

## ECN134(SEC-A03): HW3

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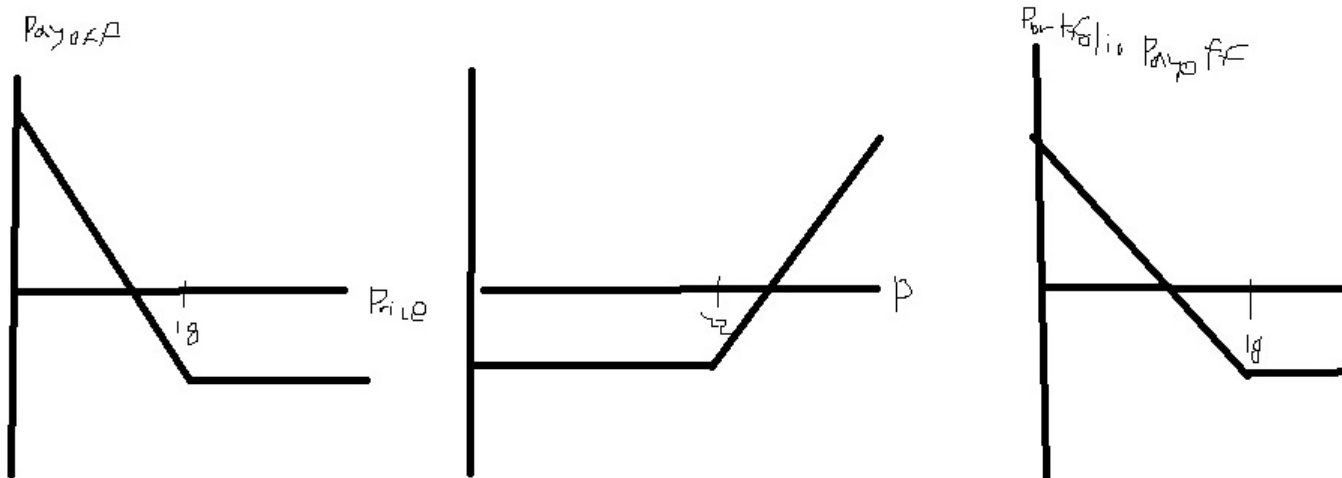
1)

Your friend has come to you with an investment idea. He notices that for SH Corp. there are put options with a strike price of \$18 and call options with a strike price of \$22. The current price of SH Corp common stock is currently \$20 per share

- (a) Your friend believes the price of SH Corp stock is going to remain \$20 per share until the expiration of these options. Your friend wants you to buy a portfolio with one put option and one call option (where each option contract is for a single share of stock) because he believes the price of SH Corp will remain at \$20 per share through the expiration of the contract. Briefly explain whether buying this portfolio is a good idea or not.

The call option would not be exercised at stock price 20 because there is no reason to buy at a higher price. The put price would not be exercised at stock price 20 because there is no point in selling at a lower price than stock price. I would advise my friend to not invest in this type of portfolio because there exists no profit—only loss, given there exists a fee for each option.

- (b) Assume that the premium (fee) for each option contract (call or put) is \$1. Draw an accurate net payoff diagram for the portfolio mentioned in part a).



- (c) If you believe the volatility of SH. Corp stock is relatively low, would you rather have the long position on the portfolio in part a) or the short position on the portfolio in part a)? Briefly explain.

Date: 3/11/16.

There should be a short position for the portfolio because we make no profit with our options. So, we become sellers, and wait to buy options back at a better time, for optimal profit.

2)

Upside Inc. currently trades for \$100 per share. It is expected with equal probability to either rise in price to \$110 per share in one year or \$150 per share in one year. Assume the binomial model for option contracts

- (a) Assume you will build a portfolio consisting of one share of Upside Inc. and call options on Upside Inc. with a strike price of \$100 (for one share of stock). What is the hedge ratio for this portfolio?

$110 + 10h = 150 + 50h \Rightarrow h = -1$ . So, we sell 1 share for  $h = -1$ .

- (b) What is the price of a call option for this portfolio assuming a 10% risk-free rate? The put price of a call option for this portfolio is  $\frac{100}{1+.10} = 90.9091$

- (c) Using put-call parity, what must the price of a put option with a strike price of \$100 be today assuming a 10% risk-free rate?

The price of a put option  $C$  with strike price 100 is  $100 - 2C = 90.9091 \Rightarrow c = \$4.55$

3)

Small Inc. is considering the following project with the following annual cash flows.

Year	0	1	2	3	4
Cash Flow	-\$10	\$9	\$2	\$3	-\$5

- (a) What is the payback period for this project?

Payback period is  $1 + \frac{1}{2} = 1.5$  years.

- (b) What is the discounted payback period for this project if the discount rate is 20%? The call option would not be exercised at stock price 20 because there is no reason to buy at a higher price. The put price would not be exercised at stock price 20 because there is no point in selling at a lower price than stock price. I would advice my friend to not invest in this type of portfolio because there exists no profit—only loss, given there exists a fee for each option.

- (c) If Small Inc. has a cutoff period of 2 years, briefly explain if they would accept this project under the payback method? What about the discounted payback method?

The call option would not be exercised at stock price 20 because there is no reason to buy at a higher price. The put price would not be exercised at stock price 20 because there is no point in selling at a lower price than stock price. I would advice my friend to not invest in this type of portfolio

- (d) What is the net present value of this project if the discount rate is still 20%? Briefly explain if they should accept this project based on NPV analysis.

$110 + 10h = 150 + 50h \Rightarrow h = -1$ . So, we sell 1 share for  $h = -1$ .

- (e) Suppose there are 10 shares outstanding of Small Inc. selling for \$10 per share. If they undertake this project, what would you calculate their share price should be assuming Small Inc. is a common-equity only company? The call option would not be exercised at stock price 20 because there is no reason to buy at a higher price. The put price would not be exercised at stock price 20 because there is no point in selling at a lower price than stock price. I would advice my friend to not invest in this type of portfolio