

FN 201 Business Finance

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Lecture 7: Capital budgeting and long-term investment

Capital budgeting decision



Should we build
this plant or
sell the land?



Cash flow to be included in capital budgeting

- ▶ The cash flow that should be included in a capital budgeting analysis are those that will only occur if the project is accepted, called **incremental cash flow**.
- ▶ These cash flows must **relevant** to the project
- ▶ The stand-alone principle allow us to analyze each project in isolation from the firm simple by focusing on incremental cash flows

Example

- ▶ The Weber-Decker Co. just paid \$1 million in cash for a building, as part of a new capital budgeting project. This entire \$1 million is an immediate cash outflow. However, assuming straight-line depreciation over 20 years, thus the reduction in accounting expense is only \$50,000 in the first year. The remaining \$950,000 is expensed over the following 19 years.
- ▶ For the capital budgeting purposes, the relevant cash outflow at the time 0 is the full \$1 million, not the reduction in earnings of only \$50,000.

Capital budgeting concepts

Focusing on incremental cash flows

- ▶ Cash flows that directly result from a proposed investment. They effectively represent the **marginal costs (MC)** and **marginal benefits (MB)** expected to result from undertaking a proposed investment.
- ▶ Typically overhead costs are fixed and not incremental to the project and should not be included in the calculation of incremental earnings.

Ignoring financing costs

- ▶ In capital budgeting decisions, *interest expense is typically not included*. The rationale is that the project should be judged on its own, not on how it will be financed.
- ▶ Firms calculate a project's cash flows under the assumption that the project is financed only with equity. Any adjustments for debt financing are reflected in the discount rate, not the cash flows.

Capital budgeting concepts

Considering taxes

- ▶ All activities that subjected to tax must be calculated on after-tax basis.
- ▶ Taxes on earnings before interest and taxes (EBIT) – profits (losses) from proceeds from sales of assets
- ▶ Use marginal tax rate - the percentage of taxed owned on the next dollar of income.

Adjusting for non-cash expenses

- ▶ Non-cash expenses include depreciation, amortization.
- ▶ Even though non-cash expense itself is not cash flows, its tax-deductibility has tax consequence.
- ▶ There are two ways to calculate cash flows that take this effect into account.
 - ▶ Operating cash flows = Net Operating Profit After Tax (NOPAT) + Non-cash expenses
 - ▶ Operating cash flows = Net Operating Profit After Tax (NOPAT) + Tax shield

Example

- ▶ Suppose a firm spends \$4,000 in cash to purchase a fixed asset today that it plans to fully depreciate on a straight-line basis over four years to zero salvage. Acquiring this machine, the firm can now produce 1,000 units of some product each year. The product costs \$4 to make and sells for \$10. Compute the NOPAT given 30% tax rate.

Depreciation

- ▶ Straight-line depreciation
 - ▶ $\text{Depreciation} = (\text{Initial cost} - \text{salvage}) / \text{number of years}$
- ▶ Double declining balance (DDB) method
 - ▶ The double declining balance depreciation method is an accelerated depreciation method that counts twice as much of the asset's book value each year as an expense compared to straight-line depreciation.
 - ▶ $\text{Depreciation} = (\text{Fixed asset} - \text{accumulated depreciation}) \times (2 / \text{asset's life in years})$
- ▶ MACRS – modified accelerated cost recovery system
 - ▶ Need to know asset class is appropriate
 - ▶ Multiply percentage given in table by the initial cost

Example

- ▶ Depreciation for \$100,000 fixed asset, life 10 years, salvage value \$10,000

Straight-Line (10% of begin-salvage every year)				Double-Declining (20% of year's beginning book value every year)		
--	Depr	Book	Accum	Depr	Book	Accum
1	9,000	91,000	9,000	20,000	80,000	20,000
2	9,000	82,000	18,000	16,000	64,000	36,000
3	9,000	73,000	27,000	12,800	51,200	48,800
4	9,000	64,000	36,000	10,240	40,960	59,040
5	9,000	55,000	45,000	8,192	32,768	67,232
6	9,000	46,000	54,000	6,554	26,214	73,786
7	9,000	37,000	63,000	5,243	20,972	79,028
8	9,000	28,000	72,000	4,194	16,777	83,223
9	9,000	19,000	81,000	3,355	13,422	86,578
10	9,000	10,000	90,000	3,422	10,000	90,000

Source: "Financial Accounting", John. J. Wild

MACRS – modified accelerated cost recovery system

RECOVERY PERIOD CLASS						
YEAR	3 YEARS	5 YEARS	7 YEARS	10 YEARS	15 YEARS	20 YEARS
1	.3333	.2000	.1429	.1000	.0500	.03750
2	.4445	.3200	.2449	.1800	.0950	.07219
3	.1481	.1920	.1749	.1440	.0855	.06677
4	.0741	.1152	.1249	.1152	.0770	.06177
5		.1152	.0893	.0922	.0693	.05713
6		.0576	.0892	.0737	.0623	.05285
7			.0893	.0655	.0590	.04888
8			.0446	.0655	.0590	.04522
9				.0656	.0591	.04462
10				.0655	.0590	.04461
11				.0328	.0591	.04462
12					.0590	.04461
13					.0591	.04462
14					.0590	.04461
15					.0591	.04462
16					.0295	.04461
17						.04462
18						.04461
19						.04462
20						.04461
21						.02231

Depreciation is expressed as a percent of the asset's cost. These schedules are based on the IRS publication *Depreciation*. Details on depreciation are presented later in the chapter. Three-year depreciation actually carries over four years because the IRS assumes purchase is made in midyear.

Example

- ▶ ATC just purchased \$105,000 worth of new computers. Installation cost for the new computers equal \$5,000. The computers have a life of five years. Compute depreciation expenses using:
 - ▶ Straight-line method given an accounting salvage value of \$10,000
 - ▶ Double declining method
 - ▶ Five-year MARCS

Operating Working capital expenditures

- ▶ Net operating working capital is the difference between operating current assets and current operating liabilities
- ▶ Firm may find that it must maintain an investment in working capital
 - ▶ Purchase of raw materials before production and sale, giving rise to an investment in inventory.
 - ▶ Credit sales will generate account receivable lowering the cash flows compared to total revenues.
 - ▶ Conversely, accounts payable reduce cash flows paid compared to cost of good sold.

Example

	1 st Oct	1 st Nov	1 st Dec	1 st Jan	1 st Feb
Minimum Cash	\$0	\$1,500	\$1,500	\$1,500	\$0
Accounts Receivable	0	25,000	11,500	2,000	0
Inventory	0	20,000	20,000	2,500	0
Accounts Payable	0	45,000	30,000	15,000	0
Monthly NOWC					
Change in NOWC					

Sunk Costs

- ▶ Costs that have **already been paid (occurred)** and are therefore not recoverable.
- ▶ Since the costs are **in the past**, they cannot be changed by the decision to accept or reject the project.
- ▶ Money that has already been spent on Research and Development Expenditures (R&D) is a **sunk cost** and therefore irrelevant. The decision to continue or abandon a project should be based only on the incremental costs and benefits of the product going forward.



Example

- ▶ The General Milk Company is currently evaluating the NPV of establishing a line of chocolate milk. As part of the evaluation the company has paid a consulting firm US\$100,000 to perform a test-marketing analysis. This expenditure was made last year. Is this cost relevant for the capital budgeting decision now confronting the management of General Milk Company?

Example-solution

- ▶ The answer is NO. The US\$100,000 is not recoverable, so the US\$100,000 expenditure is a sunk cost or spilled milk. Of course, the decision to spend US\$100,000 for a marketing analysis was a capital budgeting decision itself and was perfectly relevant before it was sunk. Our point is that once the company incurred the expense, the cost became irrelevant for any future decision.

Opportunity cost

- ▶ Lost cash flows on an alternative investment that the firm or individual decides not to make
- ▶ Firm may have an asset that is considering selling, leasing, or employing elsewhere in the business. If the asset is used in a new project, potential revenues from alternative uses are lost. Those lost revenues can meaningfully be viewed as costs.
- ▶ The value a resource could have provided in its best alternative use



Example

- ▶ Suppose NRG's new energy drink line will be housed in a factory that the company could have otherwise rented out for \$900 million per year.
- ▶ How would this opportunity cost affect NRG's incremental earnings next year, suppose the company has a tax rate of 39%?



Unavoidable competitive effects

- ▶ When developing a new product, firms may be concerned about the **cannibalization** of existing products.
- ▶ However, if sales are likely to decline in any case as a result of new products introduced by competitors, then these lost sales should be considered a sunk cost.



Cash flows estimation guidance

1. Initial investment outlay

- ▶ Capital budgeting process starts from project initiation usually be the initial investments in the project.
 - ▶ Fixed assets investment – land, building, equipment, etc.
 - ▶ Initial working capital – raw materials for manufacturing process, minimum safety stock

Cash flows estimation guidance

2. Annual operating cash flows

- ▶ After initial investments, project is ready to start generating revenues, incurring expenses. Income statements can be generated, or forecasted.
- ▶ Modified income statement to cash flow basis. Add additional related cash flows:
 - ▶ Additional (or reduction in) net working capital
 - ▶ Additional fixed assets investments – the capital expenditure (Capex)

Cash flows estimation guidance

3. Terminal year cash flow

- ▶ At the end of the projection horizon, either:
 - ▶ Proceeds from sales of fixed assets are estimated with tax effect
 - ▶ including return on all new working capital at the end
 - All inventory is sold
 - The cash balance maintained as a buffer is liquidated
 - All accounts receivable are collected
 - ▶ If the salvage value is different from book value of asset, then there is a tax effect
 - $\text{After tax salvage value} = \text{salvage} - \text{Tax rate} \times (\text{Salvage} - \text{book value})$
 - ▶ Accumulated present value of operating cash flows after horizon

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