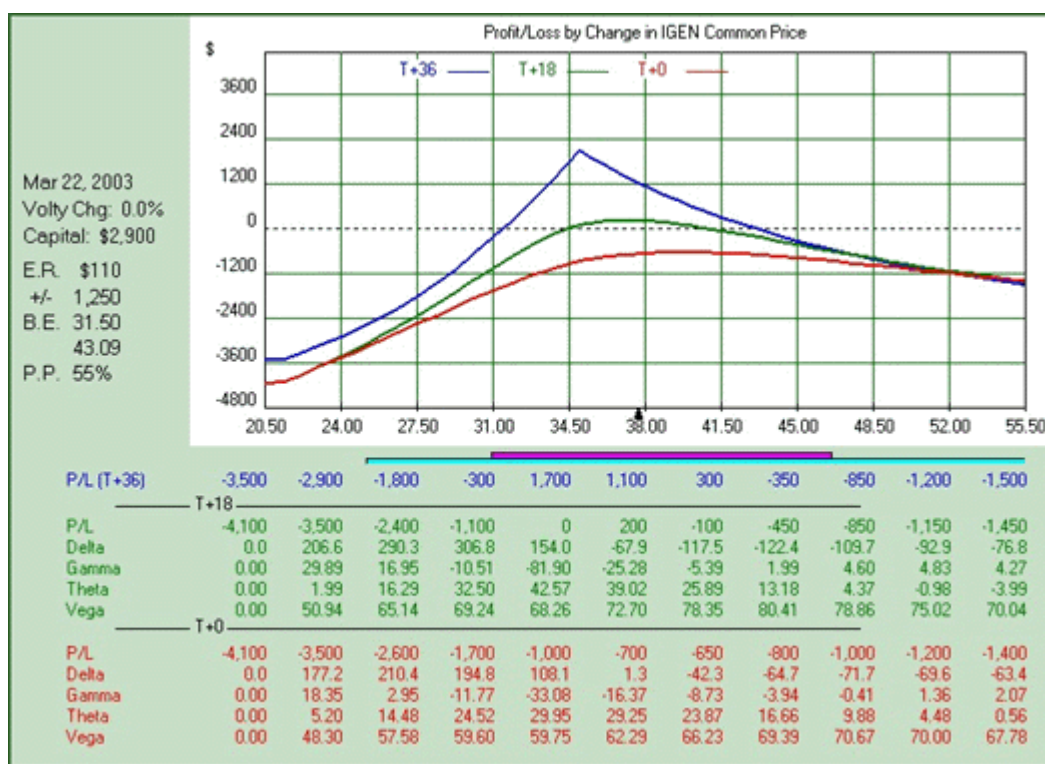
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Because an option premium does not always appear to move in conjunction with the price of the underlying stock, it is important to understand the other factors that contribute to the movement of an option's price. Options traders often refer to the Delta, Gamma, Vega, and Theta of their positions. Collectively, these terms are known as the "Greeks", and they provide a way to measure the sensitivity of an option's price to different factors.

The terms can be confusing and intimidating to new option traders, but broken down they refer to simple concepts that can help you understand the potential risk and reward of an option position. They cannot be looked up in your everyday option tables, but the best options software and online analysis sites automatically do the calculations and give you this information for every position you look at.

Below is a risk graph of a calendar spread on IGEN. Below the graph is a set of tables, with each table associated with a certain line in the graph, representing how the trade will perform at different dates in time. Notice that for each price of the stock, the column below that price shows you not only your probable profit/loss, but the Delta, Gamma, Theta and Vega as well.



So let's take a quick look at exactly what each of these terms mean.

Delta measures the sensitivity of an option's theoretical value to a change in the price of the underlying stock. It is represented by a number between 0 and 1, indicating how much the value of an option will increase when the stock price increases one dollar. In OptionVue Research, these values are normalized for dollars, meaning they show the actual dollar amount you will gain or lose as the situation changes. So when you are analyzing a position, a delta of 50 tells you that for a one dollar increase in the stock price, you will make \$50.

Delta is a very important number to consider when constructing spreads and combinational positions. Call options have positive deltas and put options have negative deltas. At-the-money options generally have deltas of around .50. Deeper in-the-money options might have a delta of .80 or higher. Out-of-the-money options have deltas as small as .20 or less. Delta will change as the option becomes further in or out-of-the-money. When a stock option is deep in the money, it will begin to trade like the stock - moving dollar for dollar with the underlying stock, while the far out-of-the-money options don't move much.

Since Delta is such an important factor, traders are also interested in how Delta changes. **Gamma** measures the rate of change in the delta for each one-point increase in the underlying stock. It is a valuable tool in helping you forecast changes in the delta of an option or an overall position. Gamma is largest for the at-the-money options and gets progressively lower for both in- and out-of-the-money options. Unlike Delta, Gamma is always positive for both calls and puts. Delta and Gamma change constantly. The factors that affect Delta and Gamma are the same ones that affect an option's value including time, the price of the stock, and volatility.

The next Greek we will look at is **Vega**, which measures the sensitivity of the option's price to changes in implied volatility. Although implied volatility changes affect whole option chains, each option has its own Vega and will react by varying degrees. For instance, the impact of volatility changes is greater for at-the-money options than for the in- or out-of-the-money options. Longer-term options, especially LEAPS, have higher Vega, and thus their value is more sensitive to changes in volatility.

Finally, **Theta** is a measure of the time decay of an option. It is the dollar amount that an option will lose each day. For at-the-money options, Theta increases as an option approaches the expiration date. For in and out-of-the-money options, theta decreases as an option approaches expiration. Theta is one of the most important concepts for a beginning option trader to understand because it explains what effect time has on the value of purchased or sold options. The further out in time you go, the smaller the time decay.

The Greeks can help you quantify the various risks of every trade you are considering, but it is important to realize that these numbers are strictly theoretical, and that the values are based on mathematical models. The Greeks provide an important measurement of the risks and potential rewards of an option position. Combining an understanding of the Greeks, with the insight that risk graphs provide, lets you take your options trading to another level.