

Additional Problems: Chapter Five: Comparison Methods 2

5S.1

General Cars is considering the purchase of a welding robot. The robot costs \$50 000 and has an expected life of eight years, with a final salvage value of \$10 000. Major maintenance is required at the end of the 2nd, 4th and 6th years, at \$5 000/occasion. If the robot is acquired, operating costs for the company will go down by \$25 000/year over the robot's life. The company's MARR is 20% per annum. On the basis of the IRR, should this investment be made?

***5S.2**

Cape Town Pizza is planning to open a new franchise. Four locations are under consideration: the waterfront, Signal Hill, Cape Grace, and Camps Bay. These alternatives involve initial costs of R 10 000, R 12 000, R 15 000 and R 20 000 respectively, and will generate revenues at the end of one year of R 11 200, R 13 800, R 16 950 and R 22 500, again respectively. The company will invest in any project that generates a rate of return of 10% or more. Assuming they are only going to open one new franchise, which location should be chosen? (Use incremental analysis based on the internal rate of return.)

If the company has enough capital to open multiple franchises, which one(s) should be chosen?

5S.3

Themba Ntombela has R 10 000 000 which he plans to invest in a hotel in Pretoria. He expects to make R 8 000 000 in the first year of operation, and another R 9 000 000 in the second year. He does not want to consider possible income beyond a two-year horizon, as he is uncertain of the future of the tourist trade.

Charl Van Den Akker already operates several hotels in Pretoria, and does not want competition from Ntombela. He offers to pay Ntombela R 1 000 000 if he will go to Cape Town and open his hotel there instead. What rate of return would Ntombela have to expect to earn from opening a hotel in Cape Town to make it worthwhile for him to accept Van Den Akker's offer?

***5S.4**

A project has £200 start-up costs, generates £300 and £100 income in the first and second years of operation respectively, then has a wind-up cost of £100 in the third year. The external interest rate, which is also the firm's MARR, is 10%. Find the IRR and ERR of the project, and say whether it should be carried out.

5S.5

An investor is considering two mutually exclusive investments, buying a water taxi or constructing a canal. These involve initial capital investments of \$58 500 and \$48 500 respectively. The water taxi project will yield \$6 648 every year over the project life, and at the end of ten years, the taxi can be sold for \$30 000. The canal project yields nothing until it is completed in ten years time, when it can be sold for \$138 000.

What is the incremental IRR associated with buying the taxi instead of building the canal? Over what range of values of the company's MARR is the taxi preferable to the canal, assuming that the company's capital can be invested externally at a rate equal to the MARR?

*5S.6

After a long period of unemployment, Jamal signs a contract to work in the distant nation of Placidia. The job requires him to be away from home for two years, and the majority of his pay is held back until he has completed the contract. If he leaves before this, he gets nothing. He receives an immediate signing bonus of Rs 70 000, but he has to spend Rs 30 000 of this on an air ticket to Placidia. The rest he gives to his family. Once in Placidia, he is provided with food and board, but after working for a year, there are unexpected difficulties in renewing his work permit. Eventually he has to pay Rs 150 000 in fees and bribes, for which he has to re-mortgage his house back home. At the end of his second year he is paid Rs 170 000. Air fares have gone up in the meantime, so he spends another Rs 35 000 on an air ticket and flies home.

Regarding the entire trip as a business investment, what is Jamal's IRR? If there are multiple solutions, you should also calculate his approximate and his exact ERR. You should assume that he can invest his funds at 12.5%.

5S.7

Yan invests $\overline{\text{¥}}10\,000\,000$ to build a casino in Macao. In the first year he makes a profit of $\overline{\text{¥}}20\,000\,000$. But in the second year, a syndicate of card-counters infiltrate his casino, and he loses $\overline{\text{¥}}15\,000\,000$. In the third year he is able to eliminate the card-counters, and makes a profit of $\overline{\text{¥}}50\,000\,000$. Assume that his income and his losses occur continuously throughout each year, and that they are all continuously compounded. What is his IRR? Any money he does not invest in the casino, he can put in his cousin's banking business, where he can earn 15%. What is his approximate ERR?