

# Capital Budgeting and Risk

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## Capital Budgeting

### Introduction

Capital Budgeting or investment appraisal is the process of determining whether or not projects are worthwhile. Capital Budgeting is a required managerial tool. It assists a lot in making key business decisions. Particularly as capital budgets are restricted, capital budgeting with its techniques can be used to grade projects. The main result should be to assist the financial managers of corporations in deciding whether a project is worth investing in or not, and to decide for those projects that optimally maximize the value of the company and maximize owners' wealth.

### Capital Budgeting Process

The first measure in the capital budgeting process is the proposal process. The proposals are made at all levels within a business organization and are reviewed by the financial managers. Then the process of reporting and analysis starts. The formal review and analysis is performed to assess the appropriateness of proposals under the use of capital budgeting techniques and evaluate their economic viability. The results of the analysis should be summated in a report and are handed over to the decision makers. The third step in the process will be the decision making. The fourth step in the capital budgeting process is the Implementation. This process involves expenditures that come from the projects implementation. The final step in the process will be the follow-up stage.

## Company and Project Costs of Capital

For an investment to be worthwhile, the expected return must be greater than the cost of capital. So the cost of capital is the rate of return that capital could be expected to earn in an alternative investment, with roughly the same risk. The company's cost of capital can be used as a discount rate for cash flows. Investment opportunities of greater or lesser risk than the company's existing business should be evaluated at the respective opportunity costs of the capital: lower costs for safer projects and higher costs for riskier projects. As it is difficult to know how much to adjust the discount rate, depending on the risk of the project, it is quite common to assign individual discount rates to different investment categories, for example speculative ventures, new products or expansion of existing business. Setting discount rates for categories makes investment decisions easier because it is necessary to decide for the right category but not to identify appropriate discount rates for each individual project. It is strongly advised to use more than one discount rate because using just a single discount rate for all projects can lead to over or under discounted cash flows. So profitable projects with a risk below the average risk can become rejected and unprofitable projects with above-average risk might get pursued.

## How to Determine Capital Cost

The company's cost of capital is the cost of a company's funds. That means debt and equity. The cost of debt is broadly defined as the risk-weighted projected return required by investors, similar to the cost of equity, where the return is largely unknown. This cost is composed to the rate of interest paid. So the interest-rate paid by the company represents the risk-free rate. This rate might get added by a risk component. It is more difficult to calculate the cost of equity because the equity does not pay a set return to its investors. So cost of equity has to be allocated by comparing one investment to others comparable with roughly the same risk in order to detect the market cost of equity. The average cost for both – weighted by their proportion - yields the average cost of the company's capital. This is called *weighted-average cost of capital* or *WACC*.

$$WACC' = \frac{debt}{debt + equity} \times r_{debt} + \frac{equity}{debt + equity} \times r_{equity}$$

In the above formula no corporate tax is included. However, the costs of debt (interest) are a tax-deductible expense for

corporations and this should be reflected in an after-tax WACC' where  $T_c$  is the corporate tax rate.

$$WACC' = \frac{\text{debt}}{\text{debt} + \text{equity}} \times \frac{r_{\text{debt}} \times (1 - T_c)}{1} + \frac{\text{equity}}{\text{debt} + \text{equity}} \times r_{\text{equity}}$$

The values of debt and equity are market values and can differ substantially from the book value for equity in particular. The rate of interest charged by the banks on new loans is a good approach for  $r_{\text{debt}}$  being the expected rate of return for debt. The cost of equity  $r_{\text{equity}}$  is the return required by investors and consists of a "risk free" interest rate  $r_f$ . This risk free rate becomes added by a capital surplus for the risk to be measured by the investor. In accordance with the capital asset pricing model (CAPM)  $r_{\text{equity}}$  is:

$$r_{\text{equity}} = r_f + \beta (r_m - r_f)$$

adjusted by the factor  $\beta$ ,  $r_m - r_f$  is the market risk capital surplus. Factor  $\beta$  increases in line with the risk of the investment and is set to zero for a wholly safe investment. Beta can also be estimated for industry if it cannot be identified faithfully on a company level. Betas below one indicate less than average risk. Betas exceeding one signify greater than average risk. Furthermore, high cyclicality businesses with high fixed costs have high betas. In the end, it is more likely that the company will be confronted with a return on equity expected by the investor rather than calculating costs of equity on its own.

## Risk

Evaluating investment opportunities means analyzing the scale that the benefits of the investment top its costs. The difference in investment opportunities between the costs and benefits are cash flows. These cash flows are for future periods and include two main factors of uncertainty. Firstly the amount and secondly the timing of when these cash flows will be generated in the future. Risk is the degree of uncertainty. Therefore safe investments should earn lower returns than risky investments.

## Summary

In times with limited sources of capital, financial managers should carefully decide whether a particular project is economically suitable. In the case of many projects, financial

manager must detect the projects that will contribute most to profits and, consequently, optimally maximize the value of the company and maximize owners' wealth. Here the company's cost of capital is a good starting point for determining individual risk weighted cost of capital, for particular projects. This is the basis of capital budgeting.