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   NEED/IMPORTANCE OF THE STUDY

   STATEMENT OF THE PROBLEM

   OBJECTIVES

   HYPOTHESES

   RESEARCH METHODOLOGY

   RESULTS & DISCUSSION

   FINDINGS

   RECOMMENDATIONS/SUGGESTIONS

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CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

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- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

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UNDERSTANDING THE GREEKS AND THEIR USE TO MEASURE RISK

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ABSTRACT

Trading options without an understanding of the Greeks - the essential risk measures and profit/loss guideposts in options strategies - is synonymous to flying a plane without the ability to read instruments. Unfortunately, many traders are not option strategy "instrument rated"; that is, they do not know how to read the Greeks when trading. This puts them at risk of a fatal error, much like a pilot would experience flying in bad weather without the benefit of a panel of instruments at his or her disposal. This tutorial is aimed at getting an instrument rated in options trading, to continue the analogy with piloting, so that we can handle any strategy scenario and take the appropriate action to avoid losses or enhance gains. When any strategy is constructed, there are associated Delta, Vega and Theta positions, as well as other position Greeks. When options are traded outright, or are combined, we can calculate position Greeks (or net Greeks value) so that we can know how much risk and potential reward resides in the strategy, whether it is a long put or call, or a complex strategy like a strangle, butterfly spread or ratio spread, among many others. Typically, you should try to match your outlook on a market to the position Greeks in a strategy so that if your outlook is correct you capitalize on favourable changes in the strategy at every level of the Greeks. That is why knowing what the Greeks are telling you is so important. Greeks can be incorporated into strategy design at a precise level using mathematical modelling and sophisticated software. But at a more basic level, the Greeks can be used as guideposts for where the risks and rewards can generally be found.

KEYWORDS

Derivatives ,Greeks, Options.

INTRODUCTION

In mathematical finance, the **Greeks** are the quantities representing the sensitivities of the price of derivatives such as options to a change in underlying parameters on which the value of an instrument or portfolio of financial instruments is dependent. The name is used because the most common of these sensitivities are often denoted by Greek letters. Collectively these have also been called the **risk sensitivities**, **risk measures** or **hedge parameters**.

The —Greeks" are five partial derivatives of price with respect to the parameters or factors which determine the value of an option. They can be used as indicators to help monitor and analyse the risks associated with portfolios which include options.

The five Greeks and the associated derivatives that this project focuses on are:

- **Delta** (price of underlying)
- **Gamma** (2nd derivative of price)
- **Vega** (volatility)
- **Theta** (time)
- **Rho** (risk free interest rate)

When any strategy is constructed, there are associated *Delta*, *Vega* and *Theta* positions, as well as other position Greeks. When options are traded outright, or are combined, we can calculate position Greeks (or net Greeks value) so that we can know how much risk and potential reward resides in the strategy, whether it is a long put or call, or a complex strategy like a strangle, butterfly spread or ratio spread, among many others. Typically, you should try to match your outlook on a market to the position Greeks in a strategy so that if your outlook is correct you capitalize on favourable changes in the strategy at every level of the Greeks. That is why knowing what the Greeks are telling you is so important. Greeks can be incorporated into strategy design at a precise level using mathematical modelling and sophisticated software. But at a more basic level, the Greeks can be used as guideposts for where the risks and rewards can generally be found.

REVIEW OF LITERATURE

This section reviews the literature on determining the use of Greeks in the derivatives market. Many textbooks (e.g. **Hull 2011, chapter 17)** contain short descriptions of the primary Greeks, i.e. Delta, Gamma, Vega, Theta, Rho, etc. **Pelsser and Vorst (1994)** discussed the determination of these Greeks in the context of the binomial model (**Cox and Rubinstein 1983**). **Garman (1992)** christens three more partial derivatives with the names speed, charm, and color. The duration of option portfolios is defined in **Garman (1985),** while *volatility immunization* and *Gamma duration* are defined in **Garman (1999)**.

Similarly, **Haug (1993)** discusses the aggregation of Vegas of options of different maturities. **Hull and White (1987)** compare Delta hedging, Delta+Gamma hedging, and Delta+Vega hedging of written FX options and conclude that the last of these works best. **Willard (1987)** calculates sensitivities for path-independent derivative securities in multifactor models, while **Ross (1998)** calculates sensitivities for multi-asset European options.

Estrella (1995) derives an algorithm for determining arbitrary price derivatives of the BMS option formula. He then examines Taylor series expansions in the stock price and finds the radius of convergence. **Broadie and Glasserman (1996), Curran (1993), and Glasserman and Zhao (1999)** all consider the estimation of security price derivatives using simulation. **Bergman (1983) and Bergman, Grundy, and Wiener (1996)** derive expressions for Delta and Gamma when volatility is a function of stock price and time. **Grundy and Wiener (1996)** also derive the theoretical and empirical bounds on Deltas for this case. **Fournie (1997) and Bermin (1999)** use Malliavin calculus to determine Deltas in even more general settings. There is a substantial literature on durations of bonds, which this literature survey ignores in the interests of brevity. However, **Bergman (1998) and Hull and White (1992)** examine Greeks of interest rate derivatives in diffusive single-factor models. Similarly, using an option pricing context, Ferri, **Oberhelman, and Goldstein (1982)** examine yield sensitivities of short term securities, while **Ogden (1987)** examines yield sensitivities of corporate bonds.

In a very general context, **Breeden and Litzenberger (1978)** show that the second derivative with respect to an option's strike price can be used to imply out state-contingent prices. Similarly, **Schroder (1995)** shows that the first derivative with respect to the strike of an American option yields the risk-neutral probability of exercise. He also interprets the Deltas of American options.

The following are some major works in this field:

- **Binomial model Greeks - Pelsser and Vorst (1994).**
- **Vega hedging.**
  – Garman (1999)
  – Haug (1993)
  – Hull and White (1987)
- **Multi-factor Greeks.**
  – Willard (1997)
  – Ross (1998)

- **Taylor series in stock price - Estrella (1995).**
- **Price Greeks for Monte Carlo simulation.**

– Broadie and Glasserman (1995)
– Curran (1993)
– Glasserman and Zhao (1999)

- **Price Greeks for level-dependent volatility.**

– Bergman, Grundy, and Wiener (1996)
– Grundy and Wiener (1996)

- **Strike price Greeks.**

– Breeden and Litzenberger (1978)
– Schroder (1995)

- **Peters, Edgar E. *Chaos and Order in the Capital Markets.* John Wiley & Sons (1991*).***

IMPORTANCE

The objective of this paper is to understand the use of five most important, and commonly used Greeks, namely, Delta, Gamma, Theta, Rho, and Vega. This paper focuses on explaining the Greeks, the concepts, their uses, their importance, and improvements and suggestions to the existing structure. The Greeks are vital tools in risk management. Each Greek measures the sensitivity of the value of a portfolio to a small change in a given underlying parameter, so that component risks may be treated in isolation, and the portfolio rebalanced accordingly to achieve a desired exposure. The Greeks in the Black–Scholes model are relatively easy to calculate, a desirable property of financial models, and are very useful for derivatives traders, especially those who seek to hedge their portfolios from adverse changes in market conditions. For this reason, those Greeks which are particularly useful for hedging Delta, Theta, and Vega are well-defined for measuring changes in Price, Time and Volatility. Although Rho is a primary input into the Black–Scholes model, the overall impact on the value of an option corresponding to changes in the risk-free interest rate is generally insignificant and therefore higher-order derivatives involving the risk-free interest rate are not common.

STATEMENT OF THE PROBLEM

This tutorial is aimed at getting an instrument rated in options trading, to continue the analogy with piloting, so that you can handle any strategy scenario and take the appropriate action to avoid losses or enhance gains. It will also provide you with the tools necessary to determine the risk and reward potential before lift-off.

When taking an option position or setting up an options strategy, there will be risk and potential reward from the following areas:

- Price Change
- Changes in Volatility
- Time Value Decay

OBJECTIVES

- To gain a brief knowledge of Greeks
- Using the greeks to understand Options
- To identify the strengths and weaknesses of Greeks
- To make a trader learn how use of greeks can prove helpful while trading.

DISCUSSION

THE GREEKS

"*An option model outputs the option value, and option sensitivities, the Greeks.*" The Greeks are vital tools in risk management. Each Greek measures the sensitivity of the value of a portfolio to a small change in a given underlying parameter, so that component risks may be treated in isolation, and the portfolio rebalanced accordingly to achieve a desired exposure. For option traders, the Greeks are a series of handy variables that help explain the various factors driving movement in options prices (also known as —premiums). Many options traders mistakenly assume that price movement in the underlying stock or security is the only factor driving changes in the option's price. In fact, it's very possible to watch the option contract move up or down in value, while the underlying price stays still. Mathematically speaking, the Greeks are all derived from an options pricing model. The most well-known is Black-Scholes, but many variations are used. For equity options, it is most common to use some form of the Cox-Ross-Rubinstein model, which accounts for the possible early exercise of American-style options. Each Greek isolates a variable that can drive options price movement, providing insight on how the option's premium will be affected if that variable changes.

The most common of the Greeks are the first order derivatives: **Delta**, **Vega**, **Theta** and **Rho** as well as **Gamma**, a second-order derivative of the value function.

SIGNIFICANCE OF THE GREEKS

DELTA

Delta is the primary indicator used when monitoring option risk. Most often, Delta is used as the "hedge ratio". By taking an opposite position in the underlying instrument equal in size to the option's Delta, we immunize the position against profit or loss variability due to small movements in the market. This is often referred to as Delta hedging, or creating a Delta-neutral portfolio. Delta hedging is the same process as hedging through duration matching in a fixed income portfolio. A risk management report could summarize the total equity exposure by summing up the products of amounts exposed times the Delta's for each equity, equity index, and any options in the portfolio.

GAMMA

Delta plays the same role in approximating the sensitivity of an option's price to changes in the price of the underlying asset as duration does for measuring the sensitivity of a bond's price. In both cases, the approximation can be improved through the use of second derivatives. For bonds, the second derivative is called convexity. For an option, the second derivative is often referred to as Gamma. If Gamma is large, creating a Delta-neutral portfolio may not provide adequate immunization against asset price changes. Delta hedging can be repeated more frequently or the option position can be made —Delta- and Gamma-neutral . This is done by taking a position in the underlying asset and an option on the asset such that the Delta and Gamma of this portfolio is equal and opposite in sign to the option being hedged. Again, this is essentially the same process as matching duration and convexity to obtain an immunized fixed-income portfolio.

THETA

Theta is generally not directly used to hedge option positions. Since there is no uncertainty as to the passage of time, one does not try to hedge its effect. However, it is useful as an aid in figuring out how the value of an option depreciates as time passes, and in planning for future transactions and transaction costs to keep Delta in balance. In other words, since the option's value changes even when the underlying asset price remains the same, it is possible to separate the effect of time on the value of the option. Theta is related to Gamma in a Delta-neutral portfolio, normally with opposite sign.

VEGA

Vega calculated from historical prices, does not usually result in option prices consistent with market prices when using a lognormal pricing model which assumes constant volatility (Black- Scholes, e.g.), The reasons for this are that the market does reflect, to some extent, the non-normal distribution of returns,

and the expectation for future volatility that is different from historical volatility. An implied volatility or a matrix of implied volatilities is often calculated from the other variables used in the pricing formula (option price, asset price, time to maturity, risk-free rate, and exercise price).
Vega is not always appropriate for comparing the effect of a change in volatility on the price of different options because it measures absolute changes in volatility rather than relative changes. If the change in the option price due to a change in relative volatility is more important, normalized Vega should be used. ―Normalized Vega measures the percentage change in an option value for a 1 percent relative increase (e.g. from 14% to 14.14%) in implied volatility. Normalized Vegas for in- and out-of-the-money options are often substantially larger than for at-the-money options.

RHO

Similar to Theta, Rho is not commonly used as a hedge parameter. However, it is a valuable statistic because it shows how sensitive an option is to changes in interest rates. It can be quite critical in pricing products which contain options (e.g. Equity Indexed Annuities), to understand how product margins need to change as interest rates move up and down. The derivative of price with respect to the strike price (Eta) has not been mentioned above. Also, the derivative of price with respect to carry costs is sometimes referred to as ―Rho-b. Many of these derivatives have closed form formulas, depending on the underlying distribution of market returns assumed in the option valuation formula.

USING "THE GREEKS" TO UNDERSTAND OPTIONS

OPTIONS

In finance, an **option** is a derivative financial instrument that specifies a contract between two parties for a future transaction on an asset at a reference price (the strike). There are two types of options:
Call Options- The option to **buy** something, stocks, index, currency, etc., at a specific price.
Put Options- The option to **sell** something, stocks, index, currency, etc., at a specific price.
The reference price at which the underlying asset may be traded is called the **Strike price** or **Exercise price**. The process of activating an option and thereby trading the underlying asset at the agreed-upon price is referred to as exercising it. Most options have an **Expiration date**. If the option is not exercised by the expiration date, it becomes void and worthless.
Further, options can be either American options or European Options.
American Options- Options that can be exercised at any time upto or on, the maturity or expiration date.
European Options- Options that can be exercised only on the maturity or expiration date.

OPTIONS PRICING

Unlike futures, to enter into an option contract, you need to make an upfront payment called **Option Price/Premium.**

COMPONENTS OF VALUE

The premium of an option has two main components: **intrinsic value and time value.**

INTRINSIC VALUE

Intrinsic value is the value that any given option would have if it were exercised today. Basically, the intrinsic value is the amount by which the strike price of an option is in the money. It is the portion of an option's price that is not lost due to the passage of time. The following equations can be used to calculate the intrinsic value of a call or put option:
Call Option Intrinsic Value = Underlying Stock's Current Price – Call Strike Price Put Option Intrinsic Value = Put Strike Price – Underlying Stock's Current Price
The intrinsic value of an option reflects the effective financial advantage that would result from the immediate exercise of that option. Basically, it is an option's minimum value. Options trading at-the-money or out-of-the-money have no intrinsic value. For **example**, let's say General Electric (GE) stock is selling at $34.80. The GE 30 call option would have an intrinsic value of $4.80 ($34.80 – $30 = $4.80) because the option holder can exercise his option to buy GE shares at $30 and then turn around and automatically sell them in the market for $34.80 - a profit of $4.80. In a different example, the GE 35 call option would have an intrinsic value of zero ($34.80 – $35 = -$0.20) because the intrinsic value cannot be negative. It is also important to note that intrinsic value also works in the same way for a put option. For example, a GE 30 put option would have an intrinsic value of zero ($30 – $34.80 = -$4.80) because the intrinsic value cannot be negative. On the other hand, a GE 35 put option would have an intrinsic value of $0.20 ($35 – $34.80 = $0.20).
Because the values of option contracts depend on a number of different variables in addition to the value of the underlying asset, they are complex to value.
Amongst the most common models of pricing are:

- Black–Scholes and the Black model.
- Binomial options pricing model.
- Monte Carlo option model.
- Finite difference methods for option pricing.

Other approaches include:

- Heston model.
- Heath-Jarrow-Morton framework.
- Variance Gamma Model.

Trying to predict what will happen to the price of a single option or a position involving multiple options as the market changes can be a difficult undertaking. Because the option price does not always appear to move in conjunction with the price of the underlying asset, it is important to understand what factors contribute to the movement in the price of an option, and what effect they have. Options traders often refer to the Delta, Gamma, Vega and Theta of their option positions. Collectively, these terms are known as the "Greeks" and they provide a way to measure the sensitivity of an option's price to quantifiable factors. These terms may seem confusing and intimidating to new option traders, but broken down, the Greeks refer to simple concepts that can help you better understand the risk and potential reward of an option position.

FINDING VALUES FOR THE GREEKS

First, you should understand that the numbers given for each of the Greeks are strictly theoretical. That means the values are projected based on mathematical models. Most of the information you need to trade options - like the bid, ask and last prices, volume and open interest - is factual data received from the various option exchanges and distributed by a data service and/or brokerage firm. But the Greeks cannot simply be looked up in your everyday option tables. They need to be calculated, and their accuracy is only as good as the model used to compute them.

TABLE 1

Options	DEC04 <25>					JAN05 <60>					APR05 <144>				
80 calls	MktPr	Delta	Gamma	Theta	Vega	MktPr	Delta	Gamma	Theta	Vega	MktPr	Delta	Gamma	Theta	Vega
75 calls	0.05	0.14	0.11	-0.03	0.07	0.05	0.31	0.34	-0.02	0.15	0.40	10.9	2.26	-0.58	6.41
70 calls	0.10	2.46	1.33	-0.49	0.87	0.10	7.32	3.47	-0.50	2.61	1.20	23.2	3.46	-1.13	10.8
65 calls	0.45	17.3	5.57	-2.60	3.94	1.20	31.6	6.37	-2.14	7.78	2.60	40.7	4.06	-1.56	14.2
60 calls>	2.25	55.1	8.45	-4.62	6.25	3.30	59.7	5.01	-2.84	9.66	4.90	59.7	3.67	-1.78	14.9
55 calls	6.10	86.9	3.46	-2.95	3.80	6.70	80.1	2.94	-2.71	7.45	8.10	76.1	2.62	-1.75	12.7
50 calls	10.80	97.3	0.80	-1.25	1.24	11.10	92.4	1.41	-1.50	4.09	12.10	87.4	1.46	-1.31	9.11
45 calls	15.70	99.6	0.13	-0.50	0.28	15.90	97.6	0.47	-0.81	1.71	16.50	93.9	0.74	-0.96	5.69
40 calls	20.60	99.9	0.02	-0.28	0.05	20.80	99.4	0.12	-0.43	0.58	21.20	97.3	0.33	-0.66	3.14
35 calls	25.60	100	0.00	-0.21	0.01	25.70	99.9	0.03	-0.26	0.16	26.00	98.9	0.13	-0.44	1.56
75 puts	15.00	-100	0.00	0.00	0.00	15.00	-100	0.00	0.00	0.00	15.00	-89.1	5.11	0.00	0.00
70 puts	9.50	-100	0.00	0.00	0.00	10.00	-100	0.00	0.00	0.00	10.20	-78.8	3.48	-0.63	10.8
65 puts	4.90	-82.9	5.55	-2.03	3.94	5.50	-68.8	6.35	-1.00	7.78	6.60	-61.6	2.55	-0.94	14.2
60 puts>	1.65	-45.2	8.47	-3.23	6.25	2.55	-40.6	5.05	-2.03	9.66	3.90	-40.3	3.60	-1.24	14.9
55 puts	0.45	-13.1	3.45	-2.40	3.80	1.00	-19.9	2.92	-1.76	7.45	2.15	-24.0	2.61	-1.19	12.7
50 puts	0.15	-2.71	0.81	-0.96	1.24	0.35	-7.67	1.41	-1.06	4.09	1.10	-12.7	1.46	-0.95	9.11
45 puts	0.05	-0.44	0.13	-0.24	0.28	0.15	-2.40	0.48	-0.56	1.71	0.55	-6.19	0.75	-0.67	5.69
40 puts	0.05	-0.06	0.02	-0.05	0.05	0.10	-0.64	0.13	-0.20	0.58	0.30	-2.76	0.34	-0.43	3.14
35 puts	0.05	-0.01	0.00	-0.01	0.01	0.05	-0.14	0.03	-0.06	0.16	0.15	-1.13	0.14	-0.23	1.56

IMPLEMENTATION ISSUES

Certain assumptions about price distributions (lognormal) may lead to closed form solutions for the partial derivatives. Software which calculates the Greeks for lognormal return distributions is readily available (Hull reference below or internet), or can be written fairly quickly in a spreadsheet, or a programming language. The lognormal type formulas require the generation of values of the normal distribution, and there are many sources for mathematical algorithms to do this.

Other considerations would include the size and number of option positions in the portfolio, the frequency of data needed for monitoring the portfolio. As the size and frequency become larger, there is more need for automatic processes to feed the data into the monitoring system. This may justify the acquisition of a commercial system which incorporates the acquisition of market data with the determination of modelled prices and partial derivative calculation.

OPTION GREEKS AND STRATEGY SELECTION

Considering future trades, we should make sure we put trades that support our current directional bias while allowing us to stay within our comfort level and meet the following two criteria:

1. Defined risk – One should know exactly how much is at risk and should be ok with losing that money.

2. Positive Theta - The majority of our trades are positive Theta because we can make money even when we're wrong. That doesn't mean we can be completely wrong and make money but the time erosion factor offsets the amount we may be losing as the trade goes against us and thus gives the trade time to go our way.

As we're considering trades, it's important to know what affect each strategy will have on the portfolio. The following table summarizes the basic effect one can expect and gives a starting point for selection of a strategy.

CONCLUSION

The Greeks help to provide important measurements of an option position's risks and potential rewards. Once you have a clear understanding of the basics, you can begin to apply this to your current strategies. It is not enough to just know the total capital at risk in an options position. To understand the probability of a trade making money, it is essential to be able to determine a variety of risk-exposure measurements.

Since conditions are constantly changing, the Greeks provide traders with a means of determining how sensitive a specific trade is to price fluctuations, volatility fluctuations, and the passage of time. Combining an understanding of the Greeks with the powerful insights the risk graphs provide can help you take your options trading to another level. Getting a firm grasp on your Greeks will help you judge what option is the best to trade, based on your outlook for the underlying. If you don't contend with the Greeks, though, you could be flying into your next option trade blind.

REFERENCES

1. D.B. Madan and E. Seneta Journal of Business, 63:511–524, 1990.The Variance-Gamma (V.G.) model for share market returns,
2. Espen Gaarder Haug, John Wiley & Sons (2007). Derivatives Models on Models,
3. Fabrice Douglas Rouah and Gregory Vainberg, John Wiley & Sons (2007) Option Pricing Models and Volatility,
4. Financial Derivatives, Pricing, Applications and Mathematics, Jamil Baz and George Chacko, Cambridge University Press (2004).
   Broadie, M., Glasserman, P.: Estimating security price derivatives using simulation, Manag. Sci.42, 269–285 (1996)
5. Financial Modelling, 3rd edition, Simon Benninga, MIT Press (2008)
6. Jaschke, S. R. (2002): The Cornish-Fisher Expansion in the Context of Delta-Gamma- Normal Approximations, Journal of Risk, 4, pp. 33-52
7. John. C. Hull. Options, Futures and other Derivatives
8. Pricing Derivatives Securities, 2nd Edition, T W Epps, World Scientific Publishing.
9. Rahul Bhattacharya The book of Greeks

WEBSITES

10. http://en.wikipedia.org/wiki/Black%E2%80%93Scholes
11. http://en.wikipedia.org/wiki/Greeks_(finance) http://en.wikipedia.org/wiki/Valuation_of_options
12. http://en.wikipedia.org/wiki/Option_(finance)
13. http://optionGreeks.org/
14. http://www.investopedia.com/university/option-Greeks/#axzz2ARWBSv8z
15. http://www.optionmonster.com/education/option_Greeks.php
16. http://www.optionseducation.org/getting_started/options_overview/options_pricing.html
    http://www.investopedia.com/articles/optioninvestor/07/options_beat_market.asp#axzz2ARWBSv8z
17. http://www.optionsplaybook.com/options-introduction/option-Greeks/
18. http://www.optiontradingpedia.com/free_option_Greeks.htm
19. http://www.theoptionsguide.com/the-Greeks.aspx
20. https://www.google.co.in/
21. https://www.tradeking.com/education/options/option-Greeks-explained

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