

A Comparison of Similarities, Differences and Conflicts Between NPV and IRR

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Abstract. The primary goal of using the IRR is to understand the discount rate which has an implication on the present value. It makes the present value of the sum of yearly nominal cash incomes equivalent to the initial net cash layout of the investment. IRR is considered one of the most ideal methods for identify an expected return with a specific business venture. In that case, it is closely related to the Compound Annual Growth Rate. The IRR can suitable be used when estimating the possible advantage or disadvantage of opening a new venture versus expanding the existing operation to achieve a higher level of efficiency. With that, a business can understand what is the most efficient step to make in ensuring the success of the business overall. In NPV, the present value is calculated through discounting a venture's future cash flows at cut off rates that are predefined while IRR cash flows get discounted through trial-and-error methods that are equal to NPV.

1. Definition

1.1. NPV

In simple terms, Net Present Value refers to the negative and positive future cash flows over the entire life cycle of a particular project as it is discounted at the current date (Osborne 2010). NPV mainly represents and intrinsic appraisal and also bears capability in finance and accounting where it aims at determining the overall security of a particular investment (Kelleher & MacCormack 2004). It is also used with an aim of valuing a business, assessing a new venture in a business or looking for ways to make the business more efficient by reducing cost. Below in figure 1 is the formula for NPV.

$$NPV = \text{Cash flow} / (1+i)^t - \text{Initial Investment}$$

Where:

i = Required Return on Discount Rate

t = Number of Time Periods

1.2. IRR

IRR on the other hand is a metric that is commonly used in capital budgeting. The main use of the method is to estimate the possible profitability of a business venture, either a new venture of an existing business or an entirely new business (Magni 2020). The IRR is used in a form where it is equated to the NPV at a cash flow of zero. Below in figure 2 is the formula for IRR.

IRR Formula

$$R1 + [(NPV1 \times (R2 - R1)\% \div (NPV1 - NPV2)]$$

Where

R1 = Lower discount rate

R2 = Higher discount rate

NPV1 = Higher Net Present Value (derived from R1)

NPV2 = Lower Net Present Value (derived from R2)

2. Differences

In NPV, the present value is calculated through discounting a venture's future cash flows at cut off rates that are predefined while IRR cash flows get discounted through trial-and-error methods that are equal to NPV.

NPV recognizes the emerging cost of capital while IRR doesn't place much consideration on the Interest Rates. The NPV obtains the amount that is preferred as an investment amount and which is required to invest in a project with consideration of present market rates. The IRR does not however, place emphasis on interest rates that are currently prevailing in the market (Osborne 2010). The main purpose of the IRR is to provide information on the minimum amount of money that could be invested into a project so as to encourage returns from the amount that may have been invested into the project. The IRR in simple terms is a means of managing risk whereas the NPV looks out for ways to increase profitability.

As per the NPV, intermediate cash flow gets reinvested at a cutoff rate and in IRR cash flow is invested at the internal rate of return (Magni 2020). NPV is commonly used as a way of evaluating investments or project plans even at times when cash movement is significantly low. IRR on the other hand is mainly suitable to a project when there is a constant flow of cash. It works when there is a comparison between negative and positive cashflows in the project.

NPV is majorly used with projects that have a high chance of going on for a very long period of time. IRR on the other hand is suitable for projects that may run for a shorter period of time (Arjunan 2017). The NPV is suitable in that case in that it recognizes the prevailing significance of the cost of capital or even market ROI. IRR on the other hand does not put any emphasis on market ROI and neither does it put it into any significant use.

3. Similarities

Despite the distinguishing factors between NPV and IRR, there are significant similarities between the two. The significant similarity between the two is the fact that in both methods, one has the capacity to obtain results regarding whether to go on or reject a new business venture. This makes the two methods efficient since they do not compete and can thus be put to use side by side. They are however, approved or dismissed on the basis of the minimum rate of return existing in the market at the current time.

In common cases, business proposals often involve a cash outflow during the very initial stages and then there are various cashflows that follow after that period. There are such similarities which come up through the entire decision-making process (Osborne 2010). As per the NPV, proposals get accepted in the event that they possess a net present value that is positive in nature. On the other hand, the IRR is normally accepted if at all the result from the IRR provides a higher value compared to the cut off rate that is in existence (Kulakov & Kastro 2017). In summary, projects that express a positive net present value also commonly express a higher level of the rate of return compared to the base value.

4. Conflicts

When there is a case of mutually exclusive projects which are in competition where acceptance of either the two or one of them, there is normally a conflict between NPV and IRR in the results they offer (Osborne 2010). Judging from the NPV, one may be forced to accept one of the two project proposals whereas the IRR reveals the other project as the most suitable. Such is a contradictory conflict since it does not give a clear path to which is the best decision to make in such a scenario.

When making comparisons between two projects, there is a high possibility that the capital differences between the two may be significantly huge. This may be the cause of the conflict or it may also arise from differences that exist in the timing of cashflows as well as patterns of the same (Kulakov & Kastro 2017). Also, different projects may have significantly diverse service times which implies that the differences will be significant but the two methods do not offer a way to reconcile such differences effectively.

In a case where a project manager has to make a choice between competing projects, it is much more suitable for the manager to opt for a project that has a much larger net present value while utilizing the cutoff rate (Magni 2010). Considering the fact that companies primarily aim to increase

shareholders' wealth, choosing a project that has a high Net Present Value is the most suitable decision to make (Magni 2020). Such a decision will have a positive impact on the price shares and thus the wealth of shareholders. In that case, NPV is the most suitable means of ranking projects especially in cases where the projects are mutually exclusive and present an almost similar level of risk.

5. Conclusion

In conclusion, the NPV and IRR tools serve different purposes in estimating project performance. IRR is more focused on analyzing and reducing the risk associated with a project. NPV on the other hand is aligned towards assessing the value of a project based on the returns it will develop. It is possible to use the NPV even when the business has no cashflows for instance before the project even begins. The same is not possible for IRR since it measures the rate of return based on cashflows. Based on the fact that managers are usually looking for ways to maximize profit for shareholders, the NPV is a more suitable tool for them compared to IRR. The two tools have a major challenge in that it is hard for one to distinguish mutually exclusive projects and decide on which is the most suitable project to go by. However, in general, both methods provide a means to determine the suitability of a particular project or even an entire business altogether. Both NPV and IRR are sound analytical tools. However, they don't always agree and tell us what we want to know, especially when there are two competing projects with equally favorable alternatives.

References

- [1] Magni, C. A. (2020). Average Internal Rate of Return. In *Investment Decisions and the Logic of Valuation* (pp. 415-486). Springer, Cham.
- [2] Osborne, M. J. (2010). A resolution to the NPV–IRR debate?. *The Quarterly Review of Economics and Finance*, 50(2), 234-239.
- [3] Arjunan, K. (2017). IRR Performs Better than NPV: A Critical Analysis of Cases of Multiple IRR and Mutually Exclusive and Independent Investments. *Revised and updated version as of, 23*.
- [4] Kulakov, N. Y., & Kastro, A. N. B. (2017). New applications of the IRR Method in the Evaluation of Investment Projects. In *IIE Annual Conference. Proceedings* (pp. 464-469). Institute of Industrial and Systems Engineers (IISE).
- [5] Magni, C. A. (2010). Average internal rate of return and investment decisions: a new perspective. *The Engineering Economist*, 55(2), 150-180.
- [6] Kelleher, J. C., & MacCormack, J. J. (2004). Internal rate of return: A cautionary tale. *The McKinsey Quarterly*, 20, 2004.