

Chapter 9 – Capital Budgeting

Capital Budget – lists the projects and investments that a company plans to undertake during future years. To create this list, firms analyze alternate projects and decide which ones to accept through a process called **Capital budgeting**. The process begins with forecasts of each project's future consequences for the firm. Some of these consequences will affect the firm's revenue and others will affect its costs.

The ultimate goal is:

Determine the effect of the decision to accept or reject a project on the firm's cash flows, and evaluate the NPV of these cash flows to assess the consequences of the decision for the firm's value.

An important source of info comes from looking at past projects of the firm, or those of other firms in the same industry.

Incremental Earnings –the amount by which a firm's earnings are expected to change as a result of an investment decision. It tells us how the decision will affect the firm's reported profits from an accounting perspective. Earnings are not actual cash flows though.

There are two reasons why computing cash flow consequences of an investment based on its earnings consequences is important:

1. Financial managers often begin by forecasting earnings.
2. If we are looking at historical data, accounting info is often the only info that is readily available.

Capital Expenditures – investments in plant, property, and equipment. These are a cash expense, and are not directly listed as expenses when calculating earnings. Instead, the firm deducts a fraction of the cost of these items each year as depreciation.

Straight-Line Depreciation – the asset's cost is divided equally over its depreciable life.

Factors to consider when estimating a project's revenues and costs:

1. A new product typically has lower sales initially, as customers gradually become aware of the product. Sales will then accelerate, plateau, and ultimately decline as the product nears obsolescence or faces increased competition.
2. The average selling price of a product and its cost of production will generally change over time. Prices and costs tend to rise with the general level of inflation in the economy. The prices of technology products, however, often fall over time as newer, superior technologies emerge and production costs decline.
3. For most industries, competition tends to reduce profit margins over time.

All of our revenue and cost estimates should be incremental, meaning that we only account for additional sales and costs generated by the project.

****Incremental Earnings Before Interest and Taxes (EBIT) –**

= Incremental Revenue – Incremental Costs – Depreciation

Incremental Revenues = additional units sold x Price

Incremental costs = additional units sold x Production Costs

Because we calculate the net income assuming no debt (no leverage), we refer to the net income we compute using this equation as **Unlevered Net Income** to indicate that it does not include any interest expenses associated with debt.

Marginal Corporate Tax Rate – the tax rate a firm will pay on an incremental dollar of pre-tax income.

$$= \text{EBIT} \times \text{The firm's marginal corporate tax rate}$$

Pro Forma Statement – Describes a statement that is not based on actual data but rather depicts a firm's financials under a given set of hypothetical assumptions.

****WHEN EVALUATING A CAPITAL BUDGETING DECISION WE GENERALLY DO NOT INCLUDE INTEREST EXPENSE.**

We evaluate a project as if the company will not use any debt to finance it, and we postpone the consideration of alternative financing choices.

Free Cash Flow – the incremental effect of a project on a firm's available cash.

Earnings include non-cash charges, such as depreciation, but do not include expenditures on capital investment.

Net Working Capital – difference between current assets and current liabilities.

$$\text{Cash} + \text{inventory} + \text{Receivables} - \text{Payables}$$

We do not include short term investments because they represent financing decisions that we keep separate from our investment decisions.

Trade Credit – the difference between receivables and payables that is the net amount of a firm's capital consumed as a result of those credit transactions; the credit that a firm extends to its customers.

$$\text{*Change in Net Working Capital (NWC) in year } t = \text{NWC}_t - \text{NWC}_{t-1}$$

***Free Cash Flow =**

$$= (\text{Revenues} - \text{Costs} - \text{Depreciation}) \times (1 - \text{Tax Rate}) + \text{Depreciation} - \text{CapEx} - \text{Change in NWC}$$

$$= \text{Unlevered Net Income} + \text{Depreciation} - \text{CapEx} - \text{Change in NWC}$$

It can be rewritten as:

$$= (\text{Revenues} - \text{Costs}) \times (1 - \text{Tax Rate}) - \text{CapEx} - \text{Change in NWC} + \text{Tax Rate} \times \text{Depreciation}$$

The last term in this equation, Tax Rate x Depreciation, is called **Depreciation Tax Shield**, which is the tax savings that results from the ability to deduct depreciation. As a consequence, depreciation expenses have a positive impact on free cash flow.

Compute the present value of each free cash flow in the future by discounting it at the project's cost of

capital. The present value of the free cash flow in year t (or FCF_t) is:

$$PV(FCF_t) = \frac{FCF_t}{(1+r)^t} = FCF_t \times \frac{1}{(1+r)^t}$$

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Many projects use a resource that the company already owns. Because the firm does not need to pay cash to acquire this resource for a new project, it is tempting to assume that the resource is available for free. However, in many cases the resource could provide value for the firm in another opportunity or project. The **opportunity cost** of using a resource is the value it could have provided in its best alternative use. Because this value is lost when the resource is used by another project, we should include the opportunity cost as an incremental cost of the project.

Project externalities – indirect effects of a project that may increase or decrease the profits of other business activities of the firm. For example, some purchasers of Apple's iPhone would otherwise have bought Apple's iPod Nano.

Cannibalization – As in the example in the previous definition, when sales of a firm's new product displace sales of one of its existing products. The lost sales of the existing project are an incremental cost to the company of going forward with the new product.

Sunk Cost – any unrecoverable cost for which a firm is already liable. They have or will be paid regardless of the decision whether or not to proceed with the project. Therefore, they are not incremental with respect to the current decision and should not be included in its analysis. You may hire a market research firm to do market analysis to determine whether there is demand for a new product you are considering and the analysis may show that there is not enough demand, so you decide not to go forward with the project. Does that mean you do not have to pay the research firm's bill? Of course you still have to pay the bill, emphasizing that the cost was sunk and incurred whether you went forward with the project or not.

If your decision does not affect a cash flow, then the cash flow should not affect your decision. If the cash flow is the same regardless of the decision, then it is not relevant to your decision.

Common examples of Sunk Costs

1. Overhead expenses – associated with activities that are not directly attributable to a single business activity but instead affect many different areas of the corporation. Examples include the cost of maintaining the company's headquarters and the salary of the CEO. These are not incremental to the project and should not be included. Only include as incremental expenses the ADDITIONAL overhead expenses that arise because of the decision to take on the project.
2. Past research and development expenditures – a pharmaceutical company may spend tens of millions of dollars developing a new drug, but if it fails to produce an effect in trials, or has negative effects, should it proceed? The company cannot get its development costs back and the amount of those costs should have no bearing on whether to continue developing a failed drug. When a firm has already devoted significant resources to develop a new product, there may be a tendency to continue investing in the product even if market conditions have changed and the product is unlikely to be viable.

ADJUSTING FREE CASH FLOW

There are a number of complications that can arise when estimating a project's free cash flow: