Capital Budgeting under Risk- Certainty Equivalent Approach and Risk Adjusted Discount Rate

Meaning of Capital Budgeting

Capital budgeting (or investment appraisal) is the planning process used to determine whether an organization's long term investments, such as new machinery, replacement machinery, new plants, new products, and research development projects are worth pursuing. When taking on this planning process, managers must take into account the potential risks of the investment not panning out the way they plan for it to, for any number of reasons. In order to discuss this further, we should look into defining the concept or risk.

Meaning of Risk

Risk is the potential that a chosen action or activity (including the choice of inaction) will lead to a loss (an undesirable outcome). The notion implies that a choice having an influence on the outcome exists (or existed). Potential losses themselves may also be called "risks."

Capital Budgeting under Risk

Two alternative methods have been developed for incorporating project risk into the capital budgeting decision process. One is the certainty equivalent method, in which the expected cash flows are adjusted to reflect project risk: Risky cash flows are scaled down because the riskier the flows, the lower their certainty equivalent values. The second is the risk-adjusted discount rate method, where differential project risk is dealt with by changing the discount rate: Average-risk projects are discounted at the firm's corporate cost of capital, above-average-risk projects are discounted at a higher cost of capital, and below-average-risk projects are discounted at a rate below the corporate cost of capital. The risk-adjusted discount rate method is used by most companies, so we focused on it in earlier chapters. However, the certainty equivalent approach does have some advantages, so financial managers should be familiar with it as well.

The Certainty Equivalent Approach

The certainty equivalent (CE) method follows directly from the concept of utility theory. Under the CE approach, the decision maker must first evaluate a cash flow's risk and then specify how much money, to be received with certainty, will make him or her indifferent between the riskless and the risky cash flows.

In Certainty-equivalent approach, adjusted cash flows are discounted at Risk free Rate.

In this approach the investors will analyze the risk free and risky cash flows. They will evaluate the risk and understand, how much money will be received with certainty.

The formula for calculating the certainty equivalent cash flow is as follows:

Certainty equivalent cash flow = expected cash flow / (1 + risk premium)

The risk premium is calculated as the risk-adjusted rate of return minus the risk-free rate. The expected cash flow is calculated by taking the probability-weighted dollar value of each expected cash flow and adding them up.

To further complicate matters, certainty equivalents should reflect shareholders' risk preferences rather than those of management. For these reasons, the certainty equivalent method is not used very often in corporate decision making. However, it is conceptually a powerful tool, and in a later section we will use certainty equivalents to help see some assumptions embodied in constant risk-adjusted discount rates.

The Risk-Adjusted Discount Rate Method

The risk-adjusted discount rate is based on the risk-free rate and a risk premium. The risk premium is derived from the perceived level of risk associated with a stream of cash flows for which the discount rate will be used to arrive at a net present value.

Though the use of a risk-adjusted discount rate initially appears to be a highly regimented and quantitatively sound approach to evaluating risky investments, it is subject to one significant flaw, which is how the risk premium is derived. Managers could break the system by first

calculating the maximum discount rate that will still result in their project being approved, and lobby in favor of the application of that discount rate – irrespective of the actual risk profile of the project.

The main advantages of the risk-adjusted discount rate are that the concept is easy to understand and it is a reasonable attempt to quantify risk. However, as just noted, it is difficult to arrive at an appropriate risk premium, which can render the results of the analysis invalid. This approach also assumes that investors are risk-averse, which is not always the case. Some investors will accept a high level of risk if they perceive a potentially large payoff from an investment in the future.

In theory, if managers were able to estimate precisely both a project's certainty equivalent cash flows and its risk-adjusted discount rate (or rates), the two methods would produce the identical NPV. However, the risk-adjusted discount rate method is easier to use in practice because the discount rate for average-risk projects (the firm's corporate cost of capital) can be estimated from observable market data, but no market data are available to help managers estimate certainty equivalent cash flows.

Reasons to Use Risk-Adjusted Discount Rate

The most common adjustment relates to uncertainty to the timing, dollar amount or duration of cash flows. For long-term projects, there is also uncertainty relating to future market conditions, profitability of the investment and inflation levels. The discount rate is adjusted for risk based on the projected liquidity of the company, as well as the risk of default from other parties. For projects overseas, currency risk and geographical risk are items to consider. A company may adjust the discount rate to reflect Investments with the potential to damage a company's reputation, lead to a lawsuit or result in regulatory issues. Finally, the risk-adjusted discount rate is altered based on projected competition and the difficulty of retaining a competitive advantage.

Certainty Equivalents versus Risk-Adjusted Discount Rates

As noted above, investment risk can be handled by making adjustments either to the numerator of the present value equation (the certainty equivalent, or CE, method) or to the denominator (the risk-adjusted discount rate, or RADR, method). The RADR method dominates in practice

because people find it far easier to estimate suitable discount rates based on current market data than to derive certainty equivalent cash flows. Some financial theorists have suggested that the certainty equivalent approach is theoretically superior, but other theorists have shown that if risk increases with time, then using a risk-adjusted discount rate is a valid procedure