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**OPTIONS
INSTITUTE**

Interactive Brokers Webcast

Using the Option Greeks

June 14, 2017

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Option Greeks

Outline

- **Pricing Concepts**
- **Volatility Behavior**
- **Summary / Q&A**
- **Contact / Links**

Pricing Concepts

Option Price Components

Six Option Pricing Factors –

Price of Stock

Option Strike Price

Time Until Expiration

Interest Rates

Dividends

Implied Volatility

Factors that change

Pricing Concepts

Price of Stock

Delta –

Expected change in the price of an option based on a one-point change in the stock

**Delta for a call option is positive
Range will be 0.00 to 1.00**

**Delta for a put option is negative
Range will be -1.00 to 0.00**

Pricing Concepts

Price of Stock

Stock at 30.00 –

		Price	Delta	
ITM	27 Call	3.40	0.85	
ITM	28 Call	2.70	0.75	
ITM	29 Call	2.00	0.60	
ATM	30 Call	1.50	0.50	
OTM	31 Call	1.05	0.45	
OTM	32 Call	0.75	0.35	
OTM	33 Call	0.50	0.25	

0.00

1.00



Pricing Concepts

Price of Stock

Stock at 30.00 –

		Price	Delta	
OTM	27 Put	0.35	-0.15	
OTM	28 Put	0.60	-0.25	
OTM	29 Put	0.95	-0.40	
ATM	30 Put	1.45	-0.50	
ITM	31 Put	2.00	-0.55	
ITM	32 Put	2.65	-0.65	
ITM	33 Put	3.40	-0.75	

-1.00

Pricing Concepts

Price of Stock

- **As the stock price moves around the Delta for an option contract will change as well**
- **We have an option Greek that gives us an estimate of how much Delta will change based on a change in the underlying price**

Gamma gives us an idea how much Delta changes based on price changes in the underlying stock

Be aware of Gamma – but do not worry too much about it

Pricing Concepts

Price of Stock

Gamma –

Stock Price	29.00	30.00	31.00
30 Call Price	1.05	1.50	2.05
30 Call Delta	0.40	0.50	0.60

Stock down 1.00 Point

Call price down 0.45
 Call Delta down 0.10
 Gamma = 0.10

Stock up 1.00 Point

Call price up 0.55
 Call Delta up 0.10
 Gamma = 0.10

0.05 of Gamma impacts
 option price changes

Pricing Concepts

Price of Stock

Gamma –

Stock Price	29.00	30.00	31.00
30 Put Price	2.05	1.50	1.05
30 Put Delta	-0.60	-0.50	-0.40

Stock down 1.00 Point

Put price up 0.55
 Put Delta down 0.10
 Gamma = 0.10

Stock up 1.00 Point

Put price down 0.45
 Put Delta up 0.10
 Gamma = 0.10

0.05 of Gamma impacts
 option price changes

Pricing Concepts

Time Decay

- Several factors influence how much time value is priced into an option contract
- Time to expiration, underlying price relative to strike price, and implied volatility all contribute to time value
- All else being the same an option with time value is expected to lose value as expiration approaches

Theta is the option Greek used to display expected rate of time decay

The rate of time decay will vary based on a variety of factors

Pricing Concepts

Time Decay

Stock at 40.00 – 60 Calendar Days to Expiration

		Price	7 Day Theta
ITM	36 Call	4.35	0.05
ITM	38 Call	2.80	0.07
ATM	40 Call	1.65	0.10
OTM	42 Call	0.85	0.07
OTM	44 Call	0.40	0.06

Pricing Concepts

Time Decay

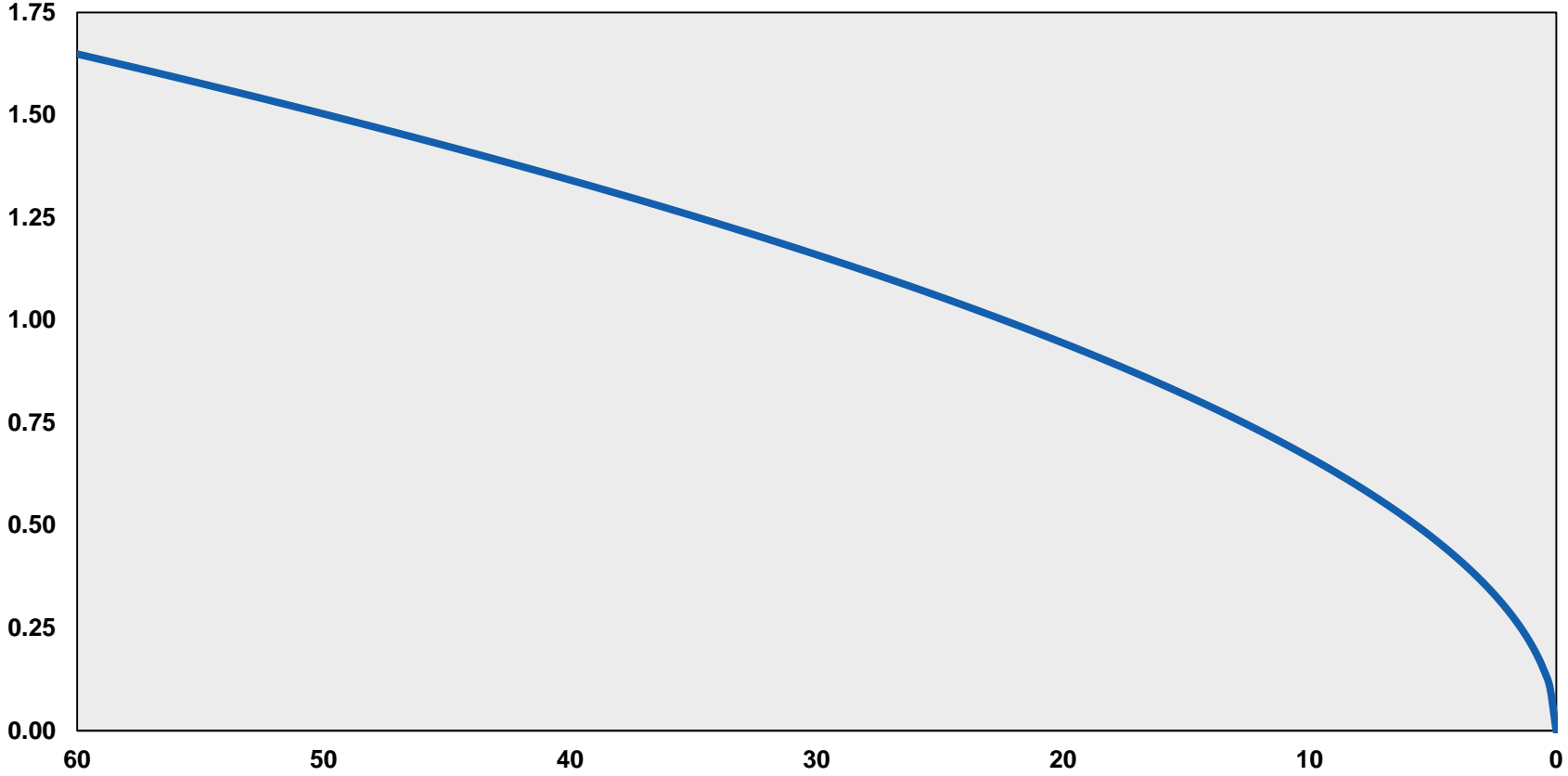
Stock at 40.00 – 7 Calendar Days to Expiration

		Price	7 Day Theta
ITM	36 Call	4.01	0.01
ITM	38 Call	2.05	0.05
ATM	40 Call	0.55	0.55
OTM	42 Call	0.05	0.05
OTM	44 Call	0.01	0.01

Pricing Concepts

Time Decay

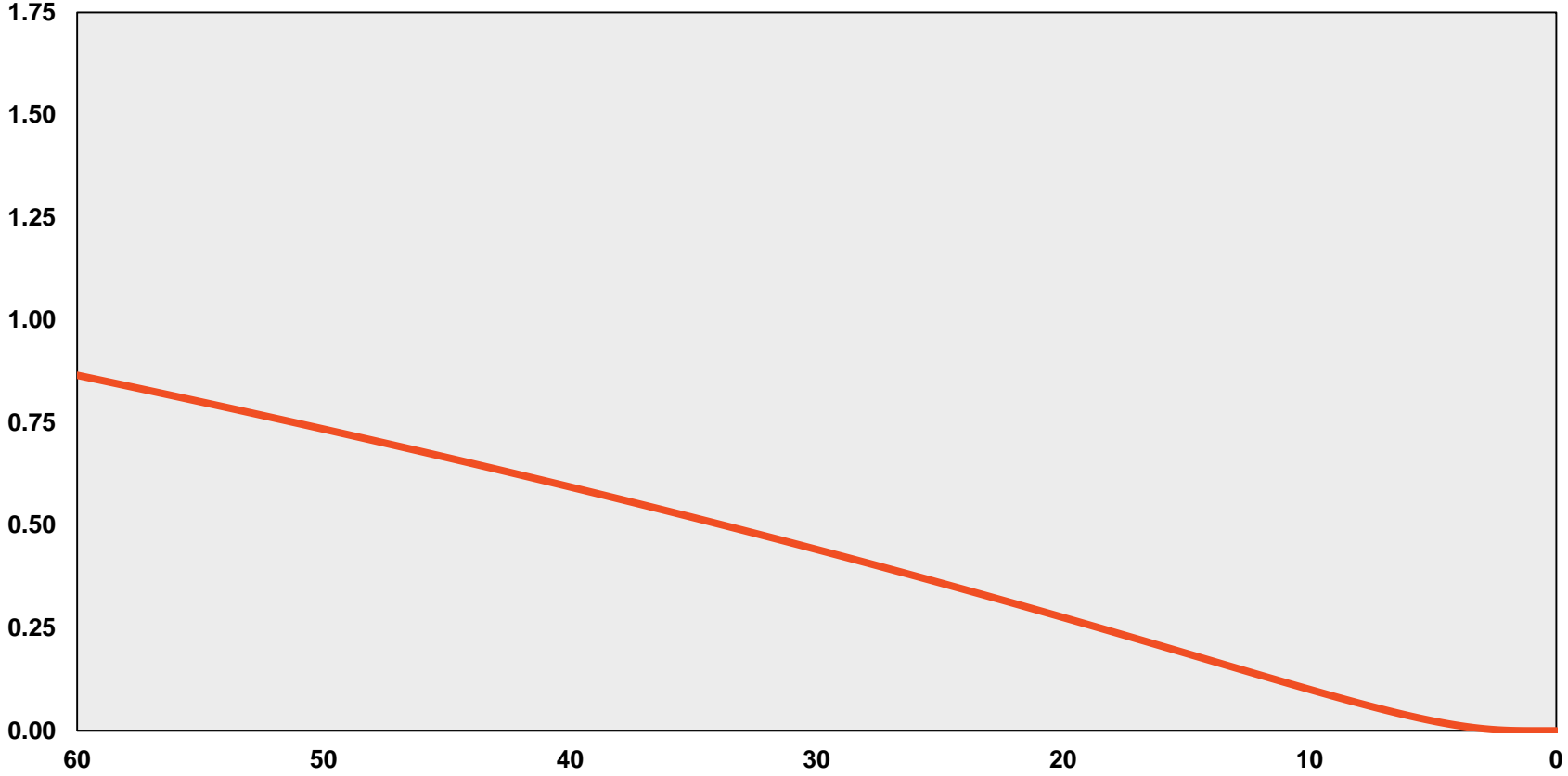
40 Call – Stock at 40.00 - 60 Days of Time Decay



Pricing Concepts

Time Decay

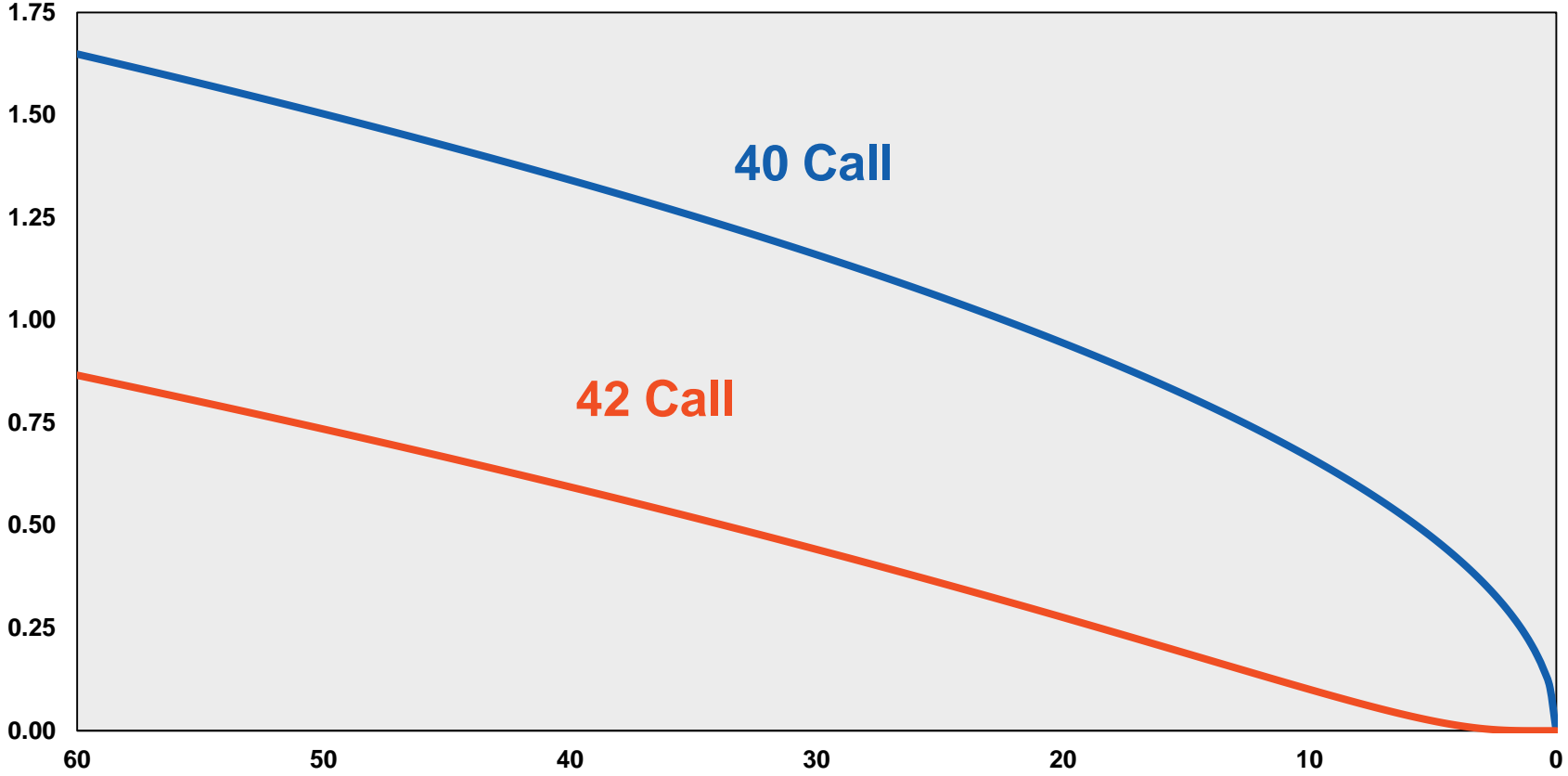
42 Call – Stock at 40.00 – 60 Days of Time Decay



Pricing Concepts

Time Decay

40 Call vs 42 Call – Stock at 40.00



Pricing Concepts

Implied Volatility

The Insurance Analogy –

Option Contract

Price of Stock

Option Strike Price

Time Until Expiration

Interest Rates

Implied Volatility

Insurance Policy

Asset

Deductible

Time of Contract

Interest Rates

Risk of Loss

Pricing Concepts

Implied Volatility

Two Types of Volatility –

**Historical Volatility – based on past
stock price changes**

**Implied Volatility – expected volatility based
option market pricing**

**Vega is the option Greek that indicates how much an option
price will change based on a 1% change in Implied Volatility**

Pricing Concepts

Implied Volatility

Vega –

40 Call Price	1.15	1.25	1.35
Implied Volatility	19%	20%	21%

Implied Volatility down 1%
Call price down 0.10
Vega = 0.10

Implied Volatility up 1%
Call price up 0.10
Vega = 0.10

Pricing Concepts

Implied Volatility

Vega –

40 Put Price	1.15	1.25	1.35
Implied Volatility	19%	20%	21%

Implied Volatility down 1%
Put price down 0.10
Vega = 0.10

Implied Volatility up 1%
Put price up 0.10
Vega = 0.10

Implied Volatility changes have the same impact on call and put options

Option Greeks

[Questions / Links / Contact](#)

Questions?

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