Capital Budgeting Decisions – Chapter 8 Summary

Capital budgeting is the process of choosing between alternative investments/projects. This can be both a quantitative and qualitative decision, and certainly one that is of great importance to firms of all sizes. The project/investment evaluation methods we will consider are:

1. Net Present Value (NPV)
2. Profitability Index (PI)
3. Internal Rate of Return (IRR)
4. Payback Period

In practice, most companies use more than one method. By and large, NPV and IRR are two of the most common.

Net Present Value

Net Present Value of a project is the present value of net cash flows resulting from it, discounted at the firm's cost of capital, minus the project's net investment.

NPV=DCF-NINV, where DCF is the present value of all net cash flows, discounted at cost of capital (required rate).

The net present value of a project represents that project's contribution to the firm value, and therefore the increase in wealth of shareholders due to it. If the project's NPV is positive, that means the project will earn a return above the required rate, and is therefore accepted. If the NPV is negative, the project earns less than the required rate. If NPV is equal to zero, the firm earns just the required rate. The main advantage of using NPV is its consistency with the shareholder wealth maximization. Using NPV, we choose the project that will contribute the most to the current value of the firm.

The main disadvantage of NPV is that it favors large projects over smaller ones. In other words, NPV is size-biased.

Profitability Index

Profitability Index is very similar to NPV. Both methods discount net cash flows to the present. It is also known as "benefit-cost ratio." The index number represents the "bang for the buck" of the project, present value benefit for each dollar of initial investment. If PI is greater than 1, than the project earns above the required rate, and can be accepted. If PI is less than one, the project earns less than the required rate and is rejected. If PI is equal to one, the project earns just the required rate.

$$PI = \frac{DCF}{NINV}$$

Note that:

- When PI=1, NPV=0

- When PI>1, NPV>0
- When PI<1, NPV<0

When considering mutually exclusive projects of different sizes, NPV method should be used, because the project that will contribute most to firm value must be selected. On the other hand, when capital is scarce, and several independent projects are under consideration, PI may be a good method. In that case, using PI would guarantee that we do not overlook smaller, but profitable projects, in favor of larger but less profitable projects.

Internal Rate of Return

The internal rate of return is defined as the rate at which a project's discounted net cash flows equal its net investment. As a matter of fact, IRR for projects –in most ways- is very similar to YTM for bonds.

- When a project's NPV is equal to zero, then its IRR is equal to the required rate.
- When a project's NPV is negative, its IRR is lower than the required rate.
- When a project's NPV is positive, its IRR is greater than the required rate.

IRR is a very widely used method. Its main advantage is that it is easy to interpret. It gives a percentage return for every project. This is easier to interpret than a dollar amount, and makes comparing projects easier. If the IRR is more than, or equal to, the required rate, the project is accepted. Otherwise, the project is rejected.

The main problem with IRR is that when cash flows are uneven, it can be calculated only by trial and error, or using a computer. Another disadvantage is that it assumes that intermediate cash flows are reinvested at the IRR, as opposed to the required rate. This is not always a realistic assumption.

Payback Period

PB is the amount of time until cumulative net cash flows from a project equal the initial investment. For example, a project with $50,000 initial investment generates $20K in the first year, $10K per year for the next five years. The payback period would than be 4 years, because the sum of all cash flows in the first four years equals the initial investment.

PB is hardly ever used as the main criterion for capital budgeting decisions. Its main advantage is that it gives an estimate of the amount of time it will take the project to free up the initial investment that was laid out for it. This may be important if the financial manager is concerned with liquidity of the firm. The main disadvantage is that it gives equal weight to all cash flows, regardless of when they are generated. Another disadvantage is that it essentially ignores all cash flows that will be generated after the payback period.