Homework solution lecture 15

14-17. Mercer Corp. is an all-equity firm with 10 million shares outstanding and $100 million worth of debt outstanding. Its current share price is $75. Mercer's equity cost of capital is 8.5%. Mercer has just announced that it will issue $350 million worth of debt. It will use the proceeds from this debt to pay off its existing debt, and use the remaining $250 million to pay an immediate dividend. Assume perfect capital markets.

a. Estimate Mercer's share price just after the recapitalization is announced, but before the transaction occurs.

b. Estimate Mercer's share price at the conclusion of the transaction. (*Hint*: use the market value balance sheet.)

c. Suppose Mercer's existing debt was risk-free with a 4.25% expected return, and its new debt is risky with a 5% expected return. Estimate Mercer's equity cost of capital after the transaction.

a. MM => no change, $75

b. Initial enterprise value = 75 × 10 + 100 = 850 million

New debt = 350 million

E = 850 – 350 = 500

Share price = 500/10 = $50

c. Ru = (750/850) × 8.5% + (100/850) × 4.25% = 8%

Re = 8% + 350/500(8% – 5%) = 10.1%

15-11. Rumolt Motors has 30 million shares outstanding with a price of $15 per share. In addition, Rumolt has issued bonds with a total current market value of $150 million. Suppose Rumolt's equity cost of capital is 10%, and its debt cost of capital is 5%.

a. What is Rumolt's pretax weighted average cost of capital?

b. If Rumolt's corporate tax rate is 35%, what is its after-tax weighted average cost of capital?

a. $E = \$15 \times 30 = \$450$ million. $D = \$150$ million.

$$\text{Pretax WACC} = \frac{450}{600}10\% + \frac{150}{600}5\% = 8.75\%$$

b. $$\text{WACC} = \frac{450}{600}10\% + \frac{150}{600}5\%(1 - 35\%) = 8.3125\%$$

20-4. Explain the difference between a long position in a put and a short position in a call.

When a party has a long position in a put, it has the right to sell the underlying asset at the strike price; when it has a short position in a call, it has the obligation to sell the underlying asset at the strike price if exercised. These are clearly different positions.

20-5. Which of the following positions benefit if the stock price increases?

a. Long position in a call

b. Short position in a call

c. Long position in a put

d. Short position in a put

Long call and short put

20-6. You own a call option on Intuit stock with a strike price of $40. The option will expire in exactly three months' time.

If the stock is trading at $55 in three months, what will be the payoff of the call?

b. If the stock is trading at $35 in three months, what will be the payoff of the call?

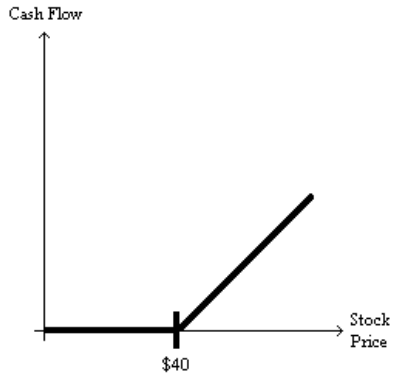
c. Draw a payoff diagram showing the value of the call at expiration as a function of the stock price at expiration.

Long call option: value at expiration:

a. $15

b. 0$

c. Draw graph:



20-7. Assume that you have shorted the call option in Problem 6.

a. If the stock is trading at $55 in three months, what will you owe?

b. If the stock is trading at $35 in three months, what will you owe?

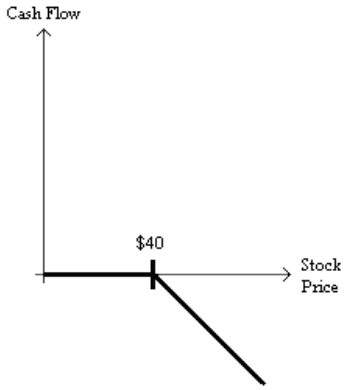
c. Draw a payoff diagram showing the amount you owe at expiration as a function of the stock price at expiration.

Short call: value at expiration date:

a. You owe $15.

b. You owe nothing.

c. Draw the payoff diagram:



20-8. You own a put option on Ford stock with a strike price of $10. The option will expire in exactly six months' time.

a. If the stock is trading at $8 in six months, what will be the payoff of the put?

b. If the stock is trading at $23 in six months, what will be the payoff of the put?

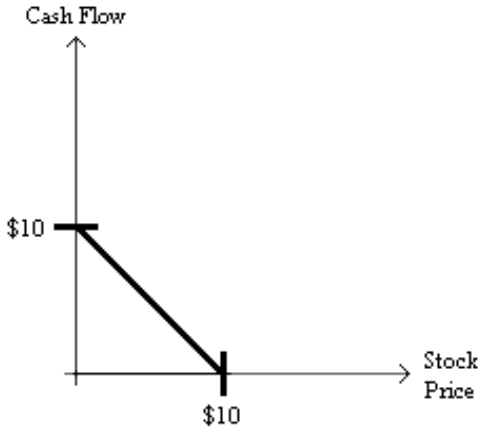
c. Draw a payoff diagram showing the value of the put at expiration as a function of the stock price at expiration.

Long put value at expiration:

a. $2

b. $0

c. Draw payoff diagram:



20-9. Assume that you have shorted the put option in Problem 8.

a. If the stock is trading at $8 in three months, what will you owe?

b. If the stock is trading at $23 in three months, what will you owe?

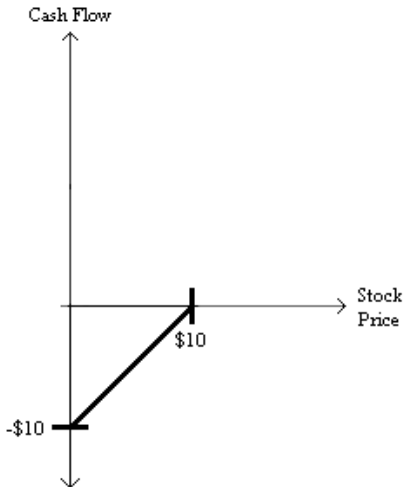
c. Draw a payoff diagram showing the amount you owe at expiration as a function of the stock price at expiration.

Short put: value at expiration:

a. You owe $2.

b. You owe nothing.

c. Draw payoff diagram:



20-17. Dynamic Energy Systems stock is currently trading for $33 per share. The stock pays no dividends. A one-year European put option on Dynamic with a strike price of $35 is currently trading for $2.10. If the risk-free interest rate is 10% per year, what is the price of a one-year European call option on Dynamic with a strike price of $35?

Put-call parity:

$$C = P + S - \frac{K}{1+r} = 2.10 + 33 - \frac{35}{1.1} = 3.282$$

20-18. You happen to be checking the newspaper and notice an arbitrage opportunity. The current stock price of Intrawest is $20 per share and the one-year risk-free interest rate is 8%. A one year put on Intrawest with a strike price of $18 sells for $3.33, while the identical call sells for $7. Explain what you must do to exploit this arbitrage opportunity.

The arbitrage opportunity exists because:

$$\$7 > \$3.33 + \$20 - \frac{\$18}{(1+0.08)} = \$6.66 .$$

So the call is overpriced compared to the portfolio of a put, the stock, and risk-free borrowing.

As a result, the strategy would be to sell the call option, buy the put, buy the stock, and borrow $16.67 (the present value of $18).

The net amount left after doing this is $.34, with no cash flows when the options expire.