

Capital Budgeting Simulation and Mini-Case

University of Phoenix

FIN/540 Managerial Accounting and Finance Foundations

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Workshop 6

Capital Budgeting

(I) Based on items (a) through (h), which company would you recommend acquiring?

We recommend the acquisition of Corporation B.

(J) Define, analyze and interpret the answers to items (c) through (h). Present the rationale behind each item and why it supports your decision stated in item (i). Also, attempt to describe the relationship between NPV and IRR. Also explain how you would analyze projects differently if they had unequal projected years (i.e., if Corporation A had a 5 year projection and Corporation B had a 7 year projection).

Net Present Value (NPV) – Present value of cash inflows minus present value of cash outflows. Investment rule – Accept project if NPV is positive. For mutually exclusive projects, choose the one with the highest (positive) NPV. Comments – The “gold standard” of investment criteria. Only criterion necessarily consistent with maximizing the value of the firm.

Internal Rate of Return (IRR) – The discount rate at which project NPV equals zero. Investment rule – Accept project if IRR is greater than opportunity cost of capital. Comments – Results in same accept/reject decision as NPV in the absence of project interactions.

Payback period – Time until sum of project cash flows equals the initial investment. Investment rule – Accept project if payback period is less than some specified number of years. Comments – a quick and dirty rule of thumb, with several critical pitfalls. Ignores cash flows beyond the acceptable payback period. Ignores discounting. Tends to improperly reject long-lived projects.

Profitability index – Ratio of Net present value to initial investment. Investment rule – accept project if profitability index is greater than zero. In case of capital rationing, accept projects with highest profitability index. Comments – Results in same accept/reject decision as

NPV in the absence of project interactions. Useful for ranking projects in case of capital rationing, but misleading in the presence of interactions. Cannot rank mutually exclusive projects.

Discounted payback period – most investments involve an initial outlay followed by income or profits. If an investment has a positive NPV there must be a time when the initial outlay is recovered, allowing for interest. This time is the discounted payback period (DPP), sometimes called the break-even point.

Modified Internal Rate of Return – Projects that have negative cash flows during the life of the project may have more than one IRR, i.e., more than one discount rate which will give a $NPV = 0$. Modified IRR was developed to deal with this issue. Modified internal rate of return is the least popular of all discounted and non-discounted models. Some argue MIRR is superior to IRR because it allows the manager to adjust the discount rate of intermediate term cash flows to better match a realistic return for the cash flows.

In our analysis of the following components we felt that all of the variables that we considered pointed to the selection of Corporation B.

| Comparative Analysis | Corporation A | Corporation B |
|--------------------------------------|----------------------|----------------------|
| Description | | |
| Discount Rate | 10.00% | 11.00% |
| NPV (Net Present Value) | 20.98% | 40.25% |
| IRR (Internal Rate of Return) | 13.05% | 16.94% |
| PB (Payback Period) | 3.64 years | 3.31 years |
| PI (Profitability Index) | 1.08% | 1.16% |
| DPP (Discounted Payback Period) | 4.60 years | 4.24 years |
| MIRR (Modified Internal Rate of Ret) | 11.79% | 14.36% |

One of the basic principles of finance is the time value of money. This essential insight allows us to make several important calculations that are fundamental to financial management.

The time value of money concept states that a dollar received today is worth more than a dollar received in the future. This is because interest can be earned on a dollar received today.

One of the best ways to approach capital budgeting, and one used commonly by businesses, is the net present value technique. With this technique, all of the after-tax cash flows associated with an investment are compared with the initial cash outlay to determine if the initial cash outlay is justified. Several figures are necessary to make this calculation. One must know what the initial cash outlay will be. Next, the cash flows associated with possession of the equipment must be estimated. Finally, a discount rate must be chosen. This discount rate should be adjusted upward as the riskiness of the cash flow increases.

A similar approach to capital budgeting is the internal rate of return method. This approach provides the same decision, as does the net present value method.

With this method, the projected cash flows are used to calculate an internal rate of return. The internal rate of return is then compared with a “hurdle rate.” The hurdle rate is equal to the discount rate used with the net present value method. If the internal rate of return exceeds the hurdle rate, the project is accepted. The calculation of internal rate of return requires use of a financial calculator or financial management software.

The net present value and internal rate of return techniques are far superior to the payback period approach to capital budgeting. In the payback period approach, the number of years required to pay back certain initial cash outlay is estimated. This approach is not very sophisticated because it does not use discounted cash flows, and because determination of the acceptable payback period is quite arbitrary.

Firms with larger capital budgets tend to favor NPV and IRR.

Explain how you would analyze projects differently if they had unequal projected years (i.e., if Corporation A had a 5 year projection and Corporation B had a 7 year projection).

Because of the positive cash flows and NPV and IRR for Corporation B, that would not affect our decision in selection Corporation B if the projections were extended for an additional two-year in the analysis.

As financial Analysts, evaluating two mutually exclusive capital investment proposals, we used different measures like NPV, IRR and PI for evaluating the proposals. The reliability of these measures depends on assumptions regarding cash flow.

IRR and PI favor smaller projects. The IRR rule also does not work when there are multiple changes in the cash flow. Theoretically, NPV is considered to be the most reliable criterion for project evaluation and is the best measure to base our decision.

(K) The two variables to be considered whose value can be considered less than certain are the internal rate of revenue (IRR) and the net present value (NPV). It must be kept in mind that the internal rate of return can be defined as the discount rate that forces a project to have a number that is equal to a net present value of zero. The reason that these variables being judged as less than certain is because these numbers are determined by trial and error, which means that the IRR is an estimation of a number that would yield an NPV equal to zero. Any project with a discount rate less than the IRR could yield a positive NPV. The higher a discount rate is the more cash flows will be discounted resulting in a lower NPV for the project.

In terms of how different these two variables would need to be, a company would approve any project where the IRR is higher than the cost of capital as the NPV will be greater than zero. For example, the IRR for a project could be equal to 18 to 20 percent, but the cost of capital of a company may be between 10 and 13 percent. It is then the duty of the company to

effectively approve the project as the maximum value for the company to make money would be around 20 percent. It could also be inferred that, if the company had a cost capital for a particular project over the 20 percent range, then the company would have a negative NPV and the project will not be considered a profitable one.

Another variable which can be considered troublesome is the profitability index (pi). This index is used to measure various projects whether or not there is existing soft or hard capital conservation. In this type of scenario, a company may be led awry to select smaller projects over larger projects with reasonably high NPV's. The profitability index was constructed to choose projects that maximized the amount of return on every dollar spent (the maximum NPV per dollar spent). This can be viewed as the right objective with a fixed amount of money on the table. However, when monetary consumption is not an issue, a company may be confused by the fact that some bigger projects needs more money to be spent and ultimately might not read as valuable with this variable.

References

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