

Understanding Financial Management: A Practical Guide

Guideline Answers to the Concept Check Questions

Chapter 7

Capital Investments and Cash Flow Analysis

Concept Check 7.1

1. **What is capital budgeting?**

Capital budgeting is the process of identifying, evaluating, and selecting investments in long-lived assets. These outlays involve capital investments, which are outlays expected to result in future benefits. Such outlays may result in both physical and intangible investments. Examples of such outlays include plant expansion, research and development, advertising, and a training program for managers.

2. **What is the difference between a current expenditure and a capital investment?**

A *current expenditure* is an outlay of money but the expected return or benefit is relevant to the short-term. Firms incur such expenditures to support their current operations. A *capital investment*, which results in a *capital expenditure*, is an outlay of money to improve capital assets. A *capital asset* is a long-lived asset with a life exceeding one year. Capital assets producing benefits over more than one year include fixed assets such as land, buildings, machinery, furniture, and fixtures.

3. **How can good capital budgeting decisions increase the value of a firm?**

Good capital budgeting decisions enable firms to acquire the long-lived fixed assets that generate a firm's future cash flows and determine its overall profitability. If managers reach appropriate decisions, the benefits generated by the projects will exceed their cost. Generating projects with positive net cash flows will lead to higher prices of the firm's stock that will increase the value of the firm.

4. **How can poor capital budgeting decisions produce negative effects to the firm?**

Capital budgeting decisions often require a substantial outlay of funds and therefore will affect the firm's future course of development. Such decisions could cause a firm to change its core business operations, and if unsuccessful lead to its demise. By making capital budgeting decisions, firms commit funds often for long periods, which can decrease overall flexibility.

5. **Why are capital budgeting decisions important to the success of a firm?**

Capital budgeting decisions are important to a firm's success because they often involve a sizeable outlay, affect a firm's future direction, and are difficult and costly to reverse. In addition, proper capital budgeting decisions can improve cash flows and lead to higher stock prices. Making appropriate capital budgeting decisions is vital to achieving the goal of maximizing shareholders' wealth. These decisions are especially important to small businesses and their success because of the size and magnitude of capital budgeting decisions.

Concept Check 7.2

1. **What is the primary purpose of expansion projects and replacement projects? How do they differ from one another?**

The primary purpose of an *expansion project* is to enhance revenues by increasing operating capacity in existing products or markets or by focusing on operations to expand into completely new products or markets. The basic purpose of a *replacement project* is to improve efficiency or to maintain or increase revenues by replacing deteriorated or obsolete fixed assets such as equipment or facilities. These two types of projects differ in that an expansion project focuses on the firm's revenues whereas a replacement project focuses on creating efficiencies within the firm.

2. **What is the difference between mandatory and discretionary capital investments? Give an example of each.**

A *discretionary project* enables a firm to choose whether to undertake various investment opportunities. For example, when Southwest Airlines replaces old planes with new, more fuel-efficient ones, the airline often reduces the operating costs associated with servicing its fleet of planes. A *mandated project* is one in which a firm undertakes to adhere to various government laws or agency rules. For example, the Environmental Protection Agency (EPA) may impose requirements that firms install certain types of equipment.

Concept Check 7.3

1. **What is the link between a firm's business strategy and its capital budgeting process?**

Before a firm starts thinking about capital budgeting, it must first develop a strategy for carrying out its goals. A firm's business strategy provides the framework within which it seeks capital investment opportunities and from which major capital budgeting decisions logically flow. Capital budgeting decisions are complex because they involve multiple factors that affect a firm's future activities and strategy. These decisions include determining the firm's business lines and identifying competitive guidelines to use in these sectors. Therefore, a firm carries out its business strategy by making investments

in long-lived assets that will maximize shareholder wealth.

2. **What are the six stages of the capital budgeting process?**

The six stages of the capital budgeting process are:

- *Stage 1: Identify project proposals.* This step involves identifying projects consistent with the firm's business strategy and conducting a preliminary evaluation and screening of these proposals.
- *Stage 2: Estimate project cash flows.* Proposals surviving the initial screening undergo further refinement. This step requires gathering additional data from various sources such as accounting, engineering, marketing, production, purchasing, and finance needed to estimate a project's inflows and outflows. Estimating future cash flows for capital projects is perhaps the most difficult part of the capital budgeting process.
- *Stage 3: Evaluate projects.* This step involves determining the financial viability of projects. Firms typically use both quantitative and qualitative methods to evaluate projects according to specified selection criteria.
- *Stage 4: Select projects.* This step concerns selecting the projects that make up the final capital budget. This is the stage where final budgeting approval and authorization occurs.
- *Stage 5: Implement projects.* This stage entails initiating and tracking projects. During the tracking phase, managers compare the estimated costs to the actual costs as a way of identifying variances such as cost overruns. Such monitoring helps to avoid delays and enables managers to make appropriate decisions if problems arise.
- *Stage 6: Perform a post-completion audit.* This final stage usually applies to selected projects and occurs after project completion. Post-completion audits provide a way of providing valuable feedback about the project and identifying errors or biases in the capital budgeting process.

3. **Evaluate the following statement: "Although a firm may estimate cash flows improperly, it can resolve this deficiency by properly performing the other stages of the capital budgeting process."**

This statement is false. If a firm evaluates a project's cash flows improperly, it runs the risk of being off-course in other stages of the capital budgeting process. Properly evaluating a project's cash flow is crucial for its viability and profitability. Other steps of the process rely on proper estimation because the project will not move forward without it.

4. **What actions should corporate managers take before implementing a project?**

Corporate managers should evaluate the projects relative to the firm's business strategy, analyze the cash flows that projects will likely produce, and select only appropriate projects. Managers need to ensure that sufficient funds are available to finance the proposed projects. In addition, they should have a plan for implementing and monitoring projects.

5. **What is the purpose of post auditing projects? Should the firm audit all capital budgeting projects after completion? Why or why not?**

The purpose of post auditing projects is to compare the project's actual costs and benefits to those initially estimated earlier in the process and to decide whether the project's performance warrants its continuance. A firm should not audit all capital budgeting projects after completion because it may be costly or impractical. Rather a firm should focus on those projects that involve a large portion of its total capital budget or are a strategic importance.

Concept Check 7.4

1. **Why should the capital budgeting process use cash flows instead of accounting profits? How can accounting profits be misleading when considering a new project?**

The capital budgeting process should use cash flows instead of accounting profits because cash flows directly affect a firm's ability to pay bills and buy assets. That is, firms can only spend or reinvest cash. Accounting profits do not represent cash. Accounting profits include some cash flows but excludes others. For example, accrual accounting allows a firm to recognize profit when no cash changes hands. Adhering to this procedure would make a firm look better, but it would not have the cash flow available to fund a new project.

2. **Why should corporate managers consider only incremental, after-tax cash flows?**

An *incremental cash flow* is the difference between the cash flows of the firm *with* and *without* the investment project over the same period. Only incremental, after-tax cash flows are relevant in capital budgeting. Using incremental after-tax cash flow enables a manager to identify the changes in cash flow that are directly attributable to a specific project. A firm will eventually use these cash flows to invest in other projects, reduce liabilities, or pay them out to shareholders.

3. **Should financing costs be considered when measuring a project's cash flows? Why or why not?**

Analysts and managers should *not* consider financing costs when measuring a project's cash flows. For example, interest expense is a form of claim by suppliers of capital and is part of the cost of capital used to determine the discount rate when computing net present value. Considering financing costs in measuring a project's cash flows would result in double counting these costs by deducting financing costs from the cash flows and discounting the cash flows by the required rate of return.

4. **Should sunk costs be included when estimating cash flows? Why or why not?**

Sunk costs, which are expenditures that occurred before making a decision, should *not* be included when estimating a project's cash flows. Sunk costs are unrecoverable. Future costs and benefits form the basis for making project decisions. Therefore, past or

historical costs are irrelevant and have no bearing on current or future decisions. No matter what actions the decision maker may take, the firm has already incurred the cost.

5. **Under what circumstances would an analyst include each of the following items as an incremental cash flow for a capital budgeting project?**
- a. **Net operating working capital.**
 - b. **Allocated overhead.**
 - c. **Opportunity costs.**
 - d. **Side effects.**

- a. If a firm decides to undertake an expansion project, there will most likely be an increase in net operating working capital (NOWC) and a net cash outflow. Changes in NOWC can also occur during the life of the project. At the termination of a project, analysts often assume that a firm can recover the accumulated NOWC invested during the project's life. Changes in NOWC affect a firm's incremental cash flows.
- b. An increase in overhead resulting from accepting a project is an incremental cash outflow and is part of a project's cash flows. If, however, overhead costs do not change by accepting a project, managers should exclude from the cash flows any overhead allocated to a new project.
- c. Analysts and managers should consider opportunity costs as an incremental cash flow if a firm accepts a proposed project and forgoes using those funds or assets in an alternative investment involving similar risk. For example, suppose that a firm has additional space in a facility that it already owns. The firm could use this space to expand production or rent it. If the firm decides to undertake the project, the rent forgone would be an opportunity cost and should be included in the project's cash flows.
- d. If a project has a positive or negative effect on the cash flows of another product or division, such side effects should be included as an incremental cash flow. For example, suppose that a firm is considering the production of a new breakfast cereal that is a close substitute for an existing cereal in its product line. The firm would count the fall in sales of the existing cereal due to the new cereal as an incremental cost of the proposed cereal.

6. **An independent petroleum refiner decides to build a new refinery on some land it bought 5 years ago for \$5 million. The firm can sell the land today for \$10 million. Should the firm include the cost of the land in estimating the cash flows of the project? If so, what is the appropriate cost -- \$5 or \$10 million? Should improvements made to the land be included?**

If the petroleum refiner decides to undertake the project, there will be no direct cash outflow associated with buying the land. In evaluating the proposed new refinery, the land is not a "free" resource for the project because the firm can sell the land for \$10 million to generate cash. Thus, an opportunity cost exists in using the land. The proper land cost would be the \$10 million market-determined value, not the \$5 million paid for the property. Of course, the \$5 price paid for the land would have an effect on taxes. Thus, the firm should consider the opportunity cost on an after-tax basis. Past improvements made to the land are sunk costs but would have tax effects on determining the after-tax opportunity cost. Future improvements made to the land would be relevant in determining the project cash flows.

7. **An international oil company spent \$1 million drilling a dry hole when searching for oil. An official argues that the company should continue drilling because the**

\$1 million spent on the drilling is too large to write off. Is the \$1 million a relevant cost in deciding whether to continue drilling? Explain.

The oil company spent the \$1 million in the past. This amount is a sunk cost and is irreversible. Therefore, the \$1 million is not a relevant cost in deciding of whether to continue drilling.

Concept Check 7.5

- What are the three major categories of cash flows in a capital budgeting project? What is the format for calculating each type of cash flow?**

The three major categories of cash flows in a capital budgeting project are the (1) *initial investment*, (2) *operating cash flows*, and (3) *terminal cash flows*.

A format for calculating the initial investment is:

Format for Calculating the Initial Investment	
	Purchase price of a new assets
+	Expenses associated with placing the asset in service
+	Opportunity cost of any existing assets employed in the project
+	Initial net operating working capital (NOWC) required
-	Proceeds from selling an existing asset
+/-	<u>Tax effects from selling an existing asset</u>
	Initial investment

A format for calculating the operating cash flows is:

Format for Calculating Operating Cash Flows	
	Operating revenues
-	Operating expenses
-	<u>Depreciation</u>
	Taxable income
-	<u>Income taxes</u>
	Net income
+	Depreciation
-	<u>Increase in net operating working capital (NOWC)</u>
	Operating cash flows

A format for calculating the terminal cash flows is:

Format for Calculating Terminal Cash Flows	
	Salvage value
-	<u>Cost of removing assets and shutting down</u>
	Salvage value before taxes
±	<u>Tax effects on disposal of an asset</u>
	Net salvage value
+	<u>Recovery of NOWC</u>
	Terminal cash flows

2. **What is the difference between conventional and unconventional cash flow patterns? Give an example of each.**

A *conventional cash flow pattern* is a time series of outgoing and incoming cash flows that has only one change in direction or sign. For example, a project might have an initial outlay of \$100,000 and then future cash inflows of \$30,000 each year for the next five years. This would result in a cash flow pattern of -, +, +, +, +, +, which is only one change in sign. An *unconventional cash flow pattern* is a series of cash flows that has more than one change of sign. For example, the pattern of -, +, -, +, +, + represents an unconventional cash flow pattern.

3. **Comment on the statement: "Depreciation is a non-cash expense and simply can be ignored when estimating a project's relevant cash flows."**

Although depreciation is a non-cash expense, managers should *not* ignore depreciation when estimating a project's relevant cash flows. While depreciation itself is not a cash flow, it does affect a project's relevant cash flow by reducing a firm's taxable income. Since depreciation reduces the tax outflow, it amounts to a cash inflow.

4. **What are the tax benefits of depreciation and how do they play into cash flow calculations?**

When a firm buys an income-producing asset, the tax laws permit the firm to depreciate the asset. Depreciation lowers a firm's taxable income and provides that firm with a depreciation tax shield. This tax shield reduces the firm's tax outflow and effectively results in a cash inflow.

5. **Tuggle Toy Company plans to expand its production capacity by adding a new machine costing \$25,000, including installation and transportation costs. The new machine requires an estimated \$2,000 increase in NOWC. What is the initial outlay for this project?**

The initial outlay for this expansionary project will be the cost of the new machine plus the increase in NOWC: $\$25,000 + \$2,000 = \$27,000$. Any increase in NOWC causes a net cash outflow that should be included with the machine's actual cost and the installation and transportation that is associated with it.

6. **What is the appropriate treatment of recaptured NOWC in terms of computing terminal cash flows?**

When a firm undertakes a new capital budgeting project, it often increases its investment in receivables and inventory above any increases in payables and accruals. Thus, NOWC increases and results in a cash outflow. Analysts typically include this increase in NOWC, which the firm must finance, as an outflow in Year 0 of the analysis. At the end of a project's life, the firm depletes any remaining inventories and collects the receivables. Thus, the appropriate treatment of recaptured NOWC is to add it to the final period's after-tax cash flow to compute the terminal cash flow. That is, analysts usually include the change in NOWC as part of the disposition proceeds at the end of the project. Analysts treat this decrease in NOWC as an inflow. In estimating cash flows, analysts often assume the firm will liquidate operating assets at their book value, and that there are no tax implications.

7. **Management at Harrington Corporation wants to build a fitness center for use by its employees. The analyst in charge of analyzing this proposed project recommends rejecting it because "the fitness center would require a large initial outlay but would not generate any cash inflows to the firm." Comment on this situation.**

The analyst may be correct in saying that the fitness center will require a large initial outlay, depending on the size and cost of the facility. Whether the fitness center generates any cash inflows to the firm requires further analysis. Cash inflows could be direct or indirect. For example, if Harrington charges its employees or others to use the fitness center, this would result in a direct future cash inflow. The firm may realize several indirect benefits by building the center. For example, the new fitness center might affect employee performance and result in greater productivity. Those using the facility as part of a wellness program might get healthier and miss fewer days at work. This could result in reducing health claims and lowering health insurance premiums. In addition, having a fitness center could be a company feature useful in attracting and retaining employees. Harrington may need to build a fitness center to remain competitive with similar firms in its industry. These tangible and intangible benefits could generate cash inflows for the firm.

Concept Check 7.6

1. **What constitutes a Section 1231 asset? How does the Internal Revenue Service (IRS) treat multiple Section 1231 gains and losses?**

Section 1231 assets are depreciable assets and real estate in a trade or business, held for more than six months. If the combined gains and losses from the taxable disposition of section 1231 assets is a gain, the firm should treat such gains as a long-term capital gain, which is currently taxed as ordinary income. If the net result of the combination is a loss, such gains and losses for section 1231 assets are fully deductible from the corporation's ordinary income.

2. **What does the IRS use for its depreciable basis guidelines?**

The depreciable basis is the full cost of a fixed asset including shipping and installation costs. The difference between the sales price of the depreciable asset and the book value (full cost less accumulated depreciation) is either a gain or loss.

3. **What is the tax treatment of selling a depreciable asset:**

a. Below its book value?

b. Above book value but below or equal to its depreciable basis?

c. Above its depreciable basis?

- a. The sale of a depreciable asset below its book value results in a loss. The firm nets the loss against other Section 1231 gains and losses for the year. If a net loss results, it reduces the firm's tax liability by an amount equal to the difference between the sales price and book value of the asset times its marginal tax rate.
- b. The sale of a depreciable asset above book value but below or equal to its depreciable basis results in a gain. The firm nets this gain against other Section 1231 gains and losses for the year. If a net gain results, the firm treats it as recaptured depreciation, which is taxed as ordinary income. Recaptured depreciation is the amount by which the firm has effectively over-depreciated the asset during its life.
- c. The sale of a depreciable asset above its depreciable basis results in both recaptured depreciation and a long-term capital gain. The firm treats the portion of the gain representing recaptured depreciation as ordinary income for tax purposes, and the capital gains portion, which is the amount by which the selling price exceeds the depreciable basis, as a capital gain.

4. **How does the IRS treat recaptured depreciation for tax purposes?**

The income tax liability on the recaptured depreciation equals the difference between the sales price and book value times its marginal tax rate. Thus, the IRS treats recaptured depreciation as ordinary income for tax purposes.

Concept Check 7.7

1. **In the expansion decision, how does Carolina Freight Company account for changes in net operating working capital (NOWC)?**

Carolina Freight Company treats the \$25,000 change in NOWC as part of the acquisitions costs (cash outflow) at the beginning of the project and as part of the disposition proceeds (cash inflow) at the end of the project.

2. **Why is depreciation added back to net income in Table B of Table 7.8?**

Carolina Freight Company adds back the annual depreciation charge for Years 1 through 6 because it recognizes that depreciation is a non-cash charge and not part of the cash outflows. The deduction of this non-cash expense results in reducing the firm's

taxable income and its taxes. The firm must add back depreciation to net income to get the project's annual operating cash flows.

3. **Why are income taxes subtracted from the salvage value in Panel C of Table 7.8?**

Carolina Freight Company sold the trucks for more than their book value (\$0) but less than their depreciable basis (\$500,000). The \$100,000 salvage value represents recaptured depreciation, which is taxed as ordinary income. Since the firm's tax rate is 34 percent, it owes \$34,000 ($0.34 \times \$100,000$) in taxes.

4. **What are the major differences between cash flow analyses for an expansion project and those for a replacement project?**

The major difference between cash flow analyses for an expansion project and a replacement project occur when estimating the initial investment and operating cash flows, rather than the terminal cash flows. Unlike an expansion decision, a replacement decision involves analyzing the effect on the cash flows of replacing equipment relative to the effect of keeping it. When determining the initial investment of a replacement decision, the manager must consider the disposition of the old asset and the tax effect of the old asset disposition. An expansion decision does not involve disposing of an old asset as part of the initial investment. When determining the operating cash flows of a replacement decision, the manager must consider the change in depreciation of the new versus old asset as well as the tax shield from the change in depreciation. An expansion decision does not involve the impact of these changes.

Concept Check 7.8

1. **What is the primary goal of capital budgeting for MNCs?**

A multinational corporation has the same primary goal as a domestic firm when it comes to capital budgeting – to maximize shareholder wealth as reflected by the market price of common stock.

2. **What are the primary distinctions between foreign capital investments and domestic investments?**

Compared with domestic investments, the capital budgeting process is more complicated in a global environment. These complications stem from such factors as different local economic conditions and customs; regulatory and tax rate differences; restrictions on capital flows; exchange rate changes; special financing opportunities; cost of capital differences; and added sources of risk. Managers of MNCs must consider each of these distinctions in conducting foreign investment analysis.

3. **Should analysts measure cash flows of capital budgeting projects from the viewpoint of the subsidiary or the parent? Why?**

Analysts should measure cash flows from the viewpoint of the parent. The project needs to be successful in the parent's currency because it is from those funds that the firm will

have the ability to pay dividends, satisfy debt obligations, and invest in new projects.

4. **What obstacles do MNCs face when procuring cash flows from foreign projects and how can they avoid these problems?**

MNCs face fees, royalties, and other payments as well as non-quantifiable benefits that could affect the cash flows from foreign projects. There are several ways that MNCs can mitigate these problems. For example, MNCs may charge royalties and fees that require periodic remission of funds by a subsidiary to the parent company. Another technique is for the subsidiary to declare a cash dividend.

5. **Why is converting cash flows from international capital investments to the currency of the parent firm necessary?**

The objective of a MNC is to maximize the wealth of its shareholders. The only way to accomplish this is through the currency of the parent corporation. The parent company needs to have access to all the funds so its managers can make decisions that are in the best interest of the firm's shareholders.