



CBA Exercise 1

1. A new (fourth) lane on the M1 is to be constructed. The costs and benefits of this road are as follows:

- £7.5million reduction in accidents calculated from life insurance values;
- £3.2million in planning;
- £2million in time-saving calculated from leisure preferences;
- £6.5million in materials;
- £6million for labour;
- £3.5million for displacement of households;
- £11million in time-savings calculated from wages.

(a) Perform a cost-benefit analysis of this project by calculating the total costs and benefits of the new road and presenting them in a table? (Assume all costs and benefits have been discounted to present values).

(b) Should the project go forward?

2. The Safe Water Drinking Act required the United States Environmental Protection Agency to establish action standards for lead in drinking water. The EPA evaluated 3 options (labelled A, B and C in the table below) using cost benefit analysis techniques. A selection of the results of this analysis is presented in the following table.

	Option		
	A	B	C
Total Benefits	\$68,957	\$63,757	\$24,325
Total Costs	\$6,272	\$4,156	\$3,655
Benefit to Cost Ratio	11.0	15.3	6.7
Marginal Benefit (MB)	\$5,192	\$39,440	\$24,325
Marginal Cost (MC)	\$2,117	\$500	\$3,665
MB to MC Ratio	2.5	78.8	6.67

(Source: Perman et al, 1999)

Option A involves the strictest standard, Option C the least strict, and option B is the intermediate option. The marginal cost and marginal benefit figures refer to incremental costs/benefits incurred in moving from no control to option C, from option C to B, and from option B to A. The US EPA chose option B. Is option B the right choice and why?

3. Using the discounting equation shown below, calculate the following net present value of a benefit accrued from a construction project.

$$P = \frac{F}{(1 + r)^n}$$

The benefits of the investment are equal to £50,000 in 5 years time. The estimated interest rate is 5%.

4. Consider a project has initial costs equal to £100,000, and yields £30,000 for five years. At the end of year 5 there is a cost of £20,000 to dispose of waste. At a discount rate of 10%, should the project be undertaken?

5. (a) The government are considering a congestion charging scheme in Derby, similar to that found in London. The scheme will cost an initial £52 million to implement (consider this year 0), and a further £16m in year 1, in order to ensure efficiency (including maintenance). The scheme will yield estimated benefits (through charging car users £5 for entry/exit into Derby) of £30m in year 1, £28m in year 2, and £20m in year 3. The expected rate of interest (discount) is 5%. Discount these figures to present value, and perform a cost benefit analysis on the scheme. Should the scheme go ahead?

(b) What other factors may need to be considered prior to implementing the scheme?