충남대학교
Chungnam National University

투자론

- *R*과 Excel을 통한 금융데이터 분석 -

13주차
실전연습문제

충남대학교
장호규 교수

Problems

1. Practice Problems for the Entire Semester
2. Data Problems
    1. Optimal portfolio selection & Beta estimation
    2. Bond fund management
    3. Fund performance analysis

충남대학교
Chungnam National University

Unit 01

Practice Problems for the Entire Semester

1. With $10,000 cash, you wish to sell short XYZ stock that is currently priced at $50 per share.

a. If the initial margin is 50%, what is the maximum number of shares that you can short?

b. Assume that you short the maximum and hold the position over a year, at the end of which time you close it out. What is your rate of return assuming:

- Cash balances (including short sale proceeds) invested with your broker earn interest at a rate of 4%
- On the day before you repurchased your shares, XYZ went ex dividend ($1 per share).
- You repurchase your shares at a share price of $53.

2. Consider the following data for two stocks.

State	Probability	Return on 1	Return on 2
Bad	1/3	0.05	-0.05
Average	1/3	0.05	0.18
Good	1/3	0.15	0.18
Expected Return	0.083		
Standard Deviation	0.047		

a. What are the expected return and standard deviation on stock 2?

b. What is the correlation between 1 and 2?

c. Portfolio P is 1/3 in stock 1 and 2/3 in stock 2. What are the expected return and standard deviation of P?

d. Our combined portfolio ($10,000 net worth) is divided 40% in the T-bills (currently paying 5%) and 60% in the portfolio P described in the last question. What are the expected return and standard deviation of our combined portfolio?

3. Suppose that we have two stocks with the following characteristics: $E(r_1) = 10\%$, $\sigma_1 = 10\%$, $E(r_2) = 20\%$, $\sigma_2 = 15\%$, $\rho = 0.2$. A risk-free return of 5% is available in T-bills. A customer walks into our brokerage firm with all of his $10,000 net worth invested in stock 1.

a. Is there **any** portfolio (consisting of stocks 1, 2 and the risk-free security) that we can put him in that will make him better off? What is it? (No short selling of stock is allowed. You don't need to find the **best** portfolio, just a **better** portfolio.)

b. When he looks us straight in the eye and asks us, "One year from now, am I going to regret following your advice?", can we assure him "No regrets, guaranteed."

4. The consensus forecast of security analysts of your favorite company is that earnings next year will be $5.00 per share. The company plows back 50% of its earnings and the Chief Financial Officer (CFO) estimates that the company's ROE is 16%.

a. If your estimate of the company's required rate of return on its stock is 10%, what should be the price of the stock?

b. Suppose you observe that the stock is selling for $50.00 per share, and that this is the best estimate of its equilibrium price, what would you conclude about either your estimate of the stock's required rate of return or the CFO's estimate of the company's return on equity?

c. Suppose you believe your own 10 percent estimate of the stock's required rate of return, what does the market price of $50.00 per share imply about the market's estimate of the company's expected return on equity?

5. Assume that you have a one-year investment horizon and are trying to choose among the four bonds:

	Par	Coupon	Maturity	Duration (yrs)
Bond A	1,000	5%	10	7.9
Bond B	1,000	8%	25	12.2
Bond C	1,000	0	3	3
Bond D	1,000	0	20	20

They yield curve is flat at 7%. Bond C and D have just been issued.

And coupon is paid annually

a. What are the prices of the bonds?

b. If you expect the yield to maturity to remain constant (at 7%) through the end of the year, what are the expected pre-tax returns on the bonds? Briefly discuss.

5. Assume that you have a one-year investment horizon and are trying to choose among the four bonds:

	Par	Coupon	Maturity	Duration (yrs)
Bond A	1,000	5%	10	7.9
Bond B	1,000	8%	25	12.2
Bond C	1,000	0	3	3
Bond D	1,000	0	20	20

c. If you expect the yield to maturity to remain constant (at 7%) through the end of the year, what are your expected after-tax rates of return on each bond (assuming a rate of 30% on capital gains and 35% on ordinary income of coupon payments)? [The after-tax rates of return are computed as simple returns, except we subtract the tax on capital gains and coupon income.]

5. Assume that you have a one-year investment horizon and are trying to choose among the four bonds:

	Par	Coupon	Maturity	Duration (yrs)
Bond A	1,000	5%	10	7.9
Bond B	1,000	8%	25	12.2
Bond C	1,000	0	3	3
Bond D	1,000	0	20	20

d. If the yield to maturity shifts to 6% by the end of the year, what is your after-tax rate of return on bond A (assuming a rate of 30% on capital gains and 35% on ordinary income)?

6. (Use the same information in Question 5) The state lottery commission is setting up a bond portfolio to fund a winner's payoff. The winner (or her estate) is entitled to $1 million per year for the next 20 years.

a. How much should be invested today?
b. What is the duration of the liability (the anticipated payout)?
c. Form a portfolio (specify dollar amounts) from bonds A, B, C and D to achieve target-date immunization.
d. Is the portfolio you set up in (c) unique? If so, indicate why. If not, indicate what considerations might influence your particular choice.
e. Briefly discuss whether immunization is an appropriate strategy in this situation.