Spring 2005
MIT 11.484 Project Evaluation in Developing Countries
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Problem Set 1:
Financial Cash Flows from Alternative Perspectives

Appraisals of an Entertainment Media Loading Project

1. The Department of Industry and Technology of the Government of Calm Island has started the 'Industrial Park' scheme in Cresseda for the promotion of small and medium enterprises. The scheme envisages the selling of 500 square meter plots of land at the end of 2006 to entrepreneurs. In 2007, they are expected to develop the land, build a workshed and install the necessary machinery.

2. Gulshan Poldofsky is currently the manager of a sales outlet for media recorders and DVDs in rented premises. He is expected to earn Rs 24,000 per annum through the year 2010. At the end of the year 2010, the machinery used in the outlet will be totally depreciated. Gulshan also has an open offer for a position in an electronics start-up where he will make Rs 20,000 per annum. He is however considering a plan to join the Industrial Park scheme and set up his own entertainment media project.

3. In December of 2006, the Department of Industry and Technology will purchase the land required for the project at the market price of Rs. 30 per square meter and then directly sell it at the subsidized rate of Rs. 9 per square meter to the promoter. The cost of site development is Rs. 3 per square meter. It is expected that this land can be sold at the price of Rs. 50 per square meter in year 2015 when the project comes to a close and assets are liquidated. The cost of construction is Rs. 400,000 and equipment is Rs. 4,800,000. The construction works and equipment are expected to have useful lives of 20 years and 12 years respectively. The annual maintenance expenses for construction works and equipment will be Rs. 100,000 from 2006 onwards.

4. Production will begin in year 2006 with 200,000 DVDs. From the following year, production will go up by 25,000 per annum and it will stabilize in year 2010 when the production level reaches 300,000 DVD per annum. Gulshan will have to devote all his time to the project starting year 2006 when production begins. He will not have to spend any time away from his current operations when the construction and installation works are being undertaken.

5. The promoter will procure raw material on credit, and accounts payable at any time are expected to be 8.25% of the annual cost of raw material. Any outstanding bills from year 2014 will be settled in year 2015. The purchase price of one jumbo sheet of raw recording media material is Rs. 1 million. Each sheet will be used to produce 25,000 DVDs. The purchase price of DVD label lamination material is Rs. 16 per DVD. The manufacturing and packaging expenses per DVD are Rs. 10.

6. The sales price of a DVD is Rs. 70 and accounts receivable are expected to be 7.5% of sales revenue. Cash balance requirements will be 4% of sales revenue. All outstanding receivables at the end of year 2014 will be collected in year 2015.

7. The promoter will be given financial assistance by the Industries Department in the form of a term loan disbursed at the end of 2006 to cover the initial cost of land purchase, site development, construction and machinery. The loan will carry an interest rate of 7.5% per annum. Unpaid interest will be capitalized and added to the initial principal. Principal and interest will be repaid in 7 equal installments starting in 2008.

8. The plant is set up in 2007, production takes place from year 2006 to 2014 and liquidation takes place in 2015.

NOTE: Assume there is no price inflation.

The Assignment:

1. Construct a table of parameters.

2. Construct a loan schedule, showing the interest and principal repayments throughout the life of the project.

3. Construct a 12-year financial cashflow profile (2006-2015) of the project from the point of view of the total invested capital. Calculate the net present value of the project using a discount rate of 9.5%.

4. Construct a 12-year cashflow profile of the project from the owner's (promoter's) point of view. Calculate the net present value of the project using a discount rate of 11%. Is this an attractive project to the owner?

5. Construct a 12-year cashflow profile of the project from the economy's point of view. Calculate the net present value of the project using a discount rate of 13%.

6. Construct a 12-year cashflow profile of the project from the point of view of the Department of Industry and Technology's budget. (no need to calculate a NPV) How would the cashflow change if the department owned the land instead of buying it?

7. The promoter is concerned that the project benefits are sensitive to the price of DVD label lamination material and would like to investigate the issue. Conduct a sensitivity analysis to determine the effect of the price of DVD lamination material on the net present value of the project from the promoter's perspective. (Start with a price of Rs. 14 and increase it by an increment of Rs. 1 to a maximum value of Rs. 24) Is the project sensitive to the price of lamination material?

HINT:
To calculate the equal installments for principal and interest repayments, use the @PMT function of the spreadsheet:

@PMT (debt at beginning of Yr of repayment, interest rate, number of years of repayment)

For example, if a loan is given at a rate of 8%, and the repayment is to start at the end of year 4 and is to go on for 6 years, one would compute the annual installment as follows:
@PMT (debt at the beginning of Yr 4,0.08,6)