MIT Sloan School of Management

J. Wang
E52-456

15.407
Fall 2003

Problem Set 9: Capital budgeting

Due: December 9, 2003

1. (BM) United Pigpen is considering a proposal to manufacture high-protein hog-feed. The project would make use of an existing warehous, which is currently rented out to a neighboring firm. The next year's rental charge on the warehouse in $100,000, and thereafter the rent is expected to grow in line with inflation at 4% a year. In addition to using the warehouse the proposal envisages an investment in plant and equipment of $1.2 million. This could be depreciated for tax purposes straight-line over 10 years. However, Pigpen expects to terminate the project at the end of 8 years and to resell the plant and equipment in year 8 for $400,000. Finally, the project requires an initial investment in working capital of $350,000. Thereafter, working capital is forecast to be 10% of sales in each of years 1 through 7.

Year sales of hog feed are expected to be $4.2million, and thereafter sales are forecast to grow by 5% a year. Manufacturing costs are expected to be 90% of sales, and profits are subject to tax at 35%. The cost of capital is 12%.

What is the NPV of Pigpen's project?

2. (BM) A widget manufacturer currently produces 200,000 units a year. It buys widget lids from an outside supplier at a price of $2 a lid. The plant manager believes that it would be cheaper to make these lids rather than buy them. Direct production costs are estimated to be only $1.50 a lid. The necessary machinery would cost $150,000. This investment could be written off for tax purposes using the seven-year tax depreciation schedule. The plant manager estimates that the operation would require additional working capital of $30,000 but argues that this sum can be ignored since it is recoverable at the end of the 10 years. If the company pays tax at a rate of 35 percent and the opportunity cost of capital is 15 percent, would you support the plant managers proposal? State clearly any additional assumptions that you need to make.

3. Acid Rain

Read the HBS case, “Acid rain: The Southern Company (A)”, that is included in the Reading Package. Answer the following questions in your write-up.

(a) Compare Option 1 (burn without scrubbers), Option 2 (install scrubbers) and option 3 (burn low-sulfur cola). In Option 2, assume that the scrubbers are installed promptly, to be operational by 1995. In option 3, assume that the change of equipments occur immediately. Which option has the lowest cost to the Southern Co.?

(b) What about the possibility of delaying the scrubber installation for 5 years, as described in the case. Does this make the scrubbers look more or less attractive? Why?

(c) What would you recommend the Southern Company to do?

Please note:

- State your assumptions.
- Show your calculations.
- If you use a spreadsheet to show the calculations, please explain in the write-up.