

ECO B9502
Urban Economics
Review Sheet

Year	Benefit	Cost	Salvage Value
Beginning of Year 1	\$0	\$50000	0
End of Year 1	\$60000	\$48000	0
End of Year 2	\$55000	\$35000	0
End of Year 3	\$45000	\$33000	0
End of Year 4	\$40000	\$32000	0
End of Year 5	\$25000	\$30000	\$5000

1. Suppose a transportation firm is considering investing in a project with the costs and benefit per period given above.
 - (a) If the discount rate is 8%, should the firm invest in the project?
 - (b) Suppose the discount falls to 2%. Should it invest?
 - (c) Suppose the discount rate is 10%. Should the firm invest? If not, what is the minimum salvage value S needed to make the project worthwhile?

2. A highway is subject to congestion. The total variable cost of travel per mile on the highway is

$$\text{TVC} = 20V + 6V^2$$

Where V is traffic volume per hour, measured in hundreds of vehicles per hour.

Assume that demand on the highway is given by

$$P = 60 - V$$

Where P is the "price" paid by the driver.

- (a) What are P and V if no toll is imposed?
Assume an efficient toll is imposed.
- (b) Compute the toll.
- (c) What are the efficient levels of V , P , and AVC ?

3.
 - (a) What is an externality?
 - (b) What is a type of externality associated with highway travel?
 - (c) What causes this type of externality?

4. Why might a project that is found to have a $NPV < 0$ for a private firm be a worthwhile investment for a *public* authority?

5. Suppose a public authority builds a tunnel that exhibits Increasing Returns to Scale.
 - (a) Will the tunnel be self-financing if the Authority utilizes first-best pricing?
 - (b) What type of pricing might the authority employ to ensure that the tunnel is self-financing and social surplus is maximized?