

Econ 134A Homework 1:

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

1. Excel and NPV

In a slight change from the lecture notes, Investment one will pay \$150 a year for four years. Investment two will pay \$600 at the end of the fourth year. Both of the investments can be 'bought' for \$400.

- a). Draw the timelines with all cash flows (including the purchase) for both investments.
- b). Using Excel (or a similar spreadsheet), determine the interest rate (to the nearest tenth) where the two investments have an equal NPV.
- c). For both projects, give the interest rate (again, to the nearest tenth) such that the project has a NPV of exactly 0.
- d). If the interest rate were 10%, which projects would you accept? What if you could only accept one?

2. NPV and Interest Rates:

Suppose you were just considering investment one from the above problem. You have already (using pencil and paper) determined the NPV of the project at an interest rate of 10% (part d). Now suppose the interest rate of 10% you assumed turns out to be too low.

- a). Will the NPV of project one increase or decrease if you use the new higher interest rate?
- b). Intuitively, why will the interest rate move in that way?

3. Multi-period Exercise

- a). Given the SAIR, compute the EAIR for monthly compounding:

1%	2%	5%	10%	20%	30%	50%

b). What is the interest on the interest for each of these interest rates? (that's the difference between the number you obtained and the number you'd get for simple interest). Why do you get more than 10 times the interest on interest for the 10% over the 1% case?

c). Given a SAIR of 16%, complete the following table:

Period	EAIR
Annual	
Semi-Annual	
Quarterly	
Monthly	
Daily (365 days)	
Continuous	

4. An investment offers cash flows of \$300, -\$200, -\$125 each year starting at time 0. At a market interest rate of 15%, is this a good investment? What interest rate makes the investment worth \$0? (You'll need the quadratic equation to answer that)

5. A firm invests \$3 million in a project which will yield a perpetuity of \$1 million per year. What is the discount rate r for which this project's NPV is \$1.5 million?

6. You would like to start saving for your daughter's college education. Eighteen years from now your daughter will embark on a four-year undergraduate program at a private university. At the beginning of each of the four years you expect to pay \$25,000 in college related expenses.
 - a. How much should you save each month for the next 18 years in order to have enough funds in the bank to pay all four years of expenses when they arise? Assume the stated annual interest rate is 9% per year.
 - b. How much would you have to save each month if you continued to save, while your daughter was in school, until you pay the last \$25,000?

7. A banking firm is offering a bond that has a quarterly payment of \$50 in perpetuity. The first payment will be in three months. What is the price of the bond if the SAIR is 8% compounded quarterly?
8. A new piece of equipment can be purchased for \$50,000. The equipment will result in increased cash flows of:

Year	Cash Flow
1	\$10,000
2	\$12,500
3	\$12,500
4	\$15,000
5	\$10,000

The interest rate is 10%. What is the NPV for this investment? Should the equipment be purchased?

9. A bank offers two different rates for the interest in its savings accounts. The first is 6%, compounded monthly, and the second is 6.15%, compounded quarterly. Which offer gives the highest return?
10. An Alaskan company has received a franchise, in perpetuity, to build a pipeline from Alaska to Southern California. The pipeline will transport fresh melted glacier water to thirsty residents of the Golden State. The project will take nine years to complete at a cost of \$24 million per year. Water will start flowing nine years from now, and the first water bill will be due 12 months later. The company assumes that it can raise water rates by 4% per year. The interest rate is 8%.
- Draw a timeline of payments, calling the first year's payment C , and include at least three years of payments.
 - What is the minimum first year's payment that will allow the company to just break even?