

## ***Excel Assignment #2***

**This assignment is for credit and therefore you cannot work or discuss it with other groups. Any such incident will be considered an academic misconduct (plagiarism). The only person you can work with is your group member (if you have one). If you have any questions, please email me.**

***The assignment is based on Problem #18 at the end of chapter 7 in the book. **Work through that problem first and that will help you understand the assignment better.*****

### **NPV Profile**

A gold miner is considering investing in a new mine in South Africa. Gold mining is an industry with many unknowns. As such, the miner has developed ranges for several variables. Gold in South Africa is buried very deep, so the mine will require an initial investment of between \$200 and \$300 million (increment by \$10 million). Once this investment is made, the mine is expected to produce revenues of between \$20 and \$40 million (increment by \$1 million) per year for between 10 to 30 years (increment by 1 year). It will cost between \$5 to \$15 million (increment by \$1 million) per year to operate the mine. After the useful life of the mine, the gold will be depleted. The mine must then be stabilized on an ongoing basis, which will cost between \$5 and \$15 million (increment by \$1 million) per year in perpetuity. You are required to plot the NPV as a function of the two discount rate spin buttons. In other words, calculate NPV for all discount rates between the minimum and maximum and plot those values. That's called the NPV profile. The spin button for the Minimum Discount Rate should go from 1% to 5% (increment by 1) and the Maximum Discount Rate should go from 20% to 25% (increment by 1). Create an Excel sheet that shows two tables, one graph, and includes all the features shown in the picture below:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
				0	1	2	3	4	5	6	7	8	9	10
1														
2	<b>Cash Flows:</b>													
3	Initial Cost:	\$ (250,000,000)		\$ (250,000,000)										
4	Annual Revenue	\$ 30,000,000			\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ 30,000,000
5	Minus Annual Cost	\$ 10,000,000			\$ 10,000,000	\$ 10,000,000	\$ 10,000,000	\$ 10,000,000	\$ 10,000,000	\$ 10,000,000	\$ 10,000,000	\$ 10,000,000	\$ 10,000,000	\$ 10,000,000
6	Profit	\$ 20,000,000			\$ 20,000,000	\$ 20,000,000	\$ 20,000,000	\$ 20,000,000	\$ 20,000,000	\$ 20,000,000	\$ 20,000,000	\$ 20,000,000	\$ 20,000,000	\$ 20,000,000
7	Number of years until mine is depleted	\$ 10												
8														
9	Perpetual annual expense after mine is depleted	\$ (5,000,000)												
10														
11	Minimum discount rate	1%												
12	Maximum discount rate	20%												
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														

  

Discount Rate	NPV
1%	-\$513,217,387
2%	-\$275,435,375
3%	-\$203,411,596
4%	-\$172,227,606
5%	-\$156,956,627
6%	-\$149,331,157
7%	-\$145,839,033
8%	-\$144,747,965
9%	-\$145,114,113
10%	-\$146,385,822
11%	-\$148,223,745
12%	-\$150,411,091
13%	-\$152,805,452
14%	-\$155,311,395
15%	-\$157,864,118
16%	-\$160,419,313
17%	-\$162,946,674
18%	-\$165,425,620
19%	-\$167,842,418
20%	-\$170,188,198

  

**INSTRUCTIONS AND USEFUL HINTS:**

1. Assume the annual revenue and cost occur at the end of the year.
2. The attached picture shows calculations when the mine depletes at 10 years. The number of columns will change with the change in the time to depletion. For example, while a 10 year depletion should show 10 columns for years, a 30 year depletion should show 30 columns.
3. Imagine you are constructing this table for a client and so presentation is an important aspect. The table size has to vary with the input parameters. (Hint: The IF statements are helpful in adjusting the table size). Points will be deducted for work that is not presented professionally.
4. The inputs are listed in the picture: initial cost, annual revenue, annual cost, number of years until mine is depleted, perpetual annual expense after mine is depleted, maximum discount rate, and minimum discount rate. The user should be able to change any of these parameters and the numbers in the tables and the graph should change accordingly. In other words, both the table and the graphs should be dynamic.
5. Use the skills you acquired while working on the 1<sup>st</sup> assignment to create the graph and tables. Points will be deducted if the table or the graph is not dynamic.
6. Notice the buttons next to the Input parameters. They are called the “Spin Buttons”. You are required to figure out how to construct these buttons. The user should be able to use these to change the input parameters.
7. You are dealing with a perpetuity with this assignment. You will use both the NPV and PV formulas in Excel in finding the NPV for each discount rate.

**Important instructions for submission:**

As I said before, think of this as a project you are doing for a client. I expect everyone to be professional and follow a certain procedure while handing the project over to the clients. Therefore, make sure you follow the submission instructions listed below. If you have any questions, we can discuss them in class. **I will deduct 10% points for every submission instruction (listed in A, B, & C below) that you ignore. Read part D below for policy on late submissions.**

- A. You should have TWO tables and ONE graph in the spreadsheet. This is a group assignment and you are required to turn in only one assignment per group via email.
- B. When you send me the email ([sjatega@siue.edu](mailto:sjatega@siue.edu)) make sure to CC the other group members and also CC my Teaching Assistant, Gideon Sampson, at [gisamps@siue.edu](mailto:gisamps@siue.edu)
- C. Make sure first names of all group members appear in the Excel Filename **AND** your FULL names appear inside the Excel file at the top.
- D. **The Assignment is due at 11.59 PM on March 28<sup>th</sup>, 2021.** Late submissions will be accepted till 11.59PM on March 30th, but will be PENALIZED 50% of the score. Assignments submitted after that will receive a zero. I will go by the time listed on the email that I receive. Please avoid excuses such as "I emailed before the deadline but it was delivered late." Just make sure you email the assignment well before the deadline.