Capital Budgeting Report

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Section: XXX

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**Introduction**

Capital budgeting is the process used by organizations to evaluate capital projects i.e. projects which have a lifespan of more than one year. The process usually is divided into a number of steps such as idea generation, individual proposal analysis, capital budget planning and post implementation audit and monitoring. Capital projects analysis in the context of capital budgeting may include analysis of new products of services, replacement projects, expansion of existing operations etc. (CFA, 2021)

Once projects for capital budgeting are identified businesses may use a combination of different methods for decision making and project selection. These methods include Net Present Value (NPV), Internal Rate of Return (IRR), and payback period, average accounting return and Profitability Index (PI) amongst others. Brief description of each method along with their decision criteria, advantages and drawbacks are presented in the next section.

**Methods for evaluation of projects**

Net Present Value (NPV) is one of the most widely used methods for project evaluation and selection. In essence NPV is the sum of present value of all relevant cash flows associated with a project discounted using a rate of return which reflects the actual risk of the project. Relevant cash flows in this context refer to cash flows which are future and incremental and occur as a direct result of project being undertaken. For instance, cost incurred for a feasibility study to undertake a project is a sunk cost as it has to be undertaken regardless of the final decision on project being undertaken. When analyzing independent projects all projects with a positive NPV should be accepted whereas when comparing different projects one with highest NPV is selected. (Fabozzi & Peterson, 2002)

NPV method remains most preferred capital budgeting approach based on a number of its merits for instance it takes into account all of the projects future cash flows and discounts them using appropriate discount rate i.e. time value of money is appropriately considered in decision-making. Further, the method directly provides insight into the value that will be added to shareholders wealth if the project is accepted hence linking it directly to the core objective of a profit making business. However, despite its relative strengths NPV method and its results are only as good as the input estimates provided to the model i.e. the model is sensitive to changes in input estimates such as future cash flows and results may not be correct if the inputs used were not correct. (Fabozzi & Peterson, 2002)

Internal rate of return (IRR) is the discount rate at which project breaks even i.e. the rate at which present value of project cash inflow and outflows are equal. When analyzing different projects under IRR a project is accepted if the IRR is greater than the projects required rate of return or WACC. Key advantage associated with IRR methodology is that it is based on sound evaluation criteria and hence is an important alternate to NPV. A key limitation of IRR methodology is that it is based on the assumption that project cash flows are reinvested at IRR which is unrealistic. Further, in certain scenarios such as when cash flows are non-conventional NPV and IRR may give conflicting results in which scenario NPV results are preferred. (Fabozzi & Peterson, 2002)

Under the payback period decision making the focus is on the time it takes for a project to generate sufficient cash flows which cover its initial cost i.e. cumulative cash flows for a project are calculated in order to determine the point in time where they become equal to initial investment. When evaluating projects based on payback period, a project with shortest payback period is selected. Key benefit associated with payback period model is that it is simple and takes into account the liquidity aspect of undertaking a project. However, the method suffers from two basic shortfalls i.e. it does not consider cash flows which occur after the payback period not does it take into account time value of money. Hence a project may have a short payback period but its cash flow stream following said period may be such that it does not add any value to shareholders wealth. (Fabozzi & Peterson, 2002)

Average Accounting Return (ARR) which is calculated using average net income of the project divided by projects average book value. The project is then accepted if the project AAR is greater than the required ARR. A key drawback of ARR is that it is an accounting measure and hence does not take into account cash flows and market values and hence is unable to determine impact of project on share price. The benefit of the model is that it is intuitive and allows for a clear analysis of the project in terms of its profitability. (Fabozzi & Peterson, 2002)

Lastly, Profitability Index (PI) is calculated by dividing present value of the future cash flows by projects the initial investment i.e. it gives an estimate of present value generated per dollar of money invested. Typically, a project with PI greater than one is acceptable and hence PI rule typically leads to decisions which are similar to the NPV method. The main advantage associated with the method it that it allows for different project to be ranked and compared while taking into account time value of money whereas it suffers from the same drawback as IRR i.e. it can lead to incorrect decisions when analyzing mutually exclusive projects. (Fabozzi & Peterson, 2002)

**Absolute versus relative measures**

An absolute measure such as NPV only takes into account present value of dollar return generated for the business whereas relative measures such as PI and IRR compare capital investments relative to some base amount such as initial investments. For example, a particular project may have a higher NPV due along with a larger initial investment but a lower PI compared to another mutually exclusive project with a smaller initial investment and a higher PI. In this situation, absolute measure will lead to the correct ranking of projects. While both absolute and relative methods may produce conflicting results for mutually exclusive projects there results will be the same when independent profitable projects are considered. (Blackwell Publishing, 2021)

**Risk in Cash Flow Projections**

As discussed in previous sections results and decisions made using capital budgeting techniques are only as good as the underlying estimates within which future cash flow projections are the most critical. There are a number of risks faced by the business when estimating cash flows for instance sunk costs which are costs that are incurred regardless of the project being accepted or rejected may sometimes be included in cash flow projections. This is incorrect as cash flow projections and hence capital budgeting process only needs to take into account cash flows which are relevant i.e. future and incremental. (Joo, 2020)

Similarly, there is a risk that cash flows associated with opportunity costs are not included in cash flow projections. Such costs are those associated with assets already owned by the business and benefits related to its existing use will need to be forgone if the project is undertaken. In this context such cash flows meet the definition of being relevant and hence need to be incorporated in cash flow projections. (Joo, 2020)

Lastly, the underlying estimates based on which cash flows estimated are generated may be faulty and hence projected cash flows may not actually be realized. For instance, if the company assumes that a new project will generate revenues of $200,000 per year and said revenue target is not met the overall cash flow projections developed using above estimate of revenue will become irrelevant. (Joo, 2020)

The above risks can be mitigated by evaluating each cash flow associated with the project with the standard definition of relevant cash flows and all such cash flows should be included in projections. Similarly, in order to reduce forecasting risks, bounds may be placed to any cash flow component outside which the true average is unlikely to be. In this context, scenario and sensitivity analysis may also be implemented to determine NPV and other measures under different combination of cash flow assumptions to gain an understanding of the impact of changes in scenarios. (Joo, 2020)

**Relevant Cash Flow Identification**

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| --- | --- | --- |
| **Scenario** | **Relevant Cash Flow (Y/N)** | **Reason** |
| Market explorative survey expenditure | **No** | This is a sunk cost and hence not relevant. |
| Additional cost savings | **Yes** | Extra cost savings generated are relevant as they will not occur if project is not undertaken. |
| Extra income a project could bring | **Yes** | Extra revenues and income generated are relevant as they will not occur if project is not undertaken. |
| Installation costs | **Yes** | Installation costs are relevant as they will not be incurred if project is not undertaken. |
| Salvage value of machinery to be replaced | **Yes** | The salvage value received on sale of existing equipment is relevant as it will change the overall initial outlay of the replacement project. |
| Tax credit for new equipment | **Yes** | This credit is achieved only if new equipment is purchased and hence meets the definition of relevant cash flows. |

**Discount rate selection**

Use of firm wide discount rate to discount all projects being evaluated is not correct as the discount rate used should reflect the relevant risk associated with the project i.e. if a project has a risk profile greater than the firms average risk profile a higher than average discount rate will be applicable and vice versa. Specifically, the discount rate used for capital budgeting purposes should reflect the risk of the project being considered and hence should not use the overall average discount rate for the company as a whole. (Lumen Learning, 2021)

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