Corporate Finance, Module 9, Analyzing Corporate Projects

Homework Assignment

(The attached PDF file has better formatting.)

A project has an 8 year life and requires an investment of $40 million.

	Pessimistic	*Expected*	*Optimistic*
Market Size	120,000	200,000	250,000
Market Share (%)	20%	25%	30%
Unit Price	$700	$800	$900
Unit Cost	$500	$400	$350
Fixed Cost (Millions)	$10 MM	$8 MM	$6 MM

The marginal tax rate is 35%, the opportunity cost of capital is 14%, and the firm uses straight-line depreciation for tax purposes.

A. What is the net present value of this project in the expected scenario?
B. What is the net present value in the pessimistic scenario?
C. What is the net present value in the optimistic scenario?

Solution Format:

Part A: We show the format for computing the net present value. Fill in the column labeled values for the expected scenario, and make similar tables for the optimistic and pessimistic scenarios.

Description	*Calculation Procedure*	*Value*
1. Revenues	200,000 × 25% × $800	
2. Variable cost	200,000 × 25% × $400	
3. Fixed cost	$8,000,000	
4. Depreciation	$40,000,000 / 8	
5. Pretax profit	(1) – (2 + 3 + 4)	
6. Tax	(5) × 0.35	
7. Net profit	(5) – (6)	
8. Net cash flow	(7) + (4)	

Question: Why do we consider depreciation? Depreciation is an accounting item; don't we focus on cash flows?

Answer: We are not concerned with GAAP (book) depreciation; we are concerned with tax depreciation. We remove the straight line depreciation to compute the pre-tax profit and the federal income taxes; we then add back the depreciation to compute the cash flows.

Question: What is a depreciation tax credit? Don't we add back only the depreciation times the tax rate?

Answer: For taxable income, we subtract tax depreciation; call this D. The tax liability is taxable income times the tax rate τ; the tax liability is a cash *outflow*. We add back tax depreciation to get the cash flows. The net effect on cash flows is $-D - (-D \times \tau) + D = + D \times \tau$. The depreciation tax credit is $D \times \tau$.

Later modules cover this subject in more detail. Two errors are common: (i) subtracting (instead of adding) the depreciation tax credit and (ii) using $D \times (1 - \tau)$ as the tax credit.

At 14%, the present value of an 8 year annuity is 4.639. We multiply the net cash flow on the last line of the table by the 4.639 annuity factor and subtract the original investment of $40 million to get the net present value of the project. In practice, the cash flows are rarely the same in all eight years, and we must form a complete spreadsheet with eight years.

Question: How would a financial analyst use this analysis? Why not use expected values for all entries?

Answer: Sales personnel are optimistic; it's hard to succeed in sales if one isn't optimistic. The sales department estimates are a mix of optimistic scenarios and average scenarios. The financial analyst must be sure to include the pessimistic scenarios.

Question: Isn't more important to know net present value analysis than to learn methods of projecting cash flows? For our cash flows analyses, we ask underwriters and agents for best estimates of cash flows; the actuaries work out the net present values.

Answer: We focus in this course on capitalization rates, betas, tax shields, and options. But these are not the major reasons that financial analysts make poor decisions; the major problem is that we can not easily project cash flows.

Instead of just asking the firm about the expected cash flows, the analyst should break up the question into its parts:

- What are the annual expected sales of the product?
- How many firms are competing in this industry?
- What market share do we expect for our firm?
- What is the anticipated price of the product?
- What are our variable costs to produce the product?
- What are our fixed costs to produce the product?

For each of these questions, the analyst takes optimistic and pessimistic values. If expected industry sales are 200,000 units, the analyst may look at values ranging from 150,000 units to 250,000 units. If the firm's expected market share is 25%, the analyst may look at values ranging from 20% to 30%.

The analyst also examines the sensitivity of the net present value to the values in each line. The analyst may ask: if our market share is 10% lower or higher than expected, what is the effect on the net present value?

Question: Are the cash flow projections for insurance products any different?

Answer: For other products, higher costs are associated with lower market share. If a firm makes cellular phones and can produce them for 20% less than its competitors, it will probably have a higher market share. For auto insurance, costs occur after the policies are sold. Higher than expected loss costs generally mean inadequate premiums. We assume that competitors are charging adequate premiums, so higher than expected loss costs often mean higher market share. Lower than expected loss costs often mean redundant premiums and lower market share. Insurance cash flows projections require a keen understanding of the relation between premium adequacy and market share.