

Supplement to Assignment #5: Capital Theory

Problem Set 5 is due at 11:00 AM on Friday, October 12th.

The Internal Rate of Return (IRR) is an important concept for capital theory and financial calculations. The information on the back of this page about the IRR is from Mansfield & Yohe, *Micro Economics*

Exercise 4: You have the unique opportunity to invest \$100,000 in farmland that will yield you \$1,000 rent for ever more. What is the internal rate of return on this investment? If you can borrow from the bank at 7% interest, should you undertake the investment? Should you invest if you feel that you should get a 4% risk premium – i.e., your required rate of return is the bank rate plus 4%?

Honors Option: Suppose you want to start a restaurant business. You estimate it will cost \$70,000 to start the business and expect to net the following income in the first five years: \$12,000, \$15,000, \$18,000, \$21,000, and \$26,000. What is the internal rate of return on your investment? Suggestion: You may want to solve this problem using a PC rather trying to find the answer analytically.

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Notes about cutting the forest and semi-log graphs.

If one obtains a return of  $r\%$  on an investment of amount  $A_0$  at time 0, the value of your investment in year  $t$  will be:

$$A_t = A_0(1+r)^t.$$

Or in continuous time,  $A(t) = A(0)e^{rt}$ .

If you plot either function it will look something like the bottom curve from investing only in the bank on figure 11.1B, p 208 of Varian.

In plotting a graph of wealth against time it is useful to use a “semi-log” graph; i.e., plot the log of  $A(t)$  because the relationship will be linear:  $\ln A(t) = \ln A(0) + rt$ . The slope of the line is  $r$ .