

Homework Assignment 3

1. Calculating option payoffs: Portfolio 1
 - (A) Graph the gross payoff at expiration and the net profit of the following portfolio of options as a function of the value of the underlying asset.
 - Purchase a call option with a strike price of 45 --- call price = 7.75
 - Sell a call option with a strike price of 50 --- call price = 3.50The gross payoff does not include the cost of the portfolio. It is the value of the portfolio at expiration. Net profit is the payoff minus the purchase price of the options. Assume the options are European and they have the same expiration date. Further assume that the risk-free rate of interest is 0%.
 - (B) Given the current stock price is 45, what beliefs would make this portfolio a good investment. Think about how the investor's beliefs about the mean return of the stock or the variance of the stock's return must differ from the market's beliefs. If an investor's beliefs are identical to the market's then the financial transaction must be a zero NPV investment.

2. Calculating option payoffs: Portfolio 2
 - (A) Graph the payoff at expiration and the net profit of the following portfolio of options as a function of the value of the underlying asset.
 - Purchase a call option with a strike price of 80 --- call price = 15.75
 - Purchase a call option with a strike price of 100 --- call price = 5.09
 - Sell two call options with a strike price of 90 --- call price = 9.41The Black-Scholes formula was used to calculate these option prices. They assume one year until expiration, an annual volatility of 20 percent, a risk-free rate of 5%, and a current stock price of 90.
 - (B) What beliefs would make this portfolio a good investment? Think about how the investor's beliefs about the mean return of the stock or the variance of the stock's return must differ from the market's beliefs.