Econ 134 - Financial Economics

Nehring   September 30, 2008

Problem Set # 1

To receive credit, your homework has to be handed in on Tuesday, October 7 in class.

Grading: You will be graded mainly for *serious effort* on each of the three problems for a total of 80 points. In addition, you can receive up to 10 points each for *correct answers* on problems 1i), 2iii), and 3iii).

You are responsible for making clear what your answer is; in particular, if the answer is a number or formula, it needs to be $\boxed{boxed}$; Hee Yeul does not have the time to figure out where your answer is hidden. Since most of the score will be allocated according to effort, *very little partial credit* will be given for success. At the end of the quarter, all homework-scores will simply be added up. Make sure to do every single problem set; otherwise, your homework score will suffer substantially.

1. (20) For the following, assume the annual returns on financial investments to be approximately normally distributed. (A table of the normal distribution is available on my web page).

i) Over the period from 1945-1992 (48 years), the annual return on corporate bonds had an average of 6% and a standard deviation of 10%. In approximately how many years during this period did an investment in corporate bonds lose money?

ii) Over the same period, the annual return on the S&P 500 (a portfolio of the 500 largest capitalization stocks) had an average of 11% and a standard deviation of 16%. During the worst five of those years, the annual return was less than (approximately) X % ; X = ?

2. (20) Venkatesh has the opportunity to buy a piece of land for $ 75,000 which he expects to be able to sell at $ 140,000 5 years hence. Venkatesh can borrow and lend at 12% interest p.a.; you can thus assume that the (compound) interest rate over 5 years is 76%.

i) What is the investment opportunity's NPV?

ii) Should Venkatesh buy the land, even if he has no desire to save at all?

iii) If Venkatesh buys the land, what is the effect on his present consumption if he keeps all future consumption unchanged with the help of appropriate borrowing and lending? Compare with i).

iv) What is the maximal price Venkatesh is willing to pay for the land?

3. (40) Hang-Ro has to decide whether to go to law school (L) or work right after graduation (W). Hang-Ro devides her life into two periods, "the present" ("0") and "the future" ("1"). She is so enthusiastic about financial calculations that in her decision-making she ignores everything else. Her income (in $ 1000) is as follows: if she works right away, she will earn 39 in each period. On the other hand, if she goes to law school, her income is 23 in period 0 and 65 in period 1. Her utility is given by $u(c_0,c_1) = c_0 c_1$.

(Reminder: the indifference curves associated with this utility-function have the form $c_1 = u/c_0$. Hint: in the case of a linear budget set, it is optimal with these preferences to allocate half of the present value of her income stream to present consumption and half to future consumption; this hint is helpful not just in situation I !)

Situation I: Hang-Ro can lend and borrow at 30% interest.

Work out the following, computing magnitudes to one digit of precision (e.g. 100/3 = 33.3):

i) the budget sets (graphically) with appropriate slopes and present and future values of the income

ii) her optimal consumption plan , as well as

iii) the amount of saving or borrowing necessary to finance this consumption plan.

iv) the highest achievable utility with appropriate borrowing or lending from L and from W.

v) her optimal career decision between L and W.

vi) Did you in fact need to know something about her preferences to determine her optimal career decision; explain briefly.

Situation II: Hang-Ro can lend freely at 50% and borrow up to 3('000) dollars also at 50% interest.

i) Do you now need to know something about her preferences to determine her optimal career decision; explain briefly.

ii) Which is her optimal career decision now?