SPEA V401 – Financial and Cost-Benefit Analysis, Srping 2024

Homework #2

**Due Wednesday, 2/14**

**Please show all of your work.** You will not receive full credit for a correct answer without work. In addition, partial credit cannot be awarded for incorrect answers without work shown. Showing your work means using the formulas we have learned in class. Using built in Excel finance formulas does not count as complete work. You may solve these problems by hand with pen and paper or using Excel (or a combination). If you use Excel, be sure to format your document so it is labeled and well-organized document

All dollar values are REAL unless otherwise specified.

1. You have a child that is 6 years old, and would like to start saving up for their college education. You would like to be able to pay $24,000 a year for four years of college starting 12 years from now (when the child turns 18). How much do you need to save annually over the 12 years to meet your goal, if you can earn a real annual return of 3.5% on your college savings account?
2. An investment costs $2400 up front, but won’t start paying off until three years from now, at which time it will return $310 per year for a period of ten years. If your real hurdle rate is 7%, does this investment make sense?
3. After graduating from IU, you are hired by a company that offers a 401(k) retirement plan. You would like to save enough in this plan so that when you retire in 55 years you have an account balance of $2.1 million. You plan to make monthly contributions, and expect a real annual return of 6%, compounded monthly. How much should you deposit each month to reach your goal?
4. The company you work for is trying to decide between two projects. Project 1 costs $160,000 up front, and has an expected life of 4 years, over which it will return $52,000 each of the four years. Project 2 would last for 20 years, costs $1.5 million up front, and returns $170,000 at the end of each of the 20 years. Assuming a real discount rate of 6%, which project has the higher equivalent annual net benefit?
5. You are offered $1600 (in nominal dollars) 7 years from now in exchange for a loan of $600 today. You expect inflation to run 2% per year, and your real hurdle rate is 5.5%. Should you make the loan?
6. You would like to have $20,000 (in real $) in an account 8 years from now. If the inflation rate is expected to be 3%, and you expect a nominal return of 5% on the account, how much would you need to put in today?
7. You take out a loan for $16,000 to buy a car that has equal nominal monthly payments over the next seven years. The real annual rate of return on the loan is 3%, and the inflation rate is 1%. What will the monthly payments be?
8. You have $600 to invest, and are choosing between two projects, both of which cost $600 up front and will yield six years of returns. The returns for the first investment will be $150 (in nominal $) per year. The returns for the second will be $120 (in real $) per year. If your real hurdle rate is 5% and the expected inflation rate is 2.5%, which of these investments should you choose (if any)?
9. You are analyzing a proposed project to renovate a local public recreation center. The project will cost $500,000 up front. It is expected that the value of the benefit to the community will be $35,000 (in nominal $) per year for 20 years. You and your team are unsure what discount rate would best proxy for the county residents time preferences and are unsure what future inflation will be. You have decided to test the sensitivity of the results to using the CBO’s recommended discount rate (2%) and the OMB’s recommended discount rate (7%). In addition, you’ve decided that expected inflation should fall somewhere between 2% and 5% annually. Perform a best and worst case sensitivity analysis. Based on this analysis do you think the county should move forward with this project?