Assignment 4 – CRP 566

Part one: Discounting vs. Future Value Determinations.

This part of the assignment allows you to assess two very basic benefit cost considerations. One is an elemental set of scenarios (Part A), and the second is a slightly more complicated set of benefit cost compilations (Part B). This spreadsheet can be downloaded from the assignments portion of the class website. But before you do those assessments, I want you to answer the following questions to give you some practice in thinking about the future and the past, monetarily that is. This will be graded as part of the assignment.

Given that we can calculate the present value of a future sum with this formula:
\[ PV = \frac{FV}{(1+r)^t} \]
or the future value of a present amount with this formula:
\[ FV = PV \times (1+r)^t \]
or the compounded rate of change between two numbers over time with this formula:
\[ \left( \frac{\text{Current Number}}{\text{Previous Number}} \right)^{\frac{1}{t}} - 1 \]
Where:
- \( PV \) = Present value
- \( FV \) = Future value
- \( r \) = rate
- \( t \) = time (in years, here)

Answer these questions:

1. This year (2015) I will make $92,200 working for the two universities. Assuming that inflation will average 2.4 percent per year for the next 10 years, what must my pay be in 5 years and in 10 years to have the same purchasing power as I have today?

   5 years $________________
   10 years $________________

2. In 1983 I made $19,900 in my first professional job with a graduate degree. What would be the comparable value in 2015 for a similarly educated planner – the value that had the same purchasing power – assuming that the compounded average rate of inflation over that 32 year intervening period was 2.75 percent?

   2015 equivalent planner’s pay $________________

3. OK. Now that we know that I made $92,200 in 2015. What is the compounded average annual rate of pay increase that I realized over the past 32 years?

   Annual average compounded gain _________________%

4. If you made the same amount in 2015 (after adjusting for inflation) as I did in 1983 in your first planning job, and you were able to realize exactly the same rate of gain as I did in question 3, what would be your annual pay in 15 years?

   Your annual pay in 15 years $________________
Now go to the spreadsheet.

For Spreadsheet Part A. This is an elemental/hypothetical benefit costs analysis. You need to calculate the present value of the benefits considering two discount rates: 5 percent, 5.5 percent and 6 percent. We already know the present value of the costs.

- You need to fill in all of the missing values – those that are in the boxes – to come up with estimates of the present value of costs and the present value of benefits.

- Answer these questions:
  a. At which discount rate is Option 1 feasible? _____________
  b. At which discount rate is Option 2 feasible? _____________
  c. Now, assume that Option 1 and Option 2 are competing proposals. Only one of the two can be funded. Based on traditional cost benefit choice criteria, which proposal should be funded? _____________
     Why? _______________________________________________________________________

For Spreadsheet Part B. This is a summary of a set of benefit-cost calculations based on expanding a portion of a state highway in Iowa from a two lane to an “improved” two lane with turning lanes and periodic passing lanes on hills and by-passes around communities. This plan was actively lobbied for by the towns along this route as necessary for their future economic growth.

- You need to calculate the net present values of the sum of all of the costs and the sum of all of the benefits in this spreadsheet using 4.3 percent as the statutorily-set discount rate.

- You need to compute, using the appropriate excel formula, the net present values of both costs and benefits at 3%, 3.5%, 4.0%, 5.0% and 5.5%, as well.

- You will compile a table that includes total benefits, total costs, net benefits, and benefit cost ratios for the set of discount rates.

- Answer these questions:
  a. Given your calculations, at which discount rate(s) is this project feasible from a benefit / cost perspective?
  b. Write one or two paragraphs on this: Given your analysis, what would you tell city leaders along this roadway about the efficiency of the project and the likelihood of state funding for it?

Note: Submit your answers for all of the components of Part B in a Word Document, to include any supporting tabular information. Send your spreadsheet along as well if you wish.