## Review Classmates: Module 3 Assignment

Review by August 3, 11:59 PM PDT

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The rule of IRR and NPV in the company



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Question 1

Explain why is it that a company that takes all projects that have positive NPV will end up maximizing shareholder value. Why is market efficiency an important condition behind the equivalence of NPV and shareholder value maximization ? (1 paragraph)

A company that opts for projects with positive NPV will ultimately maximize shareholder value because a reduction in the NPV result in cash for the project. Market efficiency is an important condition behind the equivalence of NPV and shareholder value maximization because discount purchase price of shares of cash flow to the company if markets are efficient. Stock price is related to market efficiency for this reason that if markets are not efficient , stock prices may not reflect the net present value of a new project . Both NPV and share prices are mathematically equivalent .

See the Review Criteria section of the Instructions tab for details, then allocate points for Question #1 below.

* **10 pts - 10 points for a reasonable answer that is based on the arguments that we discussed in the lectures**
* 5 pts - 5 points for an incomplete answer or a correct answer that is too long (longer than 1 paragraph)

Question 2

Does the NPV rule (take all positive NPV projects) guarantees that a company will make socially responsible investments ? You may need to recap lecture 1 to answer this question. (1 paragraph)

NPV is only a maximization of shareholder value and therefore the NPV does not guarantee that companies are doing the best for the company because of potential conflicts. Otherwise, it can lead to conflicts with society and stakeholders. For example, outsourcing of manufacturing pollution or the low price of the technology reaches that maximizes the NPV can be bad for the environment. To be a socially responsible company , you must pass on positive NPV projects. VAN does not guarantee that you will remove , abolish conflicts with society.

See the Review Criteria section of the Instructions tab for details, then allocate points for Question #2 below.

* **10 pts - 10 points for a reasonable answer that is based on the arguments that we discussed in the lectures**
* 5 pts - 5 points for an incomplete answer or a correct answer that is too long (longer than 1 paragraph)

Question 3

What is the present value of a growing perpetuity that generates a cash flow of 35 next year and grows at a rate of 7% a year forever, if the discount rate is 5% a year? (Hint : it is not a negative number !)

* NPV= 35/ (5% - 7%) = -1750
* This does not make sense….Asset seems very big.
* The answer is infinity ∞

See the Review Criteria section of the Instructions tab for details, then allocate points for Question #3 below.

* **10 pts - 10 points for figuring out what is the NPV**
* 5 pts - 5 points for an incomplete answer

Question 4

Explain why the IRR rule (take projects with IRR greater than the discount rate) is equivalent to the NPV rule (take projects with positive NPV). What are the conditions that you need to check to make sure that you can compute IRR ? (1 paragraph)

The IRR rule is equivalent to NPV rule because if the IRR is bigger than discount rate, then the NPV is positive. However IRR should not be computed if you see a negative cash flow following a positive cash flow.

The conditions are about to be aware or careful when using IRR to compare two different investments

See the Review Criteria section of the Instructions tab for details, then allocate points for Question #4 below.

* **10 pts - 10 points for a reasonable answer that is based on the arguments that we discussed in the lectures**
* 5 pts - 5 points for an incomplete answer or a correct answer that is too long (longer than 1 paragraph)

Question 5

Leather Goods Inc. wants to expand its product line into wallets. The required initial outlay is $700,000. They expect to sell 150,000 units per year, and their planning horizon is 5 years. The price of wallets is estimated to be equal to $12 for the entire period, and the costs of production are $9 per unit for the entire period. However, the company expects the wallet project to erode $200,000 of the yearly sales of the existing products of the company. In addition, they estimate that competitors, who produce similar wallets, will erode $100,000 of the firm’s current sales if the wallet project does not go through. If the wallet project does go through, erosion from competitors is going to be equal to 50,000. Assume no salvage value (the project is worth zero after the end of 5 years), no taxes, no working capital and straight line depreciation. Draw a time line with the relevant cash flows for the wallet project. There is no need to compute IRR or NPV.

* Wallet cash flows = 3$ \* 150,000= $450,000
* Initial outlay = 700,000

Are these cash flow?

|  |  |
| --- | --- |
| Time | A |
| 0 | -$700,000 |
| 1 | +$450,000 |
| 2 | +$450,000 |
| 3 | +$450,000 |
| 4 | +$450,000 |

The incremental cash flows includes: new and old.

The new project creates erosion. It means sales of existing product will decrease, cash flow down by $200,000.

We will work on competitors and produce a similar wallet, and erode sales.

* Old (no wallet project) New (wallet project)
* Wallet cash flows = 0 wallet cash flow = +450,000
* Erosion of existing cash flows = 0 Erosion of existing cash flows= -200,000
* Erosion of existing cash flows Erosion of existing cash flows from
* From competitors = -100,000 Competitors = -50,000

Wallet project reduces erosion from competitors.

* Old – New
* Wallet cash flows = + 450, 000
* Erosion of existing cash flows= -200,000
* Erosion of existing cash flows from competitors = +50,000
* Incremental cash flow = 300,000

So the cash flow are:

|  |  |
| --- | --- |
| Time | A |
| 0 | -$700,000 |
| 1 | +$300,000 |
| 2 | +$300,000 |
| 3 | +$300,000 |
| 4 | +$300,000 |

See the Review Criteria section of the Instructions tab for details, then allocate points for Question #5 below.

* **10 pts - 10 points for the correct cash flows**
* 5 pts - 5 points for an answer that is partially correct.

Question 6

You are considering whether to enroll in a full time MBA at an annual after-tax cost of 200,000 including tuition and all living expenses. The program lasts two years. You estimated that after the program ends, you will be able to increase your lifetime, after-tax earnings by 700,000. Is the MBA a positive NPV investment for you?

Is the MBA a positive NPV investment for you? This question is related to what you are missing in term of opportunity.

And we may ask this question: what is the NPV of a full time MBA?

* Total cost = 400,000
* Present value of increase in lifetime = 700,000
* But the NPV is not 300,000
* Opportunity cost: to do a full time MBA, you may need to quit your job.

See the Review Criteria section of the Instructions tab for details, then allocate points for Question #6 below.

* 10 pts - 10 points for for a reasonable answer that is based on the arguments that we discussed in the lectures
* **5 pts - 5 points for an incomplete answer**

Question 7

You work for a pharmaceutical company that is developing a new drug to reduce cholesterol. Based on current information, the drug’s NPV is estimated to be 200 million dollars. You are trying to decide whether it is worth undertaking additional research before launching the drug. Specifically, you want to find out whether the drug can also be sold to pregnant women. Right now the drug is not approved to be used for that group. This R&D will cost 10 million dollars, and will last for one year. If the research turns out to be positive, you can increase the drug’s NPV to 250 million (in one year). But if the research turns out negative results you have to go back to the original plan. In that case the NPV of the drug is still 200 million (next year). The probability of success is 30%, and the discount rate is 10%. Should you launch the drug today, or should you do additional research and wait until next year?

R&D causes you to wait before launching the drug. Is it worth to do the R&D and wait?

* Waiting will cost 10M (R&D cost), and reduce the NPV if the research is not successful. It concern the trade-off.
* So if you launch today, the NPV= 200
* R&D + Launch tomorrow

30% Success – NPV= 250

10M

Investment 70% Failure – NPV = 200

* NPV= -10+ (30%\*250+70%\*200) / (1+10%) = 185.45

So since the NPV of R&D + Launch tomorrow is low, the right decision is to launch today and not do additional research.

See the Review Criteria section of the Instructions tab for details, then allocate points for Question #7 below.

* **20 pts- 20 points for a complete answer that is correct. To get 20 points the student should set up the decision tree correctly, and calculate the correct NPV**
* 15 pts - 15 points for a good answer that has calculation mistakes. For example if the student sets up the right decision tree but makes a calculation mistake to get the NPV
* 10 pts - 10 points for an incomplete answer

Question 8

Consider the gold mine problem we discussed in the lecture notes. Your task is to show that if the cost of closing the gold mine is zero (we called this cost the “decomissioning cost”), then it will never make sense to wait a year to get more information about gold prices. There is no need to do math, a logical argument should suffice. But you can do math if you would like to.

* If the cost of abandoning a project is zero, then you would never wait. What is the benefit of abandoning a project?
* If the benefit of abandoning a project is zero, then it will never wait and you can avoid a loss. Therefore, the main benefit of waiting is to be able to achieve a zero profit if the gold price goes down.
* If the cost of closing the mine is zero, you can easily figure out that you can eliminate the loss if you open now and close tomorrow. Instead of a loss, here you get a zero and also get a current profit and in addition a good state of the world. A company will never wait. Therefore you can also achieve a payoff of zero if you open today and close tomorrow in the bad state of the world.

See the Review Criteria section of the Instructions tab for details, then allocate points for Question #8 below.

* **10 pts - 10 points for a reasonable answer that is based on the arguments that we discussed in the lectures**
* 5 pts - 5 points for an incomplete answer

Question 9

Explain why the option to wait is more valuable when investments are irreversible. (1 paragraph)

Irreversible investment are very costly to quit, abandon. Once a company invests, it is hard to go back if cash flows turn out to be lower than expected. Thus it may be better to wait for more information before committing cash to an irreversible investment.

See the Review Criteria section of the Instructions tab for details, then allocate points for Question #9 below.

* **10 pts - 10 points for a reasonable answer that is based on the arguments that we discussed in the lectures**
* 5 pts - 5 points for an incomplete answer or a correct answer that is too long (longer than 1 paragraph)