THE UNIVERSITY OF MELBOURNE

FNCE10002 Principles of Finance

Semester 1, 2019

An Introduction to Options

Study Questions for Week 12

These study questions will not be discussed in a tutorial. Answers to these questions will be provided via the LMS by the Friday of week 12. Note that questions flagged as "EXM" are past exam questions that I've used in this subject or subjects similar in scope to this subject, while those flagged as "TXT" are sourced from the textbook. If you are unsure of any answer you should check with a pit stop tutor, online tutor or me.

A. Short Answer Questions

Provide brief responses to the following questions.

A1.[EXM] For each of the following statements indicate whether the statement is true or false and *briefly* explain why.

a) A trader wishes to speculate on the potential takeover of Rio Tinto by BHP Billiton. If the takeover goes ahead the share price of Rio Tinto is expected to increase dramatically. One strategy that the trader can use is to buy call options on Rio Tinto shares.

Max(S-X, 0)

Yes, the trader may no need to buy share but to buy call option so that if the share is increase dramatically trader can still be as the strike price as sell immediately to make profit

b) An investor wishes to hedge against the possibility of a significant fall in the price of ANZ Bank's shares. The investor currently owns ANZ Bank's shares. She can hedge against this exposure by buying put options on ANZ Bank shares.

if X<ST, Max(X-S, 0)

True, if the shares drop, the investor can still sell the strike price

As the share price increase, the (intrinsic) value of call Max(S-X, 0) increase, while the intrinsic value of put Max(X-S, 0) will decrease

c) As the share price of a stock increases, all else being the same, the value of a put option on these shares will decrease and the value of a call option on these shares will increase.

True, people who want to buy call option hope the share price increase while the put option is opposite

A2. Why are the prices of both put options and call options positively related to the volatility of the underlying share and time to expiration? *Explain*.

If the underlying share has volatility over time period so it has the possibility to change in the future which is unpredictable so people may profit from the put and call options.

A3.[EXM] a) Using appropriately labeled figures, show the profit diagrams for the buyer and seller (or writer) of a call option at maturity, clearly indicating the breakeven point. Who has a limited downside risk and who has a potentially unlimited downside risk, and why?

Max(ST-X, 0)-C

net profit long call option: X, ST, -C, breakeven ST=X

net profit short call option: C, X, price ST

C-Max(ST-X, 0)

The maximum loss for buyer is option premium when market price > strike value he has unlimited benefit but limited risk

b) Using appropriately labeled figures, show the profit diagrams for the buyer and seller (or writer) of a put option at maturity, clearly indicating the breakeven point. Who has a limited downside risk and who has a potentially unlimited downside risk, and why?

net profit long put option: Max(X-ST)-P, ST=X, X, -P, price

net profit short put option: P, X, price.

P-Max(X-ST, 0)

The seller & buyer is zero sum game

the higer volatility → more dispersed distribution thus increase both probabilities

which means that seller has unlimited risk but limited benefit which is premium.

as the time to expiration increase, there is a higher probability that a pull or call option will be in-the-money or more in-the-money (if now out-of-money) in-the-money

A4.[EXM] Which of the following option positions will benefit a trader if the price of the underlying shares increases?

a. d

a) Long position in a call.
b) Short position in a call.
c) Long position in a put
d) Short position in a put.

A5. Which of the following option positions will benefit a trader if the price of the underlying shares decreases?

b. c.

a) Long position in a call.
b) Short position in a call.
c) Long position in a put
d) Short position in a put.

A6.[TXT] Examine the data in the table below. Given that both shares trade for $50 and both options have a $45 exercise price and a July expiration date, can we say that the option of Company A is overvalued or that the option of Company B is undervalued? Why or why not? *Explain*.

Company	Share Price	Expiration	Exercise Price	Call Price
A	$50	July	$45	$7.50
B	$50	July	$45	$6.75

Cannot say that, A might be volatile than the shares of B

B. Problems and Case Studies

B1.[EXM] A call option on Vine Co. shares currently trades for $0.40 per share. The expiration date is March 18 of next year and the exercise price of the option is $6.00 per share. The current price of Vine Co. shares is $5.50.

a) If this were an American option, on what date(s) can the option be exercised?

on or before March 18 of next year

b) If this were a European option, on what date(s) can the option be exercised?

only on March 18 of next year.

certainly shouldn't be exercised today, but not worthless

c) Your friend states that because the current price of Vine Co. shares is $5.50 this option is worthless. Is your friend correct? *Explain*.

No, since it has a volatility so the price may fluctuate during this period

put $\max(X-S_T)-P$

call $\max(S_T-X)-C$

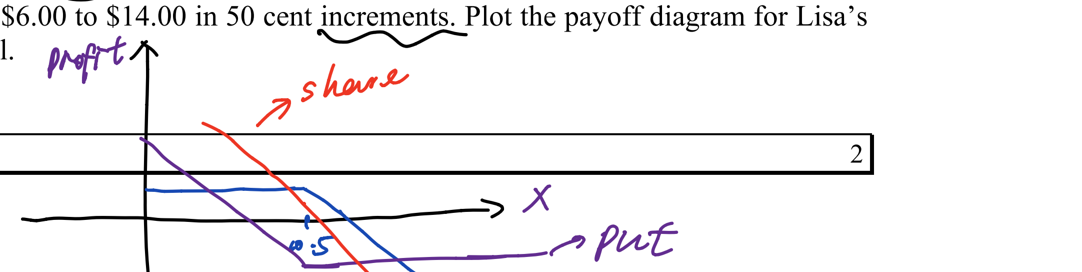
B2.[EXM] You are the holder of a put option contract over ZYX Ltd shares, which has an exercise price of $7.50. Assume you paid an option price of $0.25 per share and you will hold the contract to expiration. Indicate whether or not you would exercise the contract if the expiration date price of ZYX Ltd shares was: (a) $6.50, (b) $7.00, (c) $7.50 or (d) $8.00. Calculate the total dollar amount of profit or loss in each scenario. (a) ✓. (b) ✓ (c) ✓ (d) ✗. loss ~~0.25~~ 0.75 (8-7.5)-0.25

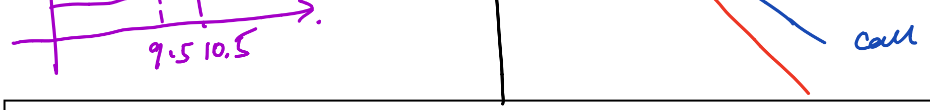
profit 0.75 profit 0.25 minimuse loss loss 0.25 per share

B3.[EXM] You are the holder of a call option contract over ZYX Ltd shares, which has an exercise price of $10.00. Assume you paid an option price of $0.20 per share, and you will hold the contract to expiration. Indicate whether or not you would exercise the contract if the expiration date price of ZYX Ltd shares was: (a) $8.50, (b) $9.50, (c) $10.50 or (d) $11.50. Calculate the total dollar amount of profit or loss in each scenario. (a) ✗ (b) ✗ (c) ✓ (d) ✓

loss 0.2 0.2 profit 0.3 1.3

B4.[TXT] Suppose that Lisa Emerson owns a share of Brisbane Chemical, which is worth $10 per share. Lisa purchases a put option on this share with an exercise price of $9.50 and she sells a call option with an exercise price of $10.50. Calculate the payoffs for Lisa's new portfolio for share prices ranging from $6.00 to $14.00 in 50 cent increments. Plot the payoff diagram for Lisa's new portfolio as well.





B5.[TXT] Answer each part separately.

a) If the underlying share price is $37, indicate whether each of the options below is in-the-money, at-the-money, or out-of-the-money.

Exercise Price	Call Option	Put Option
$20	in 买低卖高	~~in~~ out 买高
$37	at	at
$50	~~in~~	~~out~~ in.

underlying price − strike price.

option premium = intrinsic + Time value

b) The shares of Spears Entertainment currently sell for $28. A call option on this share has an exercise price of $25 and it sells for $5.25. A put option on this share has an exercise price of $30, and it sells for $3.10. What is the intrinsic value of each option? What is the time value of each option?

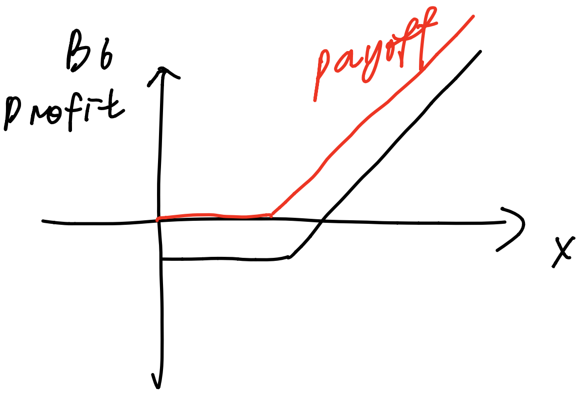
Call 28−25=$3 TV=5.25−3=2.25

put $2 TV=3.1−2=1.1.

B6. Refer to the case study "The Atlassian Bull" covered in class. For Strategy 2B, calculate the total payoff and payoff per share as well as the net profit/loss and net profit/loss per share of this strategy using the table that we used for Strategy 2A. Draw a fully labeled payoff and net profit/loss per share graph for this strategy as well. What is the main benefit of using this strategy instead of Strategy 2A?

B7. Refer to the case study "The Atlassian Bear" covered in class. For Strategy 2B, calculate the total payoff and payoff per share as well as the net profit/loss and net profit/loss per share of this strategy using the table that we used for Strategy 2A. Draw a fully labeled payoff and net profit/loss per share graph for this strategy as well. What is the main benefit of using this strategy instead of Strategy 2A?

B6



B7.