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DAN PASSARELLI

FOREWORD BY WILLIAM J. BRODSKY

TRADING  
OPTION  
GREEKS

2

SECOND EDITION

HOW TIME, VOLATILITY,  
AND OTHER PRICING FACTORS  
DRIVE PROFITS



# TRADING OPTION GREEKS

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# TRADING OPTION GREEKS

How Time, Volatility, and Other  
Pricing Factors Drive Profits

**Second Edition**

**Dan Passarelli**

**BLOOMBERG PRESS**

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*This book is dedicated to Kathleen, Sam, and Isabel. I wouldn't trade them for all the money in the world.*





# Disclaimer

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This book is intended to be educational in nature, both theoretically and practically. It is meant to generally explore the factors that influence option prices so that the reader may gain an understanding of how options work in the real world. This book does not prescribe a specific trading system or method. This book makes no guarantees.

Any strategies discussed, including examples using actual securities and price data, are strictly for illustrative and educational purposes only and are not to be construed as an endorsement, recommendation, or solicitation to buy or sell securities. Examples may or may not be based on factual or historical data.

In order to simplify the computations, examples may not include commissions, fees, margin, interest, taxes, or other transaction costs. Commissions and other costs will impact the outcome of all stock and options transactions and must be considered prior to entering into any transactions. Investors should consult their tax adviser about potential tax consequences. Past performance is not a guarantee of future results.

Options involve risks and are not suitable for everyone. While much of this book focuses on the risks involved in option trading, there are market situations and scenarios that involve unique risks that are not discussed. Prior to buying or selling an option, a person should read *Characteristics and Risks of Standardized Options (ODD)*. Copies of the ODD are available from your broker, by calling 1-888-OPTIONS, or from The Options Clearing Corporation, One North Wacker Drive, Chicago, Illinois 60606.



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# Foreword

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The past several years have brought about a resurgence in market volatility and options volume unlike anything that has been seen since the close of the twentieth century. As markets have become more interdependent, interrelated, and international, the U.S. listed option markets have solidified their place as the most liquid and transparent venue for risk management and hedging activities of the world's largest economy. Technology, competition, innovation, and reliability have become the hallmarks of the industry, and our customer base has benefited tremendously from this ongoing evolution.

However, these advances can be properly tapped only when the users of the product continue to expand their knowledge of the options product and its unique features. Education has always been the driver of growth in our business, and it will be the steward of the next generation of options traders. Dan Passarelli's new and updated book *Trading Option Greeks* is a necessity for customers and traders alike to ensure that they possess the knowledge to succeed and attain their objectives in the high-speed, highly technical arena that the options market has become.

The retail trader of the past has given way to a new retail trader of the present—one with an increased level of technology, support, capital treatment, and product selection. The impact of the staggering growth in such products as the CBOE Holdings' VIX options and futures, and the literally dozens of other products tied to it, have made the volatility asset class a new, unique, and permanent pillar of today's option markets.

Dan's updated book continues his mission of supporting, preparing, and reinforcing the trader's understanding of pricing, volatility, market terminology, and strategy, in a way that few other books have been able. Using a

perspective forged from years as an options market maker, professional trader, and customer, Dan has once again provided a resource for those who wish to know best how the option markets behave today, and how they are likely to continue to behave in the future. It is important to understand not only what happens in the options space, but also *why* it happens. This book is intended to provide those answers. I wish you all the best in your trading!

William J. Brodsky  
*Chairman and CEO*  
*Chicago Board Options Exchange*



# Preface

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I've always been fascinated by trading. When I was young, I'd see traders on television, in their brightly colored jackets, shouting on the seemingly chaotic trading floor, and I'd marvel at them. What a wonderful job that must be! These traders seemed to me to be very different from the rest of us. It's all so very esoteric.

It is easy to assume that professional traders have closely kept secrets to their ways of trading—something that secures success in trading for them, but is out of reach for everyone else. In fact, nothing could be further from the truth. If there are any “secrets” of professional traders, this book will expose them.

True enough, in years past there have been some barriers to entry to trading success that did indeed make it difficult for nonprofessionals to succeed. For example, commissions, bid-ask spreads, margin requirements, and information flow all favored the professional trader. Now, these barriers are gone. Competition among brokers and exchanges—as well as the ubiquity of information as propagated on the Internet—has torn down those walls. The only barrier left between the Average Joe and the options pro is that of knowledge. Those who have it will succeed; those who do not will fail.

To be sure, the knowledge held by successful traders is not that of what will happen in the future; it is the knowledge of how to manage the uncertainty. No matter what our instincts tell us, we do not know what will happen in the future with regard to the market. As Socrates put it, “The only true wisdom is in knowing you know nothing.” The masters of option trading are masters of managing the risk associated with what they don't know—the risk of uncertainty.

As an instructor, I've talked to many traders who were new to options who told me, “I made a trade based on what I thought was going to happen. I was right, but my position lost money!” Choosing the right strategy makes all the difference when it comes to mastery of risk management and ultimate trading success. Knowing which option strategy is the right strategy for a given situation comes with knowledge and experience.

All option strategies are differentiated by their unique risk characteristics. Some are more sensitive to directional movement of the underlying asset than others; some are more affected by time passing than others. The exact exposure positions have to these market influences determines the success of individual trades and, indeed, the long-term success of the trader who knows how to exploit these risk characteristics. These option-value sensitivities can be controlled when a trader understands the option greeks.

Option greeks are metrics used to measure an option's sensitivity to influences on its price. This book will provide the reader with an understanding of these metrics, to help the reader truly master the risk of uncertainty associated with option trading.

Successful traders strive to create option positions with risk-reward profiles that benefit them the most in a given situation. A trader's objectives will dictate the right strategy for the right situation. Traders can tailor a position to fit a specific forecast with respect to the time horizon; the degree of bullishness, bearishness, neutrality, or volatility in the underlying stock; and the desired amount of leverage. Furthermore, they can exploit opportunities unique to options. They can trade option greeks. This opens the door to many new opportunities.

## **A New Direction**

Traders, both professional and retail, need ways to act on their forecasts without the constraints of convention. "Get long, or do nothing" is no longer a viable business model for people active in the market. "Up is good; down is bad" is burned into traders' minds from the beginning of their market education. This concept has its place in the world of investing, but becoming an active trader in the option market requires thinking in a new direction.

Market makers and other expert option traders look at the market differently from other traders. One fundamental difference is that these traders trade all four directions: up, down, sideways, and volatile.

## **Trading Strategies**

Buying stock is a trading strategy that most people understand. In practical terms, traders who buy stock are generally not concerned with the literal ownership stake in a corporation, just the opportunity to profit if the stock

rises. Although it's important for traders to understand that the price of a stock is largely tied to the success or failure of the corporation, it's essential to keep in mind exactly what the objective tends to be for trading a stock: to profit from changes in its price. A bullish position can also be taken in the options market. The most basic example is buying a call.

A bearish position can be taken by trading stock or options, as well. If traders expect the value of a stock they own to fall, they will sell the stock. This eliminates the risk of losses from the stock's falling. If the traders do not own the stock that they think will decline, they can take a more active stance and short it. The short-seller borrows the stock from a party that owns it and then sells the borrowed shares to another party. The goal of selling stock short is to later repurchase the shares at a lower price before returning the stock to its owner. It is simply reversing the order of "buy low/sell high." The risk is that the stock rises and shares have to be bought at a higher price than that at which they were sold. Although shorting stock can lead to profits when the market cooperates, in the options market, there are alternative ways to profit from falling prices. The most basic example is buying a put.

A trader can use options to take a bullish or bearish position, given a directional forecast. Sideways, nontrending stocks and their antithesis, volatile stocks, can be traded as well. In the later market conditions, profit or loss can be independent of whether the stock rises or falls. Opportunity in option trading is not necessarily black and white—not necessarily up and down. Option trading is nonlinear. Consequently, more opportunities can be exploited by trading options than by trading stock.

Option traders must consider the time period in question, the volatility expected during this period, interest rates, and dividends. Along with the stock price, these factors make up the dynamic components of an option's value. These individual factors can be isolated, measured, and exploited. Incremental changes in any of these elements as measured by option greeks provide opportunity for option traders. Because of these other influences, direction is not the only tradable element of a forecast. Time, volatility, interest rates—these can all be traded using option greeks. These factors and more will all be discussed at great length throughout this book.

## **This Second Edition of *Trading Option Greeks***

This book addresses the complex price behavior of options by discussing option greeks from both a theoretical and a practical standpoint. There is some tactical discussion throughout, although the objective of this book is

to provide education to the reader. This book is meant to be less a how-to manual than a how-come tutorial.

This informative guide will give the retail trader a look inside the mind of a professional trader. It will help the professional trader better understand the essential concepts of his craft. Even the novice trader will be able to apply these concepts to basic options strategies. Comprehensive knowledge of the greeks can help traders to avoid common pitfalls and increase profit potential.

Much of this book is broken down into a discussion of individual strategies. Although the nuances of each specific strategy are not relevant, presenting the material this way allows for a discussion of very specific situations in which greeks come into play. Many of the concepts discussed in a section on one option strategy can be applied to other option strategies.

As in the first edition of *Trading Option Greeks*, Chapter 1 discusses basic option concepts and definitions. It was written to be a review of the basics for the intermediate to advanced trader. For newcomers, it's essential to understand these concepts before moving forward.

A detailed explanation of option greeks begins in Chapter 2. Be sure to leave a bookmark in this chapter, as you will flip to it several times while reading the rest of the book and while studying the market thereafter. Chapter 3 introduces volatility. The same bookmark advice can be applied here, as well. Chapters 4 and 5 explore the minds of option traders. What are the risks they look out for? What are the opportunities they seek? These chapters also discuss direction-neutral and direction-indifferent trading. The remaining chapters take the reader from concept to application, discussing the strategies for nonlinear trading and the tactical considerations of a successful options trader.

New material in this edition includes updated examples, with more current price information throughout many of the chapters. More detailed discussions are also included to give the reader a deeper understanding of important topics. For example, Chapter 8 has a more elaborate explanation of the effect of dividends on option prices. Chapter 17 of this edition has new material on strategy selection, position management, and adjusting, not featured in the first edition of the book.

# Acknowledgments

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A book like *Trading Option Greeks* is truly a collaboration of the efforts of many people. In my years as a trader, I had many teachers in the School of Hard Knocks. I have had the support of friends and family during the trials and tribulations throughout my trading career, as well as during the time spent writing this book, both the first edition and now this second edition. Surely, there are hundreds of people whose influences contributed to the creation of this book, but there are a few in particular to whom I'd like to give special thanks.

I'd like to give a very special thanks to my mentor and friend from the CBOE's Options Institute, Jim Bittman. Without his help this book would not have been written. Thanks to Marty Kearney and Joe Troccoli for looking over the manuscript. Their input was invaluable. Thanks to Debra Peters for her help during my career at the Options Institute. Thanks to Steve Fossett and Bob Kirkland for believing in me. Thanks to the staff at Bloomberg Press, especially Stephen Isaacs and Kevin Commins. Thanks to my friends at the Chicago Board Options Exchange, the Options Industry Council, and the CME group. Thanks to John Kmiecik for his diligent content editing. Thanks to those who contribute to sharing option ideas on my website, [markettaker.com](http://markettaker.com). Thanks to my wife, Kathleen, who has been more patient and supportive than anyone could reasonably ask for. And thanks, especially, to my students and those of you reading this book.



# **TRADING OPTION GREEKS**





**PART I**

# **The Basics of Option Greeks**



# CHAPTER 1

## The Basics

To understand how options work, one needs first to understand what an option is. An option is a contract that gives its owner the right to buy or the right to sell a fixed quantity of an underlying security at a specific price within a certain time constraint. There are two types of options: calls and puts. A call gives the owner of the option the right to buy the underlying security. A put gives the owner of the option the right to sell the underlying security. As in any transaction, there are two parties to an option contract—a buyer and a seller.

### **Contractual Rights and Obligations**

The option buyer is the party who owns the right inherent in the contract. The buyer is referred to as having a long position and may also be called the holder, or owner, of the option. The right doesn't last forever. At some point the option will expire. At expiration, the owner may exercise the right or, if the option has no value to the holder, let it expire without exercising it. But he need not hold the option until expiration. Options are transferable—they can be traded intraday in much the same way as stock is traded. Because it's uncertain what the underlying stock price of the option will be at expiration, much of the time this right has value before it expires. The uncertainty of stock prices, after all, is the *raison d'être* of the option market.

A long position in an option contract, however, is fundamentally different from a long position in a stock. Owning corporate stock affords the shareholder ownership rights, which may include the right to vote in corporate affairs and the right to receive dividends. Owning an option represents strictly the right either to buy the stock or to sell it, depending

on whether it's a call or a put. Option holders do not receive dividends that would be paid to the shareholders of the underlying stock, nor do they have voting rights. The corporation has no knowledge of the parties to the option contract. The contract is created by the buyer and seller of the option and made available by being listed on an exchange.

The party to the contract who is referred to as the option seller, also called the option writer, has a short position in the option. Instead of having a right to take a position in the underlying stock, as the buyer does, the seller incurs an obligation to potentially either buy or sell the stock. When a trader who is long an option exercises, a trader with a short position gets *assigned*. Assignment means the trader with the short option position is called on to fulfill the obligation that was established when the contract was sold.

Shorting an option is fundamentally different from shorting a stock. Corporations have a quantifiable number of outstanding shares available for trading, which must be borrowed to create a short position, but establishing a short position in an option does not require borrowing; the contract is simply created. The strategy of shorting stock is implemented statistically far less frequently than simply buying stock, but that is not at all the case with options. For every open long-option contract, there is an open short-option contract—they are equally common.

## Opening and Closing

Traders' option orders are either opening or closing transactions. When traders with no position in a particular option buy the option, they buy to open. If, in the future, the traders wish to eliminate the position by selling the option they own, the traders enter a sell to close order—they are closing the position. Likewise, if traders with no position in a particular option want to sell an option, thereby creating a short position, the traders execute a sell-to-open transaction. When the traders cover the short position by buying back the option, the traders enter a buy-to-close order.

## Open Interest and Volume

Traders use many types of market data to make trading decisions. Two items that are often studied but sometimes misunderstood are volume and open interest. Volume, as the name implies, is the total number of contracts traded during a time period. Often, volume is stated on a one-day basis, but could be stated per week, month, year, or otherwise. Once a new period

(day) begins, volume begins again at zero. Open interest is the number of contracts that have been created and remain outstanding. Open interest is a running total.

When an option is first listed, there are no open contracts. If Trader A opens a long position in a newly listed option by buying a one-lot, or one contract, from Trader B, who by selling is also opening a position, a contract is created. One contract traded, so the volume is one. Since both parties opened a position and one contract was created, the open interest in this particular option is one contract as well. If, later that day, Trader B closes his short position by buying one contract from Trader C, who had no position to start with, the volume is now two contracts for that day, but open interest is still one. Only one contract exists; it was traded twice. If the next day, Trader C buys her contract back from Trader A, that day's volume is one and the open interest is now zero.

## The Options Clearing Corporation

Remember when Wimpy would tell Popeye, "I'll gladly pay you Tuesday for a hamburger today." Did Popeye ever get paid for those burgers? In a contract, it's very important for each party to hold up his end of the bargain—especially when there is money at stake. How does a trader know the party on the other side of an option contract will in fact do that? That's where the Options Clearing Corporation (OCC) comes into play.

The OCC ultimately guarantees every options trade. In 2010, that was almost 3.9 billion listed-options contracts. The OCC accomplishes this through many clearing members. Here's how it works: When Trader X buys an option through a broker, the broker submits the trade information to its clearing firm. The trader on the other side of this transaction, Trader Y, who is probably a market maker, submits the trade to his clearing firm. The two clearing firms (one representing Trader X's buy, the other representing Trader Y's sell) each submit the trade information to the OCC, which "matches up" the trade.

If Trader Y buys back the option to close the position, how does that affect Trader X if he wants to exercise it? It doesn't. The OCC, acting as an intermediary, assigns one of its clearing members with a customer that is short the option in question to deliver the stock to Trader X's clearing firm, which in turn delivers the stock to Trader X. The clearing member then assigns one of its customers who is short the option. The clearing member will assign the trader either randomly or first in, first out.

Effectively, the OCC is the ultimate counterparty to both the exercise and the assignment.

## Standardized Contracts

Exchange-listed options contracts are standardized, meaning the terms of the contract, or the contract specifications, conform to a customary structure. Standardization makes the terms of the contracts intuitive to the experienced user.

To understand the contract specifications in a typical equity option, consider an example:

Buy 1 IBM December 170 call at 5.00

### *Quantity*

In this example, one contract is being purchased. More could have been purchased, but not less—options cannot be traded in fractional units.

### *Option Series, Option Class, and Contract Size*

All calls or puts of the same class, the same expiration month, and the same strike price are called an *option series*. For example, the IBM December 170 calls are a series. Options series are displayed in an option chain on an online broker's user interface. An option chain is a full or partial list of the options that are listed on an underlying.

*Option class* means a group of options that represent the same underlying. Here, the option class is denoted by the symbol IBM—the contract represents rights on International Business Machines Corp. (IBM) shares. Buying one contract usually gives the holder the right to buy or to sell 100 shares of the underlying stock. This number is referred to as *contract size*. Though this is usually the case, there are times when the contract size is something other than 100 shares of a stock. This situation may occur after certain types of stock splits, spin-offs, or stock dividends, for example. In the minority of cases in which the one contract represents rights on something besides 100 shares, there may be more than one class of options listed on a stock.

A fairly unusual example was presented by the Ford Motor Company options in the summer of 2000. In June 2000, Ford spun off Visteon Corporation. Then, in August 2000, Ford offered shareholders a choice of