PROJECT APPRAISAL AND INVESTMENT ANALYSIS

SENSITIVITY ANALYSIS

Romaisa Khan

SENSITIVITY ANALYSIS

- Sensitivity analysis is a technique which allows the analysis of changes in assumptions used in forecasts. As such, it is a very useful technique for use in investment appraisal.
- Sensitivity analysis is also called “what if analysis”
- Sensitivity analysis is the assessment of the impact for an output of a system by changing its inputs.
- It does not directly measure risk and it is limited by only being able to examine the effect of a change in one variable, while the others remaining constant, an unlikely occurrence in practice

SENSITIVITY ANALYSIS

Sensitivity analysis allows to evaluate how the resulting performance of the project at different values of given variables required for calculation. This type of analysis to determine the most critical variables that have the greatest affect on the feasibility and effectiveness of the project.

For example, sensitivity analysis can be used to study the effect of a change in interest rates on bond prices if the interest rates increased by 1%. The "What-If" question would be: "**What** would happen to the price of a bond **If** interest rates went up by 1%?". This question can be answered with sensitivity analysis.

SENSITIVITY ANALYSIS

Assumptions Used in Business Forecasting

There are many examples of where assumptions need to be made by management as they prepare important business forecasts: for example:

Cash-flow forecast

- Timing of cash inflows and outflows
- Amount of cash inflows and outflows
- Receivables & payables days

Budgeted Profit

- Sales volumes and unit selling prices
- Gross profit margins & overheads

SENSITIVITY ANALYSIS

Investment Appraisal

- Timing and amount of project cash flows
- Period over which project will run
- Amount of initial investment

Breakeven Analysis

- Average selling prices and variable costs
- Fixed costs by category and total

SENSITIVITY ANALYSIS-EXAMPLE

In budgeting process there are always variables that are uncertain such as

- Interest rate
- Inflation rate
- Operating expenses
- Future tax rates

So sensitivity analysis answers the questions

“if these variables deviate from expectations , what will be the effect and which variable is causing as largest deviation”.

TYPES OF SENSITIVITY ANALYSIS

- **Partial sensitivity analysis** the most commonly used approach, uses alternative values for individual key parameters. This is frequently applied to discount rates. That is, use several different discount rates and see if these alone will have a positive/negative impact on the NPV.
- **Best case and worst case scenarios:** Best and worst case scenario establish the upper (best-case) and lower(worst-case) boundaries of a cost benefit study's result.

SENSITIVITY ANALYSIS

This type of sensitivity shows how a broad range of a program or a policy's possible outcome effect the bottom line.

Best case analysis

Used all the most favorable assumptions

Worst case analysis

Used all the least favorable assumptions

SENSITIVITY ANALYSIS

Break even Analysis:

If you are unable to estimate a policy's most likely effects or cannot find comparable studies to help determine its best case or worst case scenarios then we can use break even analysis.

$$\text{Break Even Point (in units)} = \frac{\text{Fixed costs}}{\text{Selling price - variable costs}}$$

SENSITIVITY ANALYSIS

Key Points About Sensitivity Analysis

- Allows key assumptions to be changed to analyse effect
- Helps judge the degree of risk (e.g. in an investment project).
- Recognizes that there is no such thing as an accurate forecast.
- Considers **one variable or assumption at a time.**

SENSITIVITY ANALYSIS

Benefits and Drawbacks of Sensitivity Analysis

Benefits:

- Identifies the most significant assumptions (which therefore require closer attention).
- Helps assess risk and prepare for a less-than-favorable scenario.
- Helps make the process of business forecasting more robust.

SENSITIVITY ANALYSIS

Drawbacks:

- Only tests one assumption at a time (many assumptions may be linked).
- Only as good as the data on which forecasts are based.
- A somewhat complicated concept – not understood by all managers.

SENSITIVITY ANALYSIS – PROJECT MANAGEMENT

- Sensitivity analysis is a good technique for forecasting the attention of management on critical variable and showing where additional analysis may be beneficial before finally accepting a project.
- The NPV of a project is based upon the series of cash flows and the discount factor. Both these determinants depend upon so many variables such as sales revenue, input cost etc.
- If any of these variables changes, the value of NPV will also change. It means that the value of NPV is sensitive to all these variables.

SENSITIVITY ANALYSIS – PROJECT MANAGEMENT

Sensitivity Analysis helps in identifying the different variables having effect on the NPV of a proposal.

It helps in establishing the sensitivity or vulnerability of the proposal to a given variable and showing areas where additional analysis maybe undertaken before a proposal is finally selected.

If a company is to operate in a highly competitive market, with many rivals, sales volumes and price will be critical variables and hence, one would like to assess how sensitive the project is to changes in sales volume or price

SENSITIVITY ANALYSIS – INTEREST RATE

Interest Rate:

When you borrow money from someone. Or use somebody else's money. You have to pay service charge to him. This amount is paid back to the lender along with the original amount borrowed.

This sometimes known as the cost of money which does not belong to you, but you have used it.

The extra amount on loan which we paid back is know as interest.

SENSITIVITY ANALYSIS – INTEREST RATE

Simple interest:

Interest paid or earned on only the original amount or principle, borrowed.

The formula for calculating simple interest rate is:

$SI=Po(i)(n)$

SI= simple interest rate

Po= principal amount

i= interest rate

n= number of years

SENSITIVITY ANALYSIS – INTEREST RATE

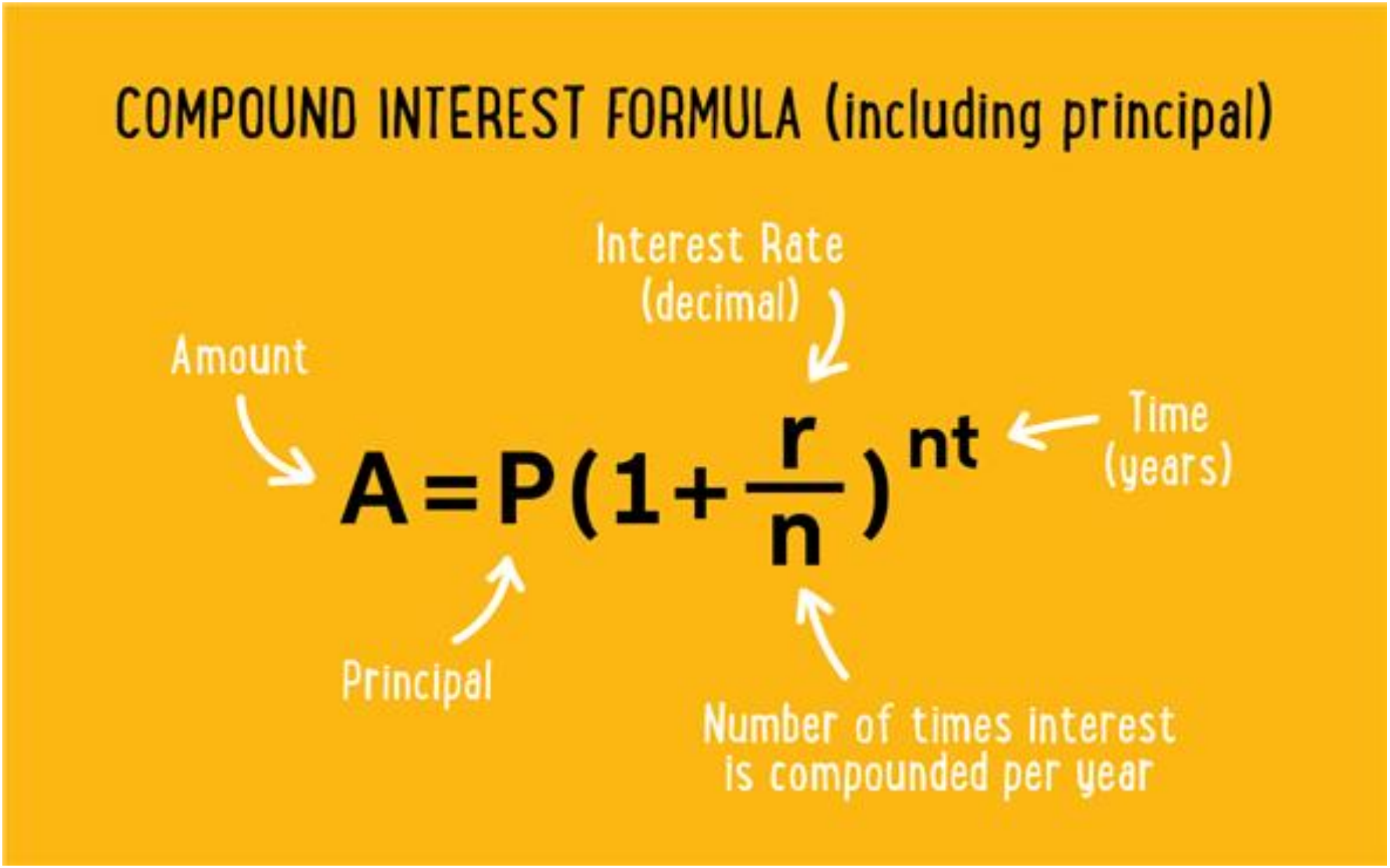
Compound interest rate

Interest paid on any previous interest earned as well as on the principal borrowed.

Compound interest is the addition of interest to the principal sum of a loan or deposit, or in other words, interest on interest. It is the result of reinvesting interest, rather than paying it out, so that interest in the next period is then earned on the principal sum plus previously accumulated interest.

The compounding may be Yearly, half yearly, Quarterly, monthly, Weekly ,daily.

SENSITIVITY ANALYSIS – INTEREST RATE



SENSITIVITY ANALYSIS

Why time is an important element in decision?

The answer of this question is “Decision making time is an important issue for the successful outcome of the decisions. Timing of the decision is important since it allows decision maker to visualize various elements needed for the decision and helps the decision making more coordinated with critical key points considered while making the decision”.

REFERENCES

https://corporatefinanceinstitute.com/resources/knowledge/modeling/what-is-sensitivity-analysis/