

Maderas Golf Course, San Diego County, 9th hole. Your teacher brilliantly birdied this hole. Then he triple-bogied the one in the background. You should play golf to understand options because you learn how things can go from really good to really bad really quickly

Note: This module relies heavily upon chapter 9!

Put and Call Options



Reminders ...

1. Our 2nd exam is on Monday, November 11, covering chapters 6-9 and all material since the last exam, including options this week.
2. The exam will be structured just like the last exam, except that it will also have a matching component.
3. I will send an instructional email to students with disabilities on Thursday or Friday.
4. I will send an instructional email to students with course conflicts on Thursday or Friday.
5. If you will miss the exam because of traveling or clinic or some other reason, email me right away and ask for approval (which is not automatically granted).
6. I will post a review video next Friday or Saturday.
7. I will try to post a sample online exam this week *iff* I can find the time, but I am not promising this.

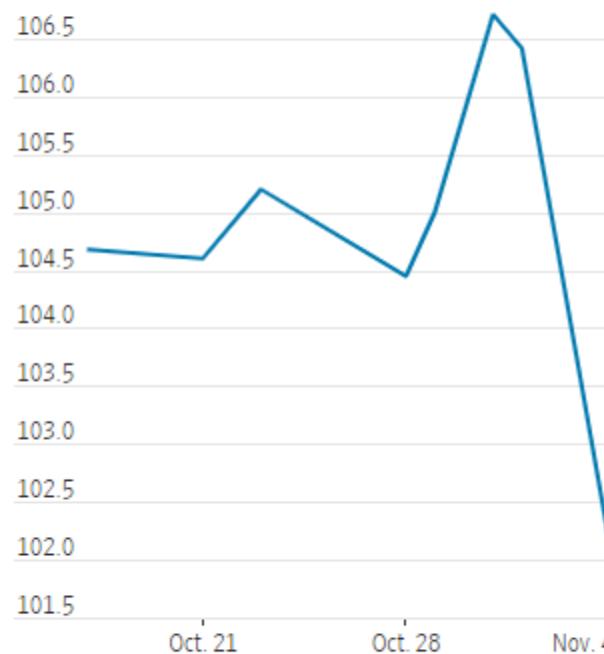
Topical (bond downgrade)

Downgrade Decline

Newell bonds drop after S&P cut the company to a junk BB+ credit rating

Price of Newell Brands bond due 2036

107.0 cents on the dollar



Source: MarketAxess

The decline follows S&P Global Ratings' decision late Friday to [cut Newell bonds to a junk credit rating](#) of double-B-plus. The company's stock jumped about 8.6% after the earnings report and rose slightly on Monday.

The contrasting bond and stock moves highlight the risk bondholders face as low interest rates encourage companies to carry heavy debt loads to stimulate growth.

The risk of additional downgrades to junk by Moody's Investors Service looms large in consumer and transportation industries, and S&P has a relatively high number of negative outlooks in manufacturing, energy and utilities, according to research firm CreditSights. About 10% of all companies rated triple-B, the lowest investment-grade rating, have a negative outlook by at least one ratings company, according to CreditSights.

Wall Street Journal,
Nov 4, 2019

Call Options

... definition of contract

Gives the owner the right to *buy* the stock from the option writer at the *strike price* on or before* the *expiration date*.

The party who sells this contract and the right that goes with it is *writing* the call.

If the party writing the call also owns the stock, he is said to be writing a *covered call*, otherwise she is writing a *naked call*.

A single contract is always for *100 shares* of stock.

* on the expiration date for European options.

Put Options

... definition of contract

Gives the owner the right to *sell* the stock to the option writer at the *strike price* on or before* the *expiration date*.

* on the expiration date for European options.

Put and call options are financial assets called *derivatives*, because their value depends upon the value of the underlying asset which, by contract, they are attached - in this case, the value of the underlying stock against which the option is written.

Reading the Options Chain

Cisco Systems, Inc. - Common Stock | [CFRA Options Report](#) [What's This?](#)

Symbol Bid Ask Last Change Change % B/A Size High Low Volume
CSCO **47.67** **47.68** **47.675** **0.645** **1.37** **2000X2600** **47.875** **47.32** **4,964,381**

CSCO's stock info

Expiration date **In the Money** **Bid/Ask same as stocks** **Strike Prices** **Out of the Money**

CSCO Nov 15 2019 **11 Days to Expiration**

Calls **Puts**

	Bid	Ask	Last	Change	Vol	Op Int	Strike	Bid	Ask	Last	Change	Vol	Op Int	
45.0 Call	3.05	3.15	3.10	0.50	25	1,479	45.00	45.0 Put	0.39	0.40	0.39	-0.14	132	5,892
45.5 Call	2.70	2.71	2.70	0.46	28	228	45.50	45.5 Put	0.50	0.51	0.47	-0.20	25	196
46.0 Call	2.33	2.35	2.36	0.45	134	689	46.00	46.0 Put	0.63	0.64	0.61	-0.23	103	5,692
46.5 Call	1.99	2.01	2.05	0.44	37	1,441	46.50	46.5 Put	0.79	0.80	0.77	-0.28	317	713
47.0 Call	1.67	1.69	1.67	0.34	193	4,536	47.00	47.0 Put	0.97	0.98	0.91	-0.35	85	4,980
47.5 Call	1.39	1.40	1.38	0.31	305	28,856	47.50	47.5 Put	1.19	1.20	1.19	-0.33	291	15,845
48.0 Call	1.13	1.14	1.12	0.26	294	2,946	48.00	48.0 Put	1.42	1.43	1.42	-0.38	285	427
48.5 Call	0.89	0.91	0.90	0.23	343	1,280	48.50	48.5 Put	1.68	1.70	1.65	-0.46	35	291
49.0 Call	0.69	0.71	0.70	0.20	210	1,305	49.00	49.0 Put	1.98	2.00	1.94	-0.50	19	389
49.5 Call	0.53	0.54	0.53	0.16	65	2,775	49.50	49.5 Put	2.32	2.34	2.32	-0.50	110	332
50.0 Call	0.39	0.40	0.40	0.13	430	10,284	50.00	50.0 Put	2.68	2.70	2.67	-0.54	112	2,963
50.5 Call	0.28	0.29	0.29	0.09	88	269	50.50	50.5 Put	3.05	3.10	3.05	-0.59	5	310

Out of the Money **In the Money** **Volume & Open Interest**

Full range available?
37.5 to 60!

Reading ... (blowup from previous page)

Cisco Systems, Inc. - Common Stock | CFRA Options Report What's This?

Symbol Bid Ask Last Change Change % B/A Size High Low Volume
CSCO **47.63** **47.64** **47.63** **0.60** **1.28** **900X3800** **47.875** **47.32** **5,390,411** Mon Nov 4 2019 11:27:36 :
 All contracts are in 100-share blocks. The Nov 15 48 Call will cost you \$112 plus fees (BA).

You can buy the CSCO November 15 48 Call for \$1.12 (BA-OOM), which gives you the right to *buy* CSCO for \$48.00 per share between now and November 15.

You can buy the CSCO November 47 Put for \$1.00 (BA-OOM), which gives you the right to *sell* CSCO for \$47.00 per share between now and November 15.

		Ask						
	Bid	1.37	1.38	1.38	0.31	445	28,856	47.50
47.5 Call								
	48.0 Call	1.11	1.12	1.12	0.26	323	2,946	48.00
	48.5 Call	0.88	0.89	0.90	0.23	343	1,280	48.50

OOM

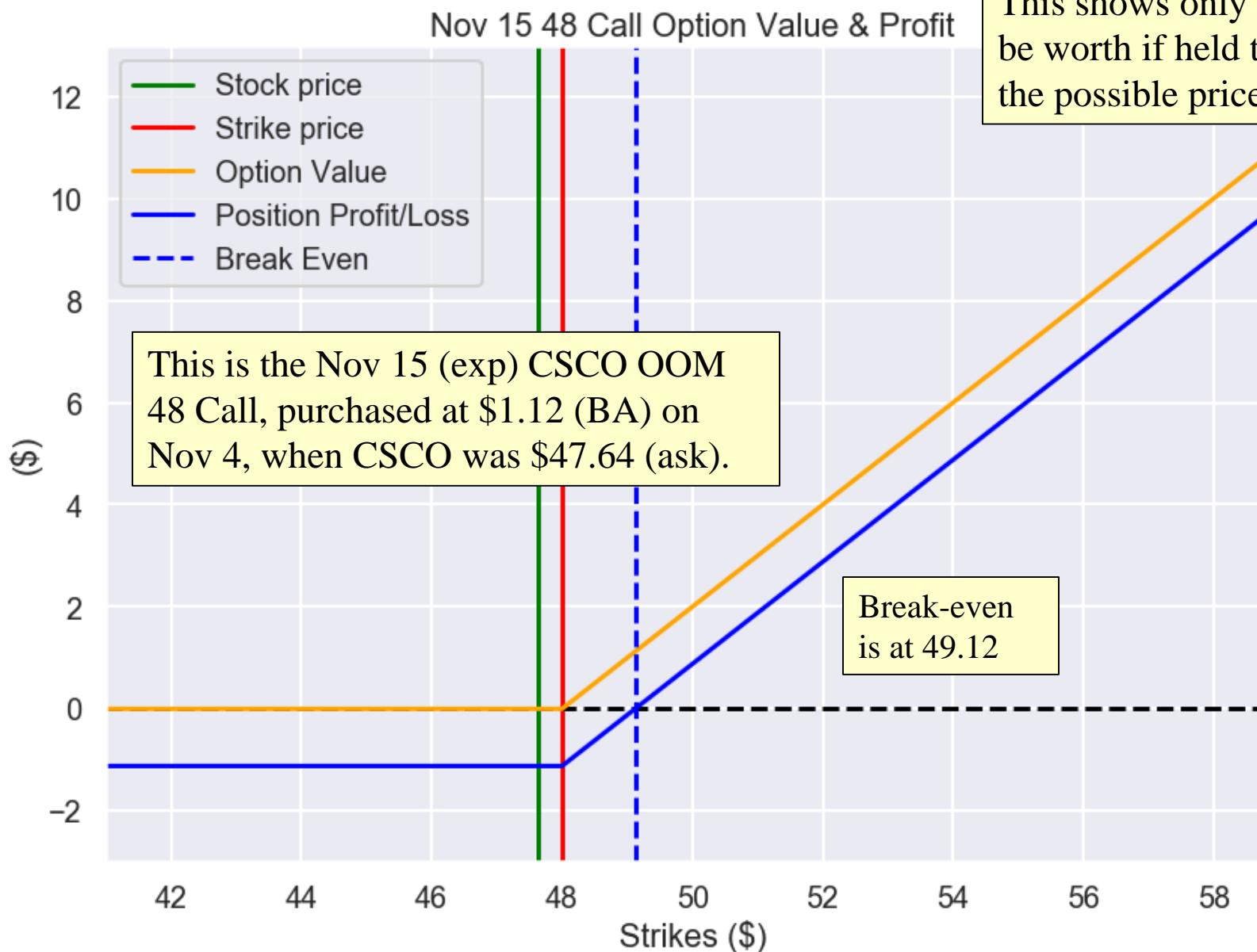
Note: These examples assume purchases at Best Ask. Obviously you can submit a limit order at any price.

		Ask						
	Bid	0.99	1.00	0.99	-0.28	104	4,980	
47.00	47.0 Put							
	47.5 Put	1.19	1.20	1.18	-0.34	311	15,845	
	48.00	48.0 Put	1.44	1.45	1.42	-0.38	285	427

OOM

Note the big Bid/Ask spread, here only a penny – the less the liquidity the bigger these spreads.

Potential Call Option Values (upon expiration)

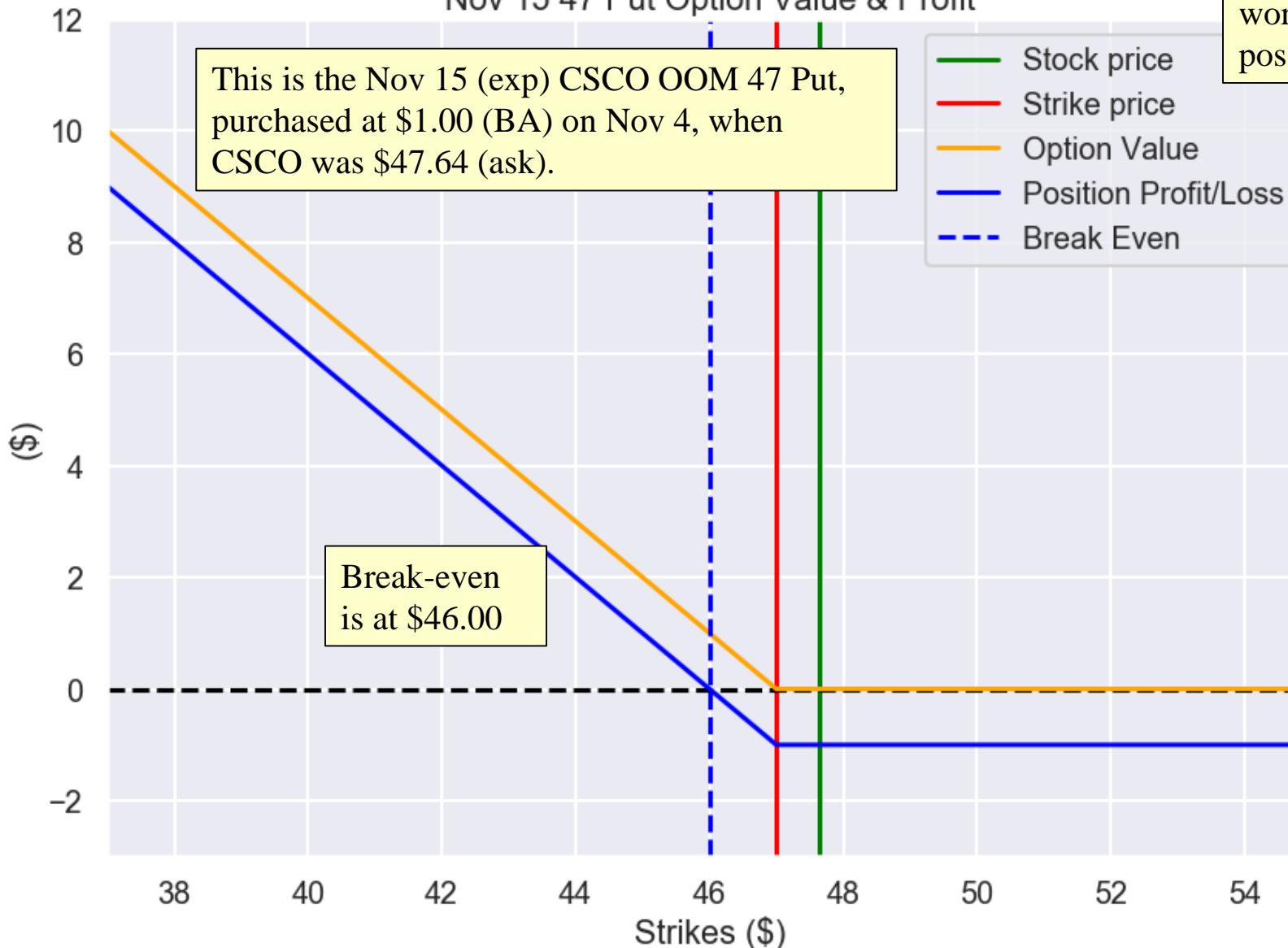


This shows only what the option will be worth if held to expiration, given the possible prices of CSCO.

This is a bet that the stock price will rise.

Potential Put Option Values (upon expiration)

Nov 15 47 Put Option Value & Profit



This shows only what the option will be worth if held to expiration, given the possible prices of CSCO.

This is a bet that the stock price will fall.

Short-term option values

Mudd Finance

The previous slides may give the impression that one will make a profit only if the option finally goes above [below] the strike price for the call [put]. But logic tells you that as an OOM call approaches the strike price, the call will rise in value even though it is still out of the money. Generally, if the price of the stock goes up the value of the call will rise so long as no other variables change (like volatility).

.. and the option reaction on the same day, all the calls down some and all the puts up some.



Look at what happened to these puts on Nov 2, when AAPL plunged. Even the puts still OOM soared in value (see circle).

NOV 02 '18 0 DAYS	NOV 09 '18 7 DAYS	NOV 16 '18 14 DAYS	NOV 23 '18 21 DAYS	MORE ▾	CALLS										PUTS										IV: 2.0%
CHANGE %	VOLUME	OPTN	OPN...	HIGH	LOW	LAST	ASK SIZE	BID SIZE	ASK	BID	STRIKE	BID	ASK	BID SIZE	ASK SIZE	LAST	LOW	HIGH	OPTN	OPN...	VOLUME	CHANGE %	IV: 2.0%		
-61.72%	2.46K	17.4K		14.90	8.50	9.00	9	123	9.25 ▢	9.15	200	2.88	2.94	122	109	2.94	1.55	3.50	40.3K	30.0K	81.48%				
-65.40%	747	324		12.64	6.93	7.40	7	292	7.55 ▢	7.45	202.5	3.70	3.80	21	1,260	3.80	2.04	4.35	786	3.64K	86.27%				
-69.92%	5.22K	3.00K		10.67	5.50	5.80	78	72	6.05 □	5.95	205	4.70	4.80	9	966	4.75	2.58	5.50	52.6K	28.8K	93.09%				
-74.10%	5.86K	1.69K		9.00	4.27	4.45	907	65	4.75 □	4.65	207.5	5.85	5.95 ▢	1,101	33	6.00	3.40	6.78	2.52K	6.25K	108.33%				
-76.86%	14.6K	21.6K		7.35	3.25	3.55	44	909	3.60 ▢	3.50	210	7.25	7.40	334	520	7.45	4.25	8.33	26.3K	6.60K	108.68%				
-81.54%	7.07K	2.31K		5.95	2.45	2.50	29	28	2.68 ▢	2.63	212.5	8.85	9.00	352	446	9.10	5.24	9.85	2.58K	1.74K	111.63%				
-83.61%	18.0K	26.4K		4.69	1.78	1.95	120	24	1.96 ▢	1.92	215	10.60	10.80 ▢	421	378	10.90	6.50	11.81	31.5K	6.45K	110.42%				
-86.28%	4.14K	2.97K		3.60	1.30	1.41	16	13	1.41 ▢	1.37	217.5	12.50	12.90 ▢	777	716	13.70	8.06	13.70	7.16K	1.19K	125.33%				
-88.79%	15.1K	24.9K		2.72	0.15	0.99	220	114	1.01 ▢	0.97	220	14.60	15.05 ▢	330	535	15.20	9.60	16.10	20.2K	5.96K	112.89%				

Discussion of option delta ...

$$\text{delta} = \frac{\partial P_{opt}}{\partial P_{st}} = 0.50 \text{ atm}$$

+ Call
- Put

In and out of the money & premiums

call: in the money (**ITM**) if strike price < stock price
 out of the money (**OTM**) if strike price > stock price

put: in the money if strike price > stock price
 out of the money if strike price < stock price

(**ATM**) at the money or (**NTM**) near the money if option is the closest
 (context)

Intrinsic value: What the option would be worth if exercised at this
 moment (OTM has no intrinsic value) -

Call int val = Stock price - strike price

Put IV = Strike price - stock price

Premium: Option price - Intrinsic value



Symbol	Bid	Ask	Last	Change	Change %	B/A Size	High	Low	Volume
CSCO	47.63	47.64	47.63	0.60	1.28	900X3800	47.875	47.32	5,390,411
									Mon Nov 4 2019

The premium ... and why do they exist?

→

47.0 Call	1.65	1.66	1.67	0.34	298	4,536	47.00
47.5 Call	1.37	1.38	1.38	0.31	445	28,856	47.50
48.0 Call	1.11	1.12	1.12	0.26	323	2,946	48.00
48.5 Call	0.88	0.89	0.90	0.23	343	1,280	48.50

In-the-money call premium = OP (Ask) - (Stock price (Ask) - Strike price)

For the 47 call: **1.02** = 1.66 - ([47.64 - 47.00 = 0.64])

→

47.00	47.0 Put	0.99	1.00	0.99	-0.28	104	4,980
47.50	47.5 Put	1.19	1.20	1.18	-0.34	311	15,845
48.00	48.0 Put	1.44	1.45	1.42	-0.38	285	427
48.50	48.5 Put	1.71	1.73	1.65	-0.46	35	291

In-the money put premium = OP – (Strike price - Stock price)

For the 48 put: **1.09** = 1.45 - ([48.00 - 47.64 = 0.36])

Out-of-the money premium = Option price (it has no intrinsic convertible value)

Buying and Selling Options Online

Suppose I want to buy the **Dec 13 48.50** call marked below in the diagram cut from my TD Ameritrade account. To buy this option if I submit a market order it will be bought at ASK (**1.28**). But there is a spread between BID and ASK. I really should submit a limit order at ASK or below, although it may not get executed. One option is to submit a limit order between BID and ASK, like **1.26**. Another option is to target an even lower price, like **1.20**, put in a day order and hope that the stock and the option dip down and the order executes.

Cisco Systems, Inc. - Common Stock  CFRA Options Report What's This?									
Symbol	Bid	Ask	Last	Change	Change %	B/A Size	High	Low	Volume
CSCO	47.66	47.67	47.665	0.635	1.35	2700X2000	47.875	47.32	5,651,910
Mon Nov 4 2019									
<input type="checkbox"/> CSCO Dec 13 2019 39 Days to Expiration (Weeklys)									
Calls 									
	Bid	Ask	Last	Change	Vol	Op Int	Strike		
47.5 Call 	1.75	1.78	1.73	0.30	6	1	47.50		
48.0 Call 	1.49	1.52	1.56	0.35	5	5	48.00		
48.5 Call 	1.24	1.28	1.24	0.24	2	33	48.50		

Typical online option trading interface (TD Ameritrade)

This is a limit order to buy-to-open 5 contracts of the CSCO Dec 13 48.5 Call at \$1.20.

Options strategy Underlying symbol CSCO Option chain

Symbol lookup

Action Contracts Expiration Strike Call/Put

Buy to open 5 Dec 13 2019 48.50 Call

Order type ? Price

Limit 1.20

Time-in-force ? Day

Action dropdown options:

- Buy to open
- Sell to close
- Sell to open
- Buy to close
- Exercise

CSCO Cisco Systems, Inc. - Common Stock

This security has special margin requirements. [See alert](#)

\$47.65 ↑ 0.62 (1.33%)

Bid	Ask	B/A size	Volume
47.65	47.66	3,500 X 4,300	5.78M

CSCO Dec 13 2019 48.5 Call (Weekly)

Bid	Ask	B/A size	Volume
1.24	1.28	331 X 128	2
Last	Open int	Imp vol	Delta
1.24	33	26.13	0.43

writing the call

use call to buy CSCO

The very elementary IB Trade Ticket (Nov 4, 2019)

ORDER ENTRY

SPY Dec19 308 CALL ▾

4.58 4.61 Adaptive ▾
BID MID ASK New! ⓘ

BUY SELL QTY 4 LMT ▾ LMT 4.61 DAY ▾ advanced +

SUBMIT

Order Confirmation

SPDR S&P 500 ETF TRUST —
Financial Instrument Last Bid Ask
SPY Dec19 308 CALL 4.77 4.58 4.60

Order Description —
BUY 4
Order Type LMT Routing SMART Time in Force DAY
Limit Price 4.61

Amount Margin Impact (in USD)
Amount 1,840.00 USD Current Change Post-trade*
Commission (est.) 0.98 ... 4.98 USD Equity with Loan 40.668 -1.847 38.821
Total n/a Initial Margin 9.015 0 9.015
■ Performance Profile Maintenance Margin 5.877 0 5.877
Position 0 4 4

*This is a current projection and is subject to change.

Don't display this message again.

Transmit Cancel

+/-	Time ▾	Fin Instrument	Action	Quantity	Price	Exch.	Commission	Account	Exctng...
	07:30:36	SPY Nov15'19 297 PUT	SLD	1	0.32	PSE	1.51	U1395405	
+	07:29:47	SPY Nov15'19 298 PUT	SLD	3	0.37	EDGX	2.21	U1395405	
	07:24:29	SPY Nov15'19 298 CALL	SLD	1	10.22	NASDAQOM	0.75	U1395405	
	07:23:10	SPY Nov15'19 300 CALL	SLD	3	8.39	NASDAQOM	1.18	U1395405	

The actual Python algo I use (Jupyter version)

Limit Order Call Option - v1_3

ibapi_call_option_limit_order_v1_3.ipynb

This model is designed to issue a limit order to buy or sell a call option. This version uses an algo to figure out the price for the limit order.
 This is version 1.3, July 11, 2019, 1.0 developed on January 4, 2018
 This was tested on July 11, 2019 for 5 contracts of MSFT 139 calls and it worked.
 The first version of this algo was used successfully under pressure for the first time on Feb 6, 2019 at market open to sell 10 call contracts of SNAP 10 for Bid + 0.60 spread.

Warning! Running this program will place a live order!

```
In [13]: import sys
sys.path.append('d:/TWS API/source/pythonclient')
import ib_insync
from ib_insync import *
```

Do your handshake and start your async loop:

```
In [14]: util.startLoop()
ib = IB()
ib.connect('127.0.0.1', 7496, clientId=39)
```

```
Out[14]: <IB connected to 127.0.0.1:7496 clientId=39>
```

Identify yourself and identify and identify the underlying stock:

```
In [15]: aname = "Prof Evans"
stosym = "SPY"
```

Identify the call option expiry and strike and the action ('BUY' or 'SELL'). We can use the method used in ibapistrangle to have an algo identify the strike with a slight modification of the program, but that is not done in this master.

Do NOT put the wrong information in here ... especially for order size!

Remember that this is for options, so a single contract for 100 shares is represented by a single digit, like 1, not 100!

The order_spread_coefficient sets the limit order price as some percent between Bid and Ask.

```
In [16]: expiry = 20191115
call_strike = 298.0
action = "SELL"
order_size = 1
order_spread_coefficient = 0.30
```

No user information is added below here unless you want to over-ride the limit price algo.

```
In [17]: call_option = Option(stosym, lastTradeDateOrContractMonth=expiry, strike=call_strike, right='C', exchange='SMART',
                           currency='USD')
cds = ib.reqContractDetails(call_option)
```

```
In [18]: call_option
```

```
Out[18]: Option(symbol='SPY', lastTradeDateOrContractMonth=20191115, strike=298.0, right='C', exchange='SMART', currency='USD')
```

```
In [19]: call_quote = ib.reqMktData(call_option,"",True,False)
```

Warning .. this is where the actual order is sent.

If in doubt, check all buy and sell, order size and price variables are set at the top.

```
In [20]: call_last = call_quote.last
call_bid = call_quote.bid
call_ask = call_quote.ask
# call_peg = (call_ask+call_bid)/2.0
call_spread = call_ask - call_bid
call_spread = round(call_spread,2)
call_peg_coeff = order_spread_coefficient
call_peg = call_bid + (call_peg_coeff*call_spread)
call_peg = round(call_peg,2)
print("Call Last:",call_last," Bid: ",call_bid," Ask: ",call_ask, " Bid/Ask spread: ",call_spread, " Peg:",call_peg)
```

```
Call Last: 10.24 Bid: 10.2 Ask: 10.27 Bid/Ask spread: 0.07 Peg: 10.22
```

```
In [21]: limit_order = LimitOrder(action,order_size,call_peg)
limit_trade = ib.placeOrder(call_option, limit_order)
limit_trade
```

```
Out[21]: Trade(contract=Option(symbol='SPY', lastTradeDateOrContractMonth=20191115, strike=298.0, right='C', exchange='SMART',
                           currency='USD'), order=LimitOrder(orderId=88, clientId=39, action='SELL', totalQuantity=1, lmtPrice=10.22, conditions=[],
                           softDollarTier=SoftDollarTier()), orderStatus=OrderStatus(status='PendingSubmit'), fills=[], log=[TradeLogEntry(time=datetime.datetime(2019, 11, 4, 15, 24, 10, 907792, tzinfo=datetime.timezone.utc), status='PendingSubmit', message='')])
```

The closest weekly ... not a lot of volume away from current price

CSCO Nov 8 2019 4 Days to Expiration (Weeklys)											Collapse			
Calls	Bid	Ask	Last	Change	Vol	Op Int	Strike	Puts	Bid	Ask	Last	Change	Vol	Op Int
39.0 Call	8.40	9.15	0.00	0.00	0	0	39.00	39.0 Put	0.00	0.03	0.05	0.05	0	3
39.5 Call	7.80	8.40	0.86	0	0	12	39.50	39.5 Put	0.00	0.03	0.00	0.00	0	0
40.0 Call	7.25	8.00	0.00	0.00	0	0	40.00	40.0 Put	0.00	0.03	0.04	0.04	0	24
40.5 Call	7.05	7.25	0.00	0.00	0	0	40.50	40.5 Put	0.00	0.03	0.02	0.02	0	10
41.0 Call	6.65	6.75	0.00	0.00	0	0	41.00	41.0 Put	0.00	0.03	0.11	0.11	0	41
42.0 Call	5.60	5.75	4.80	-0.24	0	88	42.00	42.0 Put	0.00	0.03	0.05	0.05	0	159
42.5 Call	5.15	5.25	4.30	-0.24	0	117	42.50	42.5 Put	0.00	0.01	0.08	0.08	0	143
43.0 Call	4.65	4.75	4.03	-0.01	0	211	43.00	43.0 Put	0.00	0.01	0.01	0.01	1	224
43.5 Call	4.15	4.25	3.50	-0.05	0	100	43.50	43.5 Put	0.00	0.03	0.02	0.02	0	215
44.0 Call	3.65	3.75	2.98	-0.08	0	69	44.00	44.0 Put	0.00	0.03	0.01	0.00	1	947
44.5 Call	3.15	3.25	2.58	0.01	0	188	44.50	44.5 Put	0.00	0.03	0.02	-0.01	30	388
45.0 Call	2.69	2.72	2.44	0.35	5	290	45.00	45.0 Put	0.00	0.02	0.01	-0.04	4	714
45.5 Call	2.17	2.24	2.14	0.51	0	500	45.50	45.5 Put	0.03	0.04	0.04	-0.05	21	533
46.0 Call	1.73	1.76	1.86	0.66	825	765	46.00	46.0 Put	0.05	0.06	0.06	-0.10	141	1,063
46.5 Call	1.28	1.30	1.34	0.52	130	463	46.50	46.5 Put	0.10	0.11	0.11	-0.17	82	2,032
47.0 Call	0.88	0.89	0.86	0.35	519	1,698	47.00	47.0 Put	0.19	0.20	0.19	-0.28	635	7,581
47.5 Call	0.53	0.54	0.53	0.25	467	1,877	47.50	47.5 Put	0.34	0.36	0.35	-0.39	363	878
48.0 Call	0.28	0.29	0.30	0.17	925	5,023	48.00	48.0 Put	0.59	0.60	0.61	-0.48	238	173
48.5 Call	0.13	0.14	0.13	0.07	533	1,353	48.50	48.5 Put	0.93	0.95	0.90	-0.62	187	224
49.0 Call	0.05	0.06	0.06	0.03	593	783	49.00	49.0 Put	1.36	1.39	1.38	-0.61	173	245
49.5 Call	0.02	0.03	0.02	0.01	18	650	49.50	49.5 Put	1.83	1.86	1.85	-0.62	19	70
50.0 Call	0.01	0.03	0.02	0.02	0	1,496	50.00	50.0 Put	2.31	2.35	2.49	-0.48	10	52
50.5 Call	0.00	0.03	0.01	0.01	1,028	1,060	50.50	50.5 Put	2.80	2.86	2.74	-0.73	0	1
51.0 Call	0.00	0.03	0.03	0.03	0	179	51.00	51.0 Put	3.30	3.40	3.80	-0.17	0	4
51.5 Call	0.00	0.03	0.03	0.03	0	317	51.50	51.5 Put	3.80	3.85	4.45	-0.02	0	5
52.0 Call	0.00	0.01	0.02	0.02	0	543	52.00	52.0 Put	4.30	4.40	3.42	-1.55	0	0
52.5 Call	0.00	0.03	0.02	0.02	0	26	52.50	52.5 Put	4.80	4.85	0.00	0.00	0	0
53.0 Call	0.00	0.03	0.04	0.04	0	42	53.00	53.0 Put	5.30	5.40	0.00	0.00	0	0
53.5 Call	0.00	0.03	0.01	0.01	0	5	53.50	53.5 Put	5.80	5.90	6.79	0.32	0	0
54.0 Call	0.00	0.03	0.00	0.00	0	0	54.00	54.0 Put	6.25	6.40	6.85	-0.12	0	0
54.5 Call	0.00	0.03	0.11	0.11	0	6	54.50	54.5 Put	6.60	6.90	0.00	0.00	0	0
55.0 Call	0.00	0.03	0.04	0.04	0	21	55.00	55.0 Put	7.15	7.50	0.00	0.00	0	0
55.5 Call	0.00	0.03	0.00	0.00	0	0	55.50	55.5 Put	7.10	8.35	0.00	0.00	0	0
56.0 Call	0.00	0.03	0.00	0.00	0	0	56.00	56.0 Put	7.70	9.10	0.00	0.00	0	0

No volume!

Wide spreads!

Full range: 39 to 56

The IB options chain for IWM

IWM ▾ Calls and Puts															158.77 +0.67 (+0.42%)	?	✖								
NOV 08 '19 ^w 4 DAYS		NOV 15 '19 11 DAYS		NOV 22 '19 ^w 18 DAYS		NOV 29 '19 ^w 25 DAYS		MORE ▾																	
CHANGE %	VOLUME	OPTN OP...	CALLS					PUTS					TABBED VIEW ▾					All STRIKES ▾			SMART ▾		IWM ▾	100	
			HIGH	LOW	LAST	ASK SIZE	BID SIZE	ASK	BID	STRIKE	BID	ASK	BID SIZE	ASK SIZE	LAST	LOW	HIGH	OPTN OP...	VOLUME	CHANGE %	IV: 0.9%				
			c14.38	328	54	15.06	14.94	144	0.09	0.11	12,392	13,355	c0.12	0.09	0.09	267	2								
5	24	14.61	14.61	c13.40	217	54	14.07	13.96	145	0.11	0.12	5,862	1,586	0.10	0.10	0.13	3.60K	611	-28.57%						
	4			c12.92	382	54	13.59	13.47	145.5	0.12	0.13	4,235	1,939	c0.15	0.12	0.12	5.18K	2							
	112			c12.43	370	57	13.10	12.98	146	0.13	0.14	5,338	1,772	0.13	0.11	0.13	4.60K	10	-23.53%						
	5			c11.95	339	54	12.61	12.49	146.5	0.14	0.16	8,180	9,527	c0.18	0.15	0.15	381	1							
	24			c11.46	291	54	12.12	12.01	147	0.16	0.17	1,521	2,228	0.15	0.15	0.18	578	20	-21.05%						
	16			c10.98	320	77	11.64	11.52	147.5	0.17	0.19	3,067	5,536	c0.22			612								
	1.16K			c10.50	438	78	11.15	11.04	148	0.19	0.20	1,817	1,515	0.20	0.19	0.20	2.47K	7	-13.04%						
	11			c10.03	589	58	10.67	10.56	148.5	0.21	0.22	1,747	1,615	c0.26	0.20	0.20	221	1							
	59			c9.55	742	348	10.20	10.08	149	0.23	0.24	1,863	1,139	c0.28	0.24	0.24	419	17							
	84			c9.08	876	65	9.72	9.61	149.5	0.25	0.27	3,947	4,223	c0.31			415								
6.27%	94	1.69K	9.98	9.15	9.15	581	654	9.23	9.13	150	0.28	0.30	2,416	2,997	0.27	0.26	0.31	1.04K	20	-20.59%					
		150			c8.15	685	47	8.77	8.67	150.5	0.31	0.32	2,257	49	0.33	0.32	0.33	291	4	-13.16%					
	1	77	8.33	8.33	c7.70	544	108	8.30	8.21	151	0.34	0.36	3,429	1,741	c0.43	0.32	0.36	267	222						
		174			c7.25	420	10	7.84	7.75	151.5	0.38	0.40	3,181	3,050	c0.47	0.34	0.34	333	1						
	7	1.53K	7.37	7.19	c6.80	639	457	7.38	7.29	152	0.42	0.44	3,484	1,016	0.42	0.39	0.49	676	35	-20.75%					
		171			c6.36	646	511	6.93	6.84	152.5	0.47	0.49	3,893	1,284	c0.58			224							
	4	375	6.68	6.52	c5.93	263	455	6.48	6.40	153	0.53	0.55	2,184	1,835	c0.65	0.48	0.48	400	3						
14.73%	3	376	6.31	6.31	c6.31	708	230	6.05	5.96	153.5	0.59	0.61	2,886	864	0.57	0.50	0.64	562	120	-21.92%					
19.25%	1	358	6.07	6.07	6.07	555	469	5.62	5.53	154	0.66	0.68	3,545	489	0.74	0.56	0.75	6.90K	67	-8.64%					
13.99%	157	1.91K	5.44	4.60	4.89	12	695	4.75	4.71	155	0.83	0.86	2,634	2,188	0.78	0.78	0.89	464	25	-22.77%					
9.89%	743	1.57K	4.48	3.80	3.89	43	667	3.97	3.93	156	1.05	1.07	1,447	503	1.15	0.93	1.18	1.16K	83	-9.45%					
15.79%	488	1.62K	3.75	3.08	3.30	313	671	3.25	3.21	157	1.32	1.35	1,438	1,029	1.37	1.13	1.37	412	384	-13.29%					
14.23%	38	1.17K	3.45	2.89	2.89	462	1,021	2.91	2.87	157.5	1.48	1.51	1,328	626	1.40	1.28	1.49	83	325	-20.45%					
15.25%	154	6.67K	2.95	2.50	2.57	464	544	2.59	2.55	158	1.66	1.69	1,362	295	1.65	1.42	1.72	183	44	-16.24%					
16.37%	392	17.2K	2.50	1.94	1.99	1	31	2.00	1.98	159	2.08	2.12	619	355	2.11	1.88	2.20	164	15	-13.52%					
21.43%	69	10.1K	1.87	1.53	1.53	1,001	1,109	1.51	1.48	160	2.58	2.62	623	308	2.58	2.22	2.70	131	51	-14.00%					
18.68%	53	640	1.36	1.05	1.08	1,034	304	1.10	1.08	161	3.17	3.22	530	174	2.85	2.74	3.23	27	48	-21.92%					
21.88%	807	4.73K	1.03	0.78	0.78	1,550	577	0.78	0.76	162	3.86	3.91	227	190	3.64	3.64	3.64	16	5	-17.08%					
31.82%	17	88	0.65	0.58	0.58	2,142	1,125	0.54	0.52	163	4.61	4.69	515	67	4.50	4.00	4.50	2	52	-13.46%					

November 4, 2019

Variance in the number of options contracts in the chain ...

Cisco Systems, Inc. - Common Stock					
Symbol	Bid	Ask	Last	Change	Change %
CSCO	47.63	47.64	47.64	0.61	1.30
Calls and Puts Learn more					
+ CSCO Nov 8 2019			4 Days to Expiration (Weeklys)		
+ CSCO Nov 15 2019			11 Days to Expiration		
+ CSCO Nov 22 2019			18 Days to Expiration (Weeklys)		
+ CSCO Nov 29 2019			25 Days to Expiration (Weeklys)		
+ CSCO Dec 6 2019			32 Days to Expiration (Weeklys)		
+ CSCO Dec 13 2019			39 Days to Expiration (Weeklys)		
+ CSCO Dec 20 2019			46 Days to Expiration		
+ CSCO Jan 17 2020			74 Days to Expiration		
+ CSCO Mar 20 2020			137 Days to Expiration		
+ CSCO Apr 17 2020			165 Days to Expiration		
+ CSCO Jun 19 2020			228 Days to Expiration		
+ CSCO Sep 18 2020			319 Days to Expiration		
+ CSCO Jan 15 2021			438 Days to Expiration		
+ CSCO Jan 21 2022			809 Days to Expiration		

SPDR S&P 500					
Symbol	Bid	Ask	Last	Change	Change %
SPY	307.45	307.46	307.46	1.32	0.43
Calls and Puts Learn more					
+ SPY Nov 4 2019			0 Days to Expiration (Weeklys)		
+ SPY Nov 6 2019			2 Days to Expiration (Weeklys)		
+ SPY Nov 8 2019			4 Days to Expiration (Weeklys)		
+ SPY Nov 11 2019			7 Days to Expiration (Weeklys)		
+ SPY Nov 13 2019			9 Days to Expiration (Weeklys)		
+ SPY Nov 15 2019			11 Days to Expiration		
+ SPY Nov 18 2019			14 Days to Expiration (Weeklys)		
+ SPY Nov 20 2019			16 Days to Expiration (Weeklys)		
+ SPY Nov 22 2019			18 Days to Expiration (Weeklys)		
+ SPY Nov 25 2019			21 Days to Expiration (Weeklys)		
+ SPY Nov 27 2019			23 Days to Expiration (Weeklys)		
+ SPY Nov 29 2019			25 Days to Expiration (Weeklys)		
+ SPY Dec 2 2019			28 Days to Expiration (Weeklys)		
+ SPY Dec 4 2019			30 Days to Expiration (Weeklys)		
+ SPY Dec 6 2019			32 Days to Expiration (Weeklys)		
+ SPY Dec 9 2019			35 Days to Expiration (Weeklys)		
+ SPY Dec 13 2019			39 Days to Expiration (Weeklys)		
+ SPY Dec 20 2019			46 Days to Expiration		
+ SPY Dec 31 2019			57 Days to Expiration		
+ SPY Jan 17 2020			74 Days to Expiration		
+ SPY Feb 21 2020			109 Days to Expiration		
+ SPY Mar 20 2020			137 Days to Expiration		
+ SPY Mar 31 2020			148 Days to Expiration		
+ SPY Jun 19 2020			228 Days to Expiration		
+ SPY Jun 30 2020			239 Days to Expiration		
+ SPY Sep 18 2020			319 Days to Expiration		
+ SPY Sep 30 2020			331 Days to Expiration		
+ SPY Oct 16 2020			347 Days to Expiration		
+ SPY Nov 20 2020			382 Days to Expiration		
+ SPY Dec 18 2020			410 Days to Expiration		
+ SPY Jan 15 2021			438 Days to Expiration		
+ SPY Mar 19 2021			501 Days to Expiration		
+ SPY Jun 18 2021			592 Days to Expiration		
+ SPY Sep 17 2021			683 Days to Expiration		
+ SPY Dec 17 2021			774 Days to Expiration		
+ SPY Jan 21 2022			809 Days to Expiration		

Same day ... Nov 4, 2019

Pointers about option trades

- There is often a large spread between bid and ask, and this really cuts into options trading profits.
 - conversion to electronic trading from open outcry is helping
- Never, ever, use a market order for an option trade.
 - or you may be real surprised at the price you pay.
- Before trading an option, always check ***open interest*** and ***volume*** for liquidity.
- Once an option goes into the money or becomes profitable, it can be difficult to decide when to sell it.
 - take profits now or hope that it goes higher and pray that it doesn't fall back out of the money.



The Premium/Price

The premium for an option converges to zero as the option approaches expiration.

The premium of an out-the-money option can be thought of as simply the price of the option because the option has an intrinsic value of 0 at the moment.

The premium (and the price) is a function of

1. The degree to which the option is in the money (more is smaller) or out of the money (more is greater), which implies that it is a function of the underlying **price of the stock**.
2. **Time to maturity** (shorter is smaller), which implies **time decay** as time elapses.
3. The underlying stock's **volatility** (greater is larger)

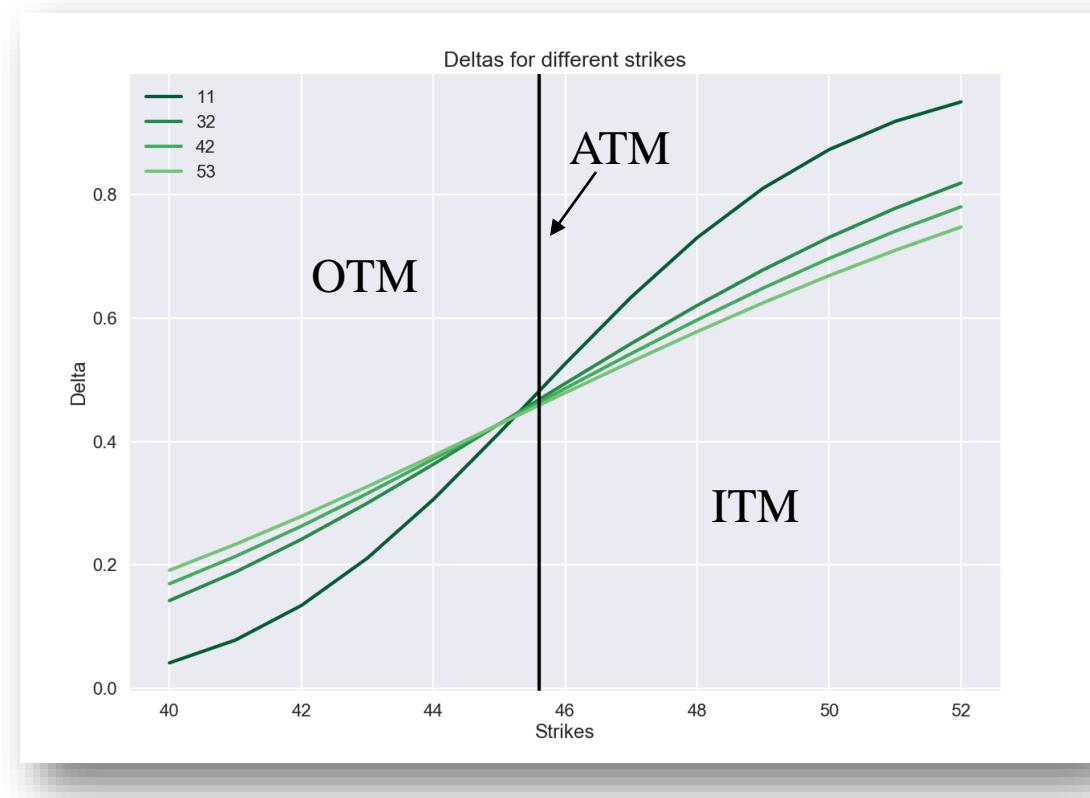
1. Direct Sensitivity to the Stock Price

The sensitivity of an options price to the underlying stock price is called the “**delta**” in options theory. To the left is a mapping of put deltas for various strikes, done in Python (and Seaborne) for Econ 136.

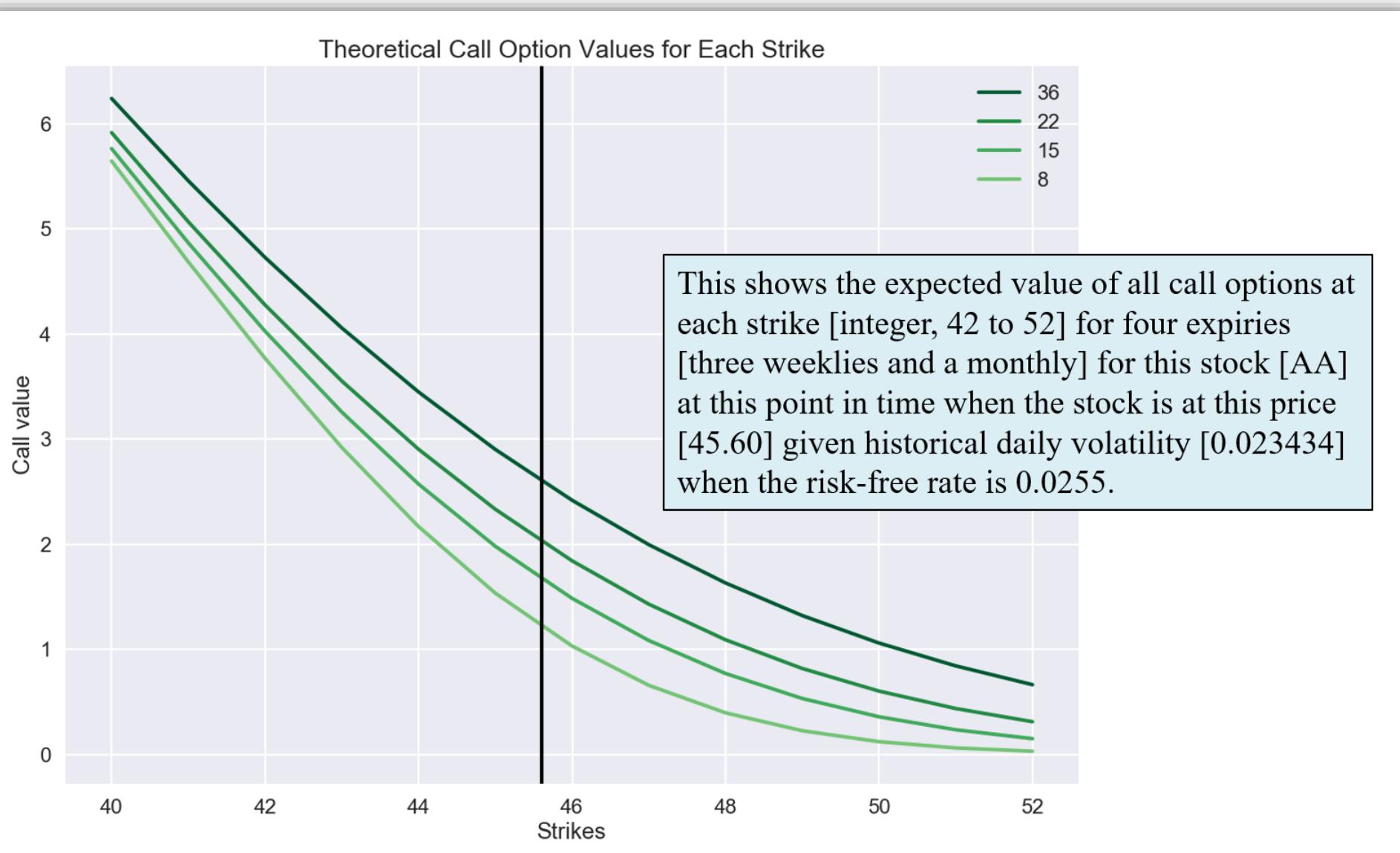
Calls: The delta is positive. It is about 0.50 at the money, then converges to one as it goes deeply ITM. It approaches zero as it goes deeply OTM.

Put: The delta is negative. It is also about 0.50 at the money, then converges to one as it goes deeply ITM. It approaches zero as it goes deeply OTM. [Example shown on right].

$$\text{delta} = \frac{\partial P_{opt}}{\partial P_{st}}$$

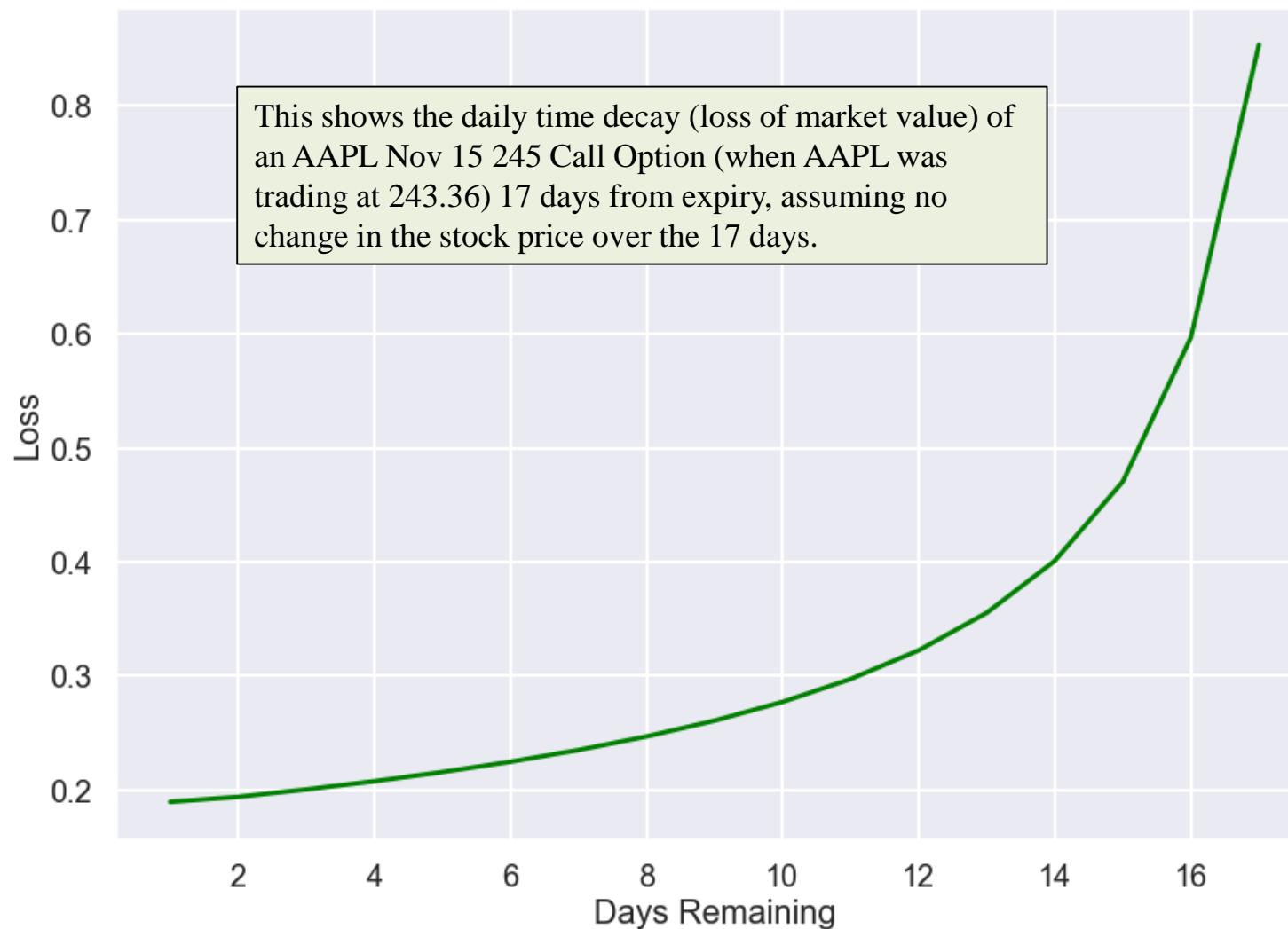


1. Sensitivity (continued)



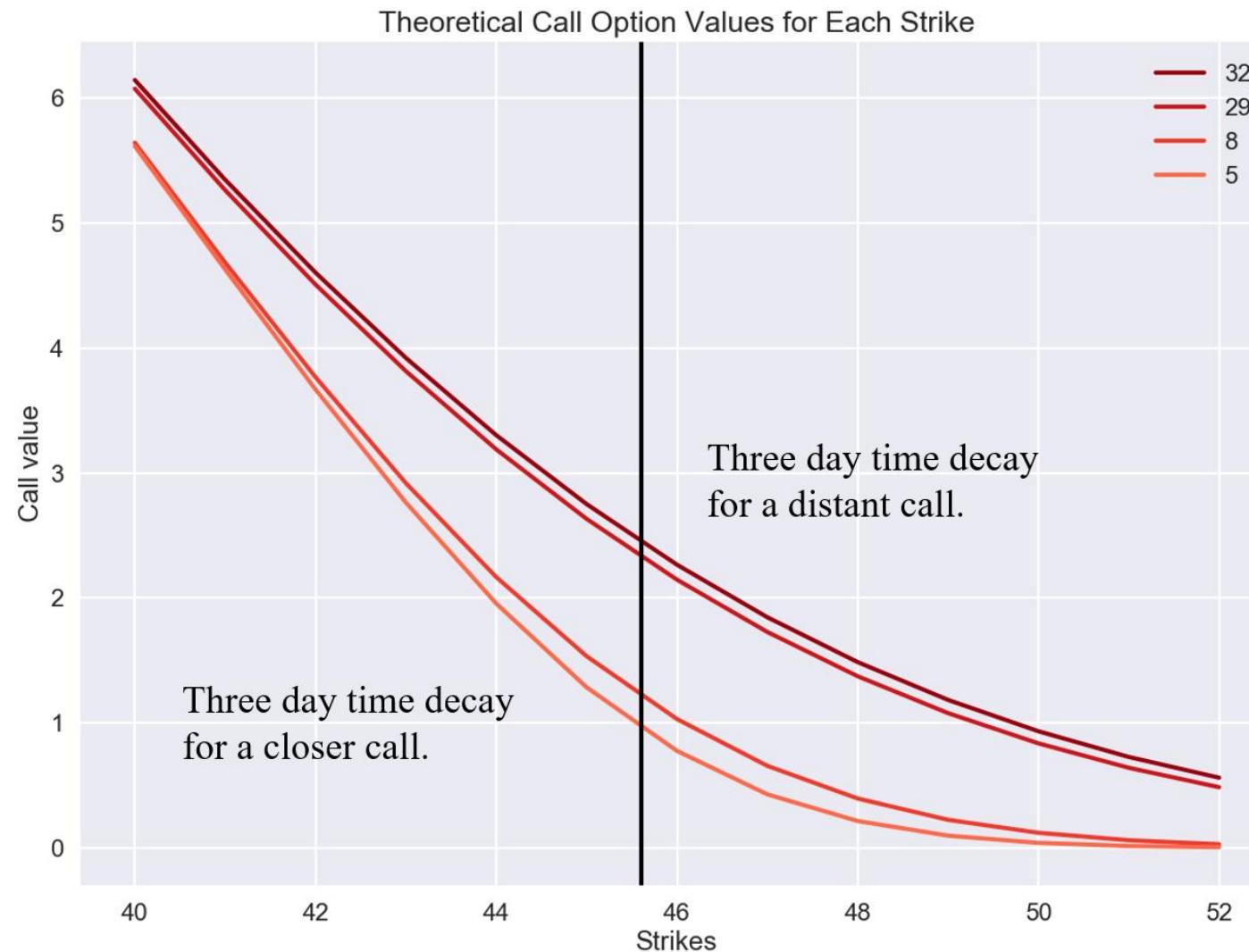
DWBH: This shows direct price sensitivity for four call options at different strike, different expiries at a moment time. Modeled in Python/Seaborn for Econ 136.

2. Time Decay



DWBH: This relationship is called “Theta” in options lingo.

2. Time Decay (continued)



DWBH: The spreads between these two mappings show 3-day time decay for two expiries for two chains. Modeled in Python/Seaborn for Econ 136.

3. Sensitivity to Stock Volatility



DWBH: This relationship depends upon context and goes by different names, like “volatility,” “implied volatility,” or “sigma” in options lingo.

The VIX index, shown above, measures the relative volatility of the S&P 500 (and hence SPY). When the volatility of any underlying stock rises, premiums and option prices rise with it, sometimes even enough to overcome a movement in a stock's price in the wrong direction! Note: there are many ways to measure stock volatility. The VIX is a good proxy.

Volatility: some of my algo models

Mudd Finance

```
1 # ib_strangle_spy_[date].py There may be multiple versions of this at different dates.
2 # This is the SPY only log
3 # September 23, 2019
4 # THIS IS A STABLE VERSION OF THE STRANGLE LOGGING MODEL DEVELOPED AS OF THE DATE ABOVE.
5 # THIS MODEL IS INTENDED AS REFERENCE. ASIDE FROM THE STOCK NAME AND EXPIRY CHOSEN, DO
6 # NOT MODIFY THIS VERSION. It can be used so long as the code is not changed.
7 # Documentation for this should be referenced from the Jupyter Notebook version of this model,
8 # which on this date was ibapistranglev1_8_dev.ipynb
9 #
10 import math
11 import numpy as np
12 import datetime
13 import logging
14 import sys
15 sys.path.append('c:/Users/Prof Gary Evans/Dropbox/PyGo/PyFi')
16 import finutil as fu
17 import timeutil as tu
18 import ib_insync
19 from ib_insync import *
20 #
21 # Provide all necessary inputs
22 #
23 aname = "Prof Evans"
24 stosym = "SPY"
25 exyear = int(2019)
26 exmonth = int(12)
27 exday = int(20)
28 #
29 # For the record when we do this:
30 #
31 when_done = tu.right_now()
32 print(when_done[0])
33 #
34 # Calculate expiry and days to expiry
35 ex_date = datetime.date(exyear,exmonth,exday)
36 if exmonth < 10:
37     ex_mo_str = "0" + str(ex_date.month)
38 else:
39     ex_mo_str = str(ex_date.month)
40 if exday < 10:
41     ex_day_str = "0" + str(ex_date.day)
42 else:
43     ex_day_str = str(ex_date.day)
44 expiry = str(ex_date.year) + str(ex_mo_str) + str(ex_day_str)
45 #
46 days = tu.daysto(exyear,exmonth,exday)
47 #
48 # NOTE: Because a logger is already built into ib_insync, we cannot use the basic log config
49 # logging.basicConfig(filename = logpath + "ib_strangle.log",level=logging.INFO,format = LOG_FORMAT)
50 # We have to use the custom logger built below
51 # Run the logger (for all line results)
52 #
53 LOG_FORMAT = "%(message)s "
54 logpath = "c:/Users/Prof Gary Evans/Dropbox/PyGo/IB/logs/"
55 logger_strangle = logging.getLogger("__name__")
56 logger_strangle.setLevel(logging.INFO)
57 x_handler = logging.FileHandler(logpath + "spy.log")
58 x_handler.setLevel(logging.INFO)
```

Model used: ib_strangle_inpos_v1_1.py
Monday, November 4, 2019, 07:59:43 AM local
AAPL, Last: 256.94, Bid: 256.92, Bid Size: 1, Ask: 256.93, Ask Size: 1, Peg: 256.93
Expiry: 20191115, days to expiry: 11.0
Call strike: 247.50, Put strike: 242.50
Call Bid: 10.10, Ask: 10.25, Peg: 10.18
Put Bid: 0.65, Ask: 0.66, Peg: 0.66
Position value: 10.84.
Call IDV: 0.010991, Duration Volatility: 0.034757
Put IDV: 0.014413, Duration Volatility: 0.045578
Call sigma ratio: 0.7091
Put sigma ratio: 0.9299
One day time decay: 0.202.
|
Model used: ib_strangle_inpos_v1_1.py
Monday, November 4, 2019, 10:35:45 AM local
AAPL, Last: 256.84, Bid: 256.83, Bid Size: 21, Ask: 256.85, Ask Size: 9, Peg: 256.84
Expiry: 20191115, days to expiry: 11.0
Call strike: 247.50, Put strike: 242.50
Call Bid: 10.00, Ask: 10.10, Peg: 10.05
Put Bid: 0.62, Ask: 0.63, Peg: 0.62
Position value: 10.67.
Call IDV: 0.010764, Duration Volatility: 0.034039
Put IDV: 0.014091, Duration Volatility: 0.044561
Call sigma ratio: 0.6945
Put sigma ratio: 0.9091
One day time decay: 0.195.

DWBH:



Option traders are
nimble and quick ...

Elementary Options Trading Strategies

... betting on or against volatility,
hedging, leveraging

Basic option strategies .. calls

- Buying a call
 - gambling that the **price or volatility** will rise
 - near or out of the money: high leverage, high risk
 - deep in the money: lower leverage, lower risk
- Writing a call
 - covered (you already own the stock)
 - reduces loss in event of stock price decline
 - can enhance yield
 - naked (you don't own the stock)
 - collecting fees and gambling that price will fall
 - potential for **infinite liability** – a lot more than the bet



Basic option strategies .. puts

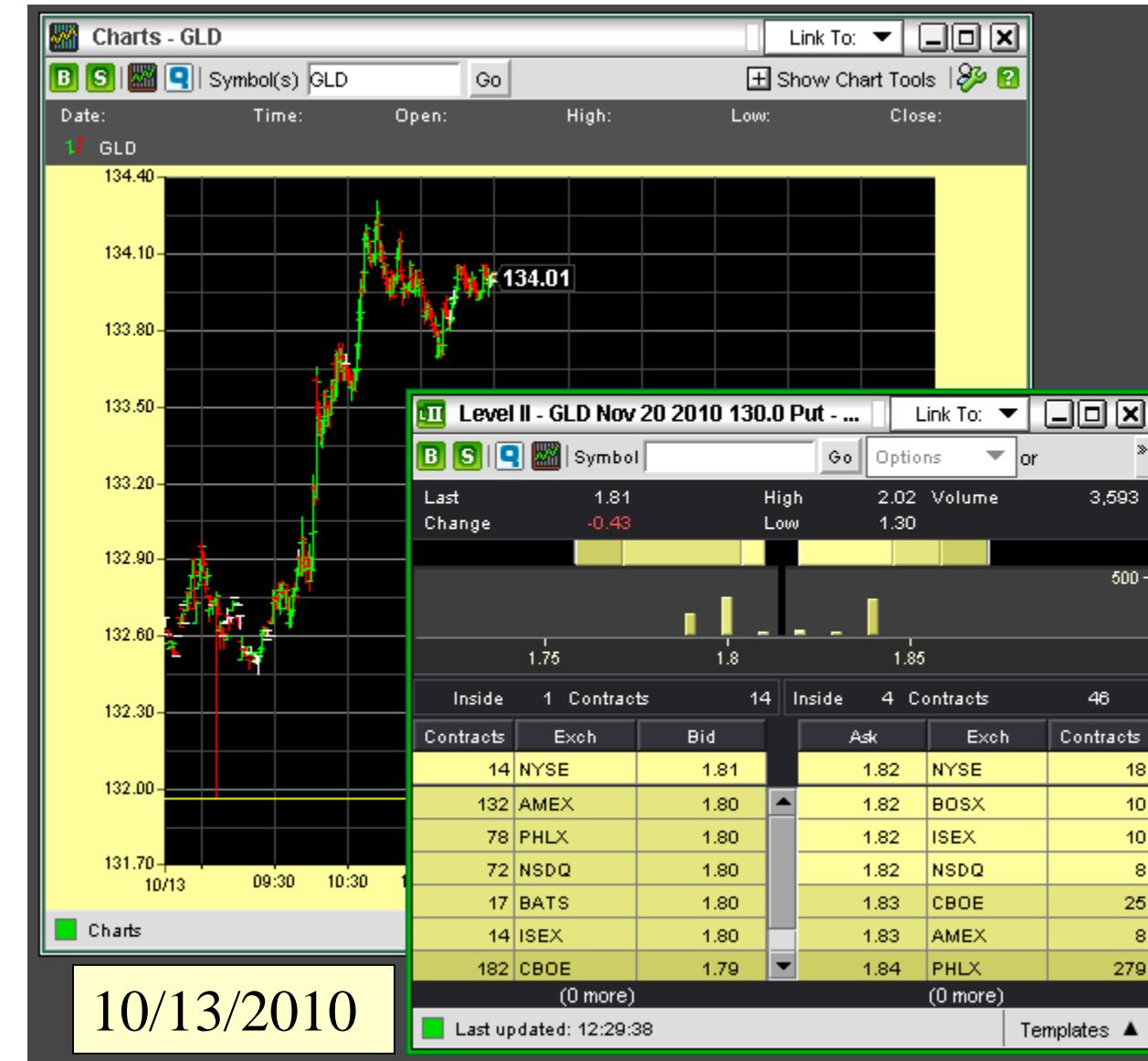
- Buying a put
 - gambling price will fall
 - *excellent hedge* for a long position in stock or related asset
- Writing a put
 - short-covered (short on stock)
 - hedging, locking (same as a call)
 - naked (no stock position)
 - gambling on no price decline
 - again, huge downside risk (if the stock plunges)



Hedging with Options:

GLD had a big run-up in 2010. Suppose you have 300 shares of GLD that you want to keep, but are worried about declining price, especially over a weekend.

You can hedge this by buying 6 put contracts ([100 shares each](#)) in the Nov 20 (exp) 130 ([strike](#)) put for \$1.82 per share.



... but this may be a little pricey for a hedge.

... the GLD hedging choices (from the previous slide)

TD Find Option - Add to Level II - GLD (SPDR GOLD TRUST GOLD SHS)

Underlying Symbol: GLD | Chain Type: Puts | Options Range: Out of The Money | View Chain

Note these choices.

1. Select Expiration (Ctrl click to select multiple) 2. Select Option(s)

Expiration	Symbol	Bid	Ask	Vol	Op Int
Oct 16 2010	GLD Nov 20 2010 122.0 Put	0.46	0.48	1,563	36,045
Nov 20 2010	GLD Nov 20 2010 123.0 Put	0.54	0.56	465	9,697
Dec 18 2010	GLD Nov 20 2010 124.0 Put	0.64	0.66	1,572	10,728
Dec 31 2010	GLD Nov 20 2010 125.0 Put	0.76	0.78	1,101	19,754
Jan 22 2011	GLD Nov 20 2010 126.0 Put	0.91	0.93	5,813	16,571
Mar 19 2011	GLD Nov 20 2010 127.0 Put	1.08	1.10	1,793	9,471
Mar 31 2011	GLD Nov 20 2010 128.0 Put	1.28	1.31	1,359	6,885
Jun 18 2011	GLD Nov 20 2010 129.0 Put	1.53	1.55	1,928	6,033
Jun 30 2011	GLD Nov 20 2010 130.0 Put	1.81	1.83	3,454	11,623
Sep 17 2011	GLD Nov 20 2010 131.0 Put	2.13	2.16	1,070	28,682
	GLD Nov 20 2010 132.0 Put	2.52	2.54	657	1,907

1 contracts selected.

Add to Level II | Close Window

The screenshot shows the 'Find Option - Add to Level II' dialog for GLD. The 'Underlying Symbol' is GLD, 'Chain Type' is Puts, and 'Options Range' is Out of The Money. The 'View Chain' button is visible. A yellow callout box labeled 'Note these choices.' has an arrow pointing to the top right of the window. On the left, a list of expirations from Oct 16 2010 to Sep 17 2011 is shown. A red arrow points from the 'Nov 20 2010' row to the options list. In the options list, the 'GLD Nov 20 2010 130.0 Put' is highlighted with a green box and a red border around the entire row. The row contains columns for Bid, Ask, Vol, and Op Int. At the bottom, it says '1 contracts selected.' and has 'Add to Level II' and 'Close Window' buttons.

We chose the red, but could have chosen the green for less cost but less protection. We could have chosen other months as well.

Writing calls and puts

An option trade is a contract. If you buy a call option, you have entered into a contract with some other trader who *wrote* that call option. That may be a small trader just like you. So long as you have permission from your brokerage to trade options, you can write them (sometimes with substantial restrictions) just as easily as buy them. When you write a call for 1 contract (representing 100 shares of stock) then you create Open Interest of 1 contract.

When you **offset** this by Buying to Close (if you do that) the Open Interest falls by 1 contract.

When writing calls, if you own the stock that must be delivered if the option is in the money at expiration, you are writing a **covered** call, which is generally allowed without restriction.

Strategy 1.1: Writing covered calls

The strategy:

1. Buy (or already own) a traditional long stock position, as you might for a traditional conservative portfolio, and
2. Write a call (typically OTM but near the money) for the same stock in (typically) the same amount as your stock holding.

35.90 -0.25 (-0.69%)

NOV 08 '19 ^W 2 DAYS		NOV 15 '19 9 DAYS		NOV 22 '19 ^W 16 DAYS		NOV 29 '19 ^W 23 DAYS		MORE ▾		
CALLS										
CHANGE %	VOLUME	OPTN OP...	HIGH	LOW	LAST	ASK SIZE	BID SIZE	ASK	BID	STRIKE
-9.62%	137	3.02K	2.12	1.66	1.88	18	570	1.82	1.80	34.5
-12.28%	1.55K	15.1K	1.80	1.29	1.50	339	1,125	1.47	1.45	35
-17.99%	2.52K	3.40K	1.50	1.00	1.14	59	1,432	1.15	1.14	35.5
-20.00%	7.82K	16.7K	1.19	0.75	0.88	716	1,526	0.89	0.87	36
-24.14%	3.46K	2.36K	1.00	0.56	0.66	200	426	0.67	0.66	36.5
-26.87%	2.08K	15.3K	0.78	0.41	0.49	667	1,192	0.50	0.48	37

DEC 06 '19 ^W 30 DAYS		DEC 13 '19 ^W 37 DAYS		DEC 20 '19 44 DAYS		JAN 17 '20 72 DAYS		MORE ▾		
CALLS										
CHANGE %	VOLUME	OPTN OP...	HIGH	LOW	LAST	ASK SIZE	BID SIZE	ASK	BID	STRIKE
-5.94%	75	4.99K	4.15	3.62	3.80	4,183	87	3.85	3.80	33
-6.59%	258	10.9K	3.50	2.91	3.12	3,099	911	3.15	3.10	34
-7.75%	808	5.48K	2.83	2.30	2.50	57	97	2.51	2.49	35
-8.84%	2.86K	5.10K	2.30	1.79	1.96	361	1,060	1.97	1.95	36
-9.52%	983	3.52K	1.80	1.37	1.52	22	178	1.51	1.50	37

Bottom example has about a 5.5% rate of return over 44 days ...

Complex Strategy 2: Buying Deep-In-The-Money (DITM) Options

- Calls:
 - Premium is nearly zero or zero.
 - Call is nearly identical to buying the stock directly, but *with leverage*
 - Rollover DITMs for index ETFs is a good, albeit risky in the short term, strategy (see example next slides)
- Puts
 - A good way to short if you think the stock will decline
 - Shorting with leverage

What is leverage?

- Leverage multiplies your percentage gain on investment relative to the percentage increase in the underlying asset value.
- $(\% \text{ gain in investment}) = (\textbf{L}) \times (\% \text{ gain in asset value})$
- Leverage comes from either **(a)** using debt to pay for part of a financial asset purchase
 - $(\textbf{L}) = (\text{Value of Purchase}) / (\text{Your } \$\$ \text{ contribution})$, which assumes the remainder is financed with debt, or
 - $(\textbf{L}) = (1 / [1 - \% \text{ of purchase financed by debt}])$
 - e.g. 2 to 1 for a stock purchase in a margin account when you borrow \$50,000 to buy \$100,000 in stock,
 - e.g. a house bought with 20% down (80% of purchase financed by debt) is leveraged 5 to 1.
- or **(b) implicitly**, because of the way a derivatives contract is structured to give you leverage. For a DITM option contract $\textbf{L} = (\text{Stock price}/\text{Option Price})$. See example next slide.
- Leverage works off of capital gains and of course works both directions; losses are leveraged too.

Current example of DITM leverage ...

Deep-in-the-Money (DITM) DIA Dec 20 250 call option (44 days)

DIA at 274.76

ASK SIZE	BID SIZE	ASK	BID	STRIKE
130	69	29.35 ▢	29.00 □	246
95	68	28.40 ▢	28.05 □	247
71	72	27.40 ▢	27.05 □	248
54	69	26.45 ▢	26.10 □	249
217	71	25.50 ▢	25.15 □	250
202	84	24.55 ▢	24.20 □	251
66	70	23.60 ▢	23.25 □	252
302	144	22.65 ▢	22.30 □	253
297	117	21.70 ▢	21.35 □	254
84	532	20.70 ▢	20.40 □	255
295	338	19.80 ▢	19.50 □	256
48	220	18.85 ▢	18.60 □	257
289	154	17.95 ▢	17.65 □	258
1,526	1,201	17.00 ▢	16.75 □	259
1,924	1,690	16.10 ▢	15.80 □	260
1,958	944	15.20 ▢	14.95 □	261
1,830	153	14.30 ▢	14.05 □	262
1,802	2,008	13.40 ▢	13.15 □	263
65	1,303	12.50 ▢	12.30 □	264

In this example, we consider a 250 call. Given that it has intrinsic value of

$$274.76 - 250 = 24.76,$$

Premium at Bid: 0.39 (acceptable)

Premium at Ask: 0.74 (too high)

We would probably be able to buy this for 25.30 or so.

The leverage on the DIA call ...

The leverage is equal to

$$\mathbf{L} = \text{Stock price} / \text{Options price}$$

$$10.86 \text{ to } 1 = 274.76 / 25.30$$

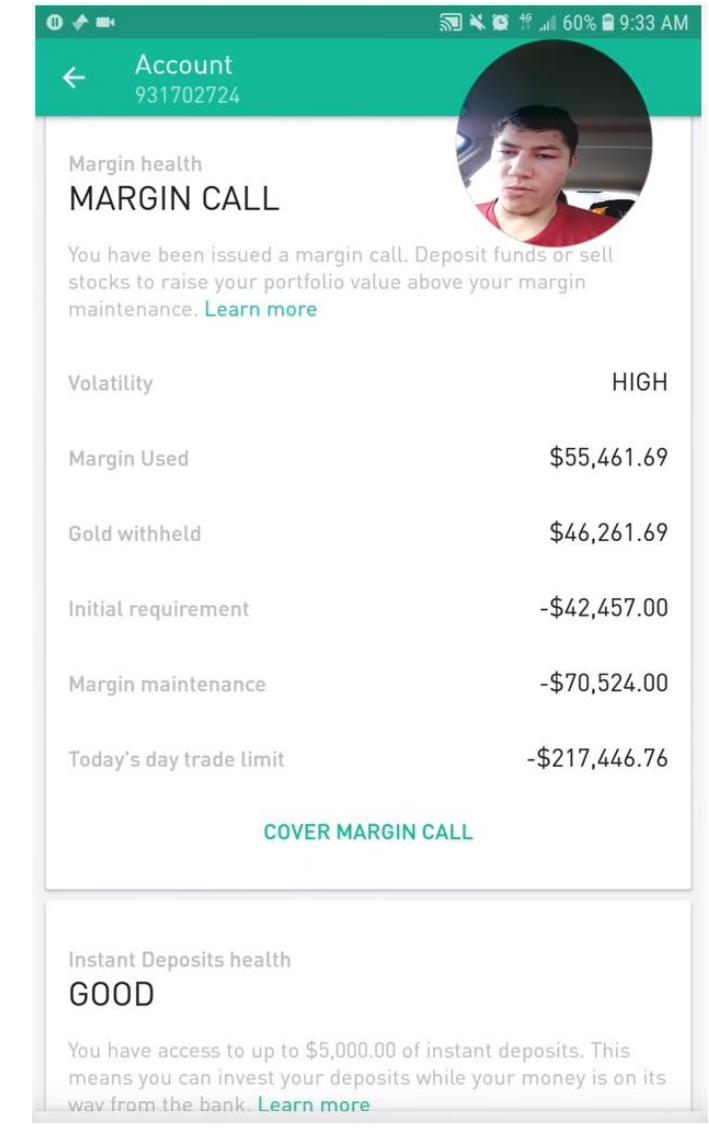
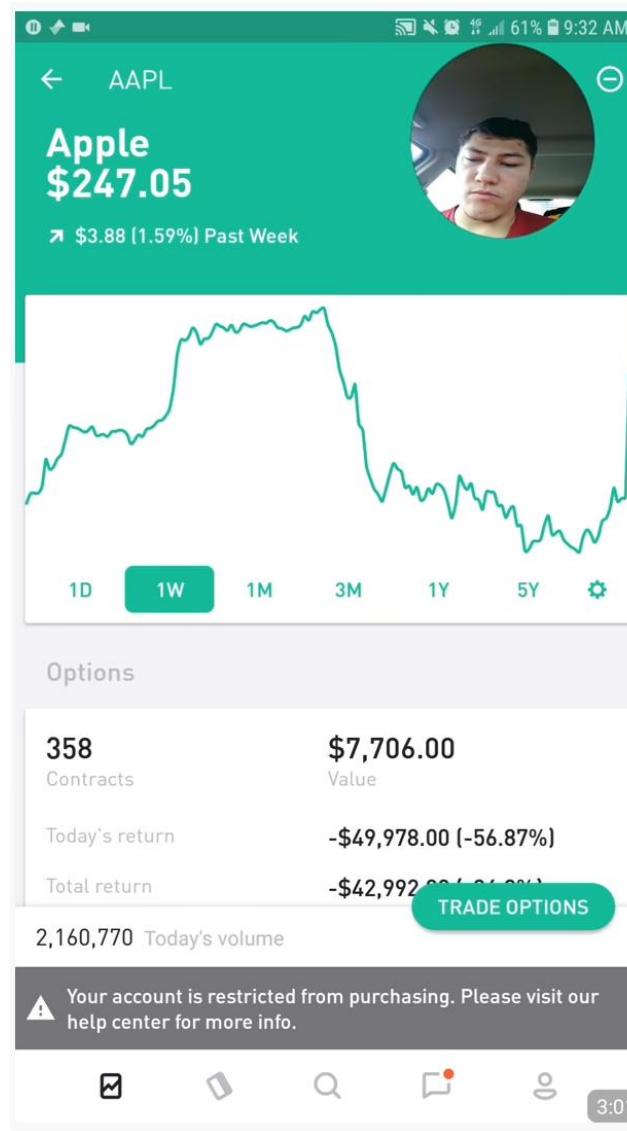


but only if there is no premium or the premium is very small. There is no meaningful time decay. And the **delta** is one or very close to one!

If the stock goes up by \$5, the option goes up by \$5. If the ETF percentage gain equals 2.0%, the option percentage gain equals 22%. This is the ultimate **directional bet**. HOWEVER, the leverage works both directions.

Mudd math alumnus Alex Griffith '17 did research suggesting that young Mudd graduates should consider holding a small inventory of DITM index etf calls in their portfolios (will explain in class if time allows).

https://www.youtube.com/watch?v=A-tNkuYV4_Q



[+] StudentOfAwesomeness 9 points 48 minutes ago

A new legendary autistic heavyweight contender made a video of him losing 40k of his 50k position (IV crushed) in next day Apple puts and posted the reaction on YouTube (hence GUH).

If that's not legendary enough, he only had 2k collateral meaning he was on 25x leverage. RH and federal regulations limit you to 2x. This crazy [REDACTED] found a glitch that let him recursively use leverage to buy covered calls which technically increased his asset size (but also increased his obligation to pay at a later date).

RH doesn't seem to factor the 'debt' in calculating buying power, so each time you buy covered calls you can leverage another 2x of your original 2x.

This was several days ago and RH has not addressed or fixed the issue. Copycat autists are now exploiting the glitch to turn 2k into 1mil buying power for lols and then getting their accounts closed and liquidated.

People expect RH to settle and/or not even pursue these debts because they are breaking federal regulations for allowing this to happen. A few people think this is the end for RH but they're the most autistic imo.

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