

Homework — Project Valuation

Optional. Worked solutions are on the website

Practice problems

8.1

1. Identify which of these are projects in the financial sense, and for each one that is, state what is committed and what comes back: (a) replacing the office air conditioning; (b) paying this month's salaries; (c) training the sales team on a new product; (d) repaying a bank loan early; (e) buying a competitor's customer list.
2. A manager presents a project with a revenue forecast 40% above anything the company has achieved. Give three questions you would ask, and say what you would do if the answers were unconvincing.
3. Explain in three sentences why the discounting is rarely where project valuations go wrong.
4. A firm's finance team rejects a project the operations director is passionate about. Describe two ways the finance team could handle this that would be more useful than simply saying no.

8.2

1. Classify each as include or exclude, with one sentence of reasoning: (a) ₦2M already spent on market research; (b) the rent forgone on a company-owned shop used by the project; (c) interest on the loan funding the project; (d) a 5% fall in sales at an existing branch; (e) the head office finance team's existing salaries.
2. A project uses land the company bought ten years ago for ₦30M, now worth ₦180M. What figure, if any, should appear in the project's cash flows, and why?
3. A new product is expected to generate ₦60M of revenue at a 45% contribution margin, of which 30% will come from customers switching from an existing product with a 55% contribution margin. Compute the incremental annual contribution.
4. Explain in four sentences why interest should not be deducted from a project's cash flows.
5. A pharmacy chain with four branches in Kumasi is opening a fifth, two kilometres from its busiest existing branch. The proposal assumes zero cannibalisation. Describe three pieces of evidence you would seek to test that assumption, and say what you would do if you could not obtain any of them.

8.3

1. A project year has revenue of ₦240M, cash operating costs of ₦186M, depreciation of ₦22M, capital expenditure of ₦15M, and an increase in working capital of ₦6M. The tax rate is 30%. Compute free cash flow.
2. Explain in three sentences why depreciation is subtracted before tax and then added back.

3. A forecast shows sales rising 20%, receivables rising 65%, and the bad-debt provision falling. Give one benign operating explanation and one aggressive-accounting explanation. What evidence would distinguish them, and how would each interpretation affect your cash-flow forecast?
4. Using the Lekki assumptions, recompute Year 3 free cash flow if operating expenses grow at 15% per year instead of 12%. State the change and comment on what it implies about the project's exposure to cost inflation.

8.4

1. A project's Year 5 free cash flow is ₦40M and Year 5 EBIT is ₦34M. The tax rate is 30%, $r = 18\%$, $g = 6\%$, and terminal ROIC is 12%. Compute terminal value first by growing Year 5 free cash flow, then by using `reinvestment rate =  $g/\text{ROIC}$ ` to rebuild Year 6 free cash flow. State the difference.
2. Explain why setting terminal capital expenditure equal to depreciation is a useful maintenance check but not enough to support a growing perpetuity.
3. An analyst uses a terminal growth rate of 3% in a cedi-denominated model where inflation is 18%. Compute the implied real growth rate and comment on whether the assumption is conservative or aggressive.
4. A project's terminal value is 78% of its total present value. State two things this tells you and one thing you would do differently in presenting the result.
5. A five-year project has a Year-0 outlay of ₦200M, a present value of Years 1–5 free cash flow of ₦112M, and Year-5 EBITDA of ₦46M. The discount rate is 20%. Compute the NPV using an exit multiple of $4 \times$ Year-5 EBITDA, and again at $6 \times$. The two answers fall on opposite sides of zero. Which would you present to a board, and what would you say about the one you did not lead with?

8.5

1. For each, argue for a rate above, below, or equal to the firm's overall cost of capital, with two sentences of reasoning: (a) a bakery buying a second oven identical to its first; (b) a bank opening a branch in a country it has never operated in; (c) a hotel refurbishing rooms it already owns; (d) a distributor launching a manufacturing operation.
2. A firm applies its 18% cost of capital to every proposal. Describe two specific ways this will distort its capital allocation over ten years.
3. The Lekki project uses a 22% naira rate while Nigerian Treasury bills yield about 20%. Explain why this should concern you, and describe what you would check.
4. A project's operating margin is 4%. A colleague argues this makes the project riskier and deserves a higher rate. Evaluate the argument in three sentences.

8.6

1. A project costs ₦50M and returns ₦18M, ₦22M, ₦24M, and ₦20M over four years. Compute payback, and NPV at 15%. Then estimate the IRR to the nearest percent.

2. Project A costs ₦5M with an IRR of 40%; Project B costs ₦120M with an IRR of 24%. The firm's cost of capital is 18% and it can fund both. Which should it do, and what does this reveal about IRR?
3. A firm has a strict two-year payback requirement. Describe two kinds of valuable project this rule will systematically reject, and give one legitimate reason a firm might keep the rule anyway.
4. A firm has ₦200M of capital and five projects with the following outlays and present values: A ₦80M/₦100M; B ₦60M/₦69M; C ₦50M/₦68M; D ₦90M/₦103M; E ₦40M/₦46M. Compute each profitability index and select the best combination within budget.

8.7

1. A project has an NPV of ₦12M at 14%, ₦4M at 17%, and -₦3M at 20%. Classify it and write two sentences of recommendation.
2. Explain why a project with a 4% operating margin is more sensitive to a 5% revenue miss than a project with a 20% operating margin, and quantify the difference with an example.
3. A laundry chain's expansion project has a base-case NPV of ₦18M, in which Year 1 revenue is ₦95M. Sensitivity work shows NPV falling by ₦31M for each 10% reduction in Year 1 revenue, and the relationship is close to linear over the relevant range. Estimate the Year 1 revenue at which NPV equals zero, and comment on whether a shortfall of that size is small enough to worry about.
4. Describe the difference between sensitivity analysis and scenario analysis, and explain in three sentences why sensitivity analysis alone tends to understate downside risk.