

Econ 134A Homework 3:

This assignment is due May 12th in lecture. Show your work and intermediate steps (the equations used, the numbers, etc.) and support or explain your answers where appropriate. Put your TAs name on your homework, and be prepared to turn it in to your TA's homework pile.

1. Excel Question: Pick a stock and calculate its Beta. Use the S&P 500 as the market portfolio. When turning in this problem, print only one page from the excel (it should show some data and calculations, along with the final answer). Use at least three years of data. What is the stock's Beta? Intuitively, why should the Beta of your chosen stock be around what you calculated it to be?

General help on this question: finance.yahoo.com is a good source for this data. (You can pick any stock by entering the symbol for that on the very top line on that page: finance.yahoo.com, For example, “^SPX” is the symbol for S&P 500) You can get daily historical prices, and at the bottom of the page, you can download it as a CSV which can be imported into Excel. In Excel, you can calculate the statistical quantities you need either using formulas or the built in functions var() and covar() Make sure to use returns, not prices.

2. Stock C and the market portfolio have the following returns depending on the state of the economy. Note the probabilities are **not** equally likely.

State of Economy	Probability	Return on C	Return on Market
Rapid Growth	.10	.25	.18
Moderate Growth	.20	.10	.20
Normal Growth	.50	.15	.04
Recession	.20	-.12	.00

- a. What is the expected return for Stock C? the Market?
- b. What is the standard deviation for Stock C? For the Market?
- c. What is the covariance between Stock C and the Market? The correlation?
- d. Calculate the value of beta for Stock C.

3. Assume the securities listed below plot on the SML. The standard deviation for the market is 22%. What is the equation for the SML? Fill in the table below:

Security	$E[R_i]$	$\text{Var}(R_i)$	$\text{Corr}(R_i, R_M)$	Beta_i
1	0.07	0.0225		
2	0.14	0.0400		0.80
3	0.10	0.1225	0.60	
4	0.07	0.0000		

4. Harry starts with \$100, lends \$50 to Sally at the risk free rate, and invests the rest in the market portfolio. Sally, meanwhile, starts with \$100, borrows the \$50 from Harry, and invests in the market portfolio. The market portfolio's expected return is 12% and the risk free rate is 4%. The standard deviation of the market portfolio is 22%.
 - a. What returns should Harry and Sally receive on their portfolios?
 - b. What are the standard deviations of the two portfolios?

5. Hudson River Corporations' stock has a beta of 1.132. If HRC is an all equity firm, the risk-free rate is 6% and the market risk premium is 8.5% what is the appropriate discount rate for new projects that have a risk level equal to that of the firm?

6. Helper Industries has an asset beta of 1.20 and wants to know what its equity beta will be at different debt ratios. Assume that the firm can issue risk free debt at 6%, the market risk premium is 8%, and that there are not taxes. Calculate the firm's equity beta and cost of equity at debt ratios from 30% to 60% in 10% increments

7. Hoosic Company has \$285 million of risk free debt outstanding at the same time its common stock is worth \$665 million. Analysis indicates that the firm's equity has a beta of 1.25. Ignore taxes.
 - a. What is the firm's asset beta?
 - b. Hoosic's cost of debt is 6%, same as the risk free rate. The return on the market is 14%. What is Hoosic's WACC? (no taxes)
 - c. Now assume Hoosic pays taxes at a 35% rate. Before tax cost of debt is still 6%, and the cost of equity is now 14.95%. What is the WACC?
 - d. Hoosic has an investment project. The Project costs \$275,000 and will generate an after tax flow of \$34,905 per year forever. Hoosic intends on keeping the debt-equity ratio constant. What is the NPV of this project?

8. Option to Abandon

A piece of equipment can be purchased for \$100,000. It will result in a cash flow for the next five years of \$25,000, and the relevant interest rate is 10%. The corporate interest rate is 34%, and the equipment will be straight-line depreciated over the five year life span.

 - a. what is the annual cash flow from the tax shield?
 - b. what is the NPV of this project?

Now suppose after one year of operation the true level of cash flows from this piece of equipment will be learned. After one year, the equipment will produce a cash flow of \$5,000 with probability .5 or a cash flow of \$45,000 with probability .5. Additionally, the equipment could be sold for \$50,000 after the one year of use. Assume if the equipment is sold the tax shield is totally lost.

- c. Now what is the NPV of this project
(Hint: Figure out what is best to do in each state—sell or continue producing—then calculate the NPV as in the previous question)
- d. What is the value of the option to abandon? (You should just need to do simple arithmetic.)