

**Problem Set #8**

1. Suppose the government is considering a program that involves purchasing 60 new airplanes. It wishes to know the social cost of this program. Use the following information to calculate the social cost of this program, where social cost takes into account both the necessary government expenditures for airplanes as well as any net changes in consumer plus producer surplus.

- Before implementation of the program, the market demand for airplanes is given by:

$$Q = 500 - P, \text{ where } Q \text{ is the quantity of airplanes and } P \text{ is the price.}$$

- The market supply curve for airplanes is  $Q = -100 + P$
- The market price of airplanes before the program is implemented is  $P = \$300$
- Government demand under this program is given by  $Q^G = 60$ .

2. For the following problems, assume the interest rate is 5%.

A. What is the present value of \$100 a year, starting next year and lasting forever?

B. What is the present value of \$100 a year, starting next year and lasting for 15 years?

C. Current estimates suggest that when comparing individuals with similar abilities, those who decide to go to college will earn on average 44 percent more than those who graduate from high school but don't go to college. Suppose someone is in his senior year of high school (call this year 0) and is trying to decide between the following two choices:

1. Start working next year (in year 1) and work for 44 years at an annual salary of \$37,300.
2. Go to college for the next 4 years (years 1-4), paying an annual tuition of \$10,000. After 4 years of college, work (beginning in year 5) for 40 years at an annual salary of \$53,700.

Which gives the highest present value of net benefits?

3. Suppose you wish to estimate the economic value of life using the Required Compensation approach. You have observations on the characteristics from 4 different occupations. They are:

Occupation	Annual Salary	Annual risk of death	Education required	Years of experience required
A	\$70,000	0	College degree	5
B	\$35,000	1/8000	High school degree	6
C	\$60,000	1/2000	College degree	1
D	\$34,000	0	High school degree	6

Comparison of which 2 occupations will give the most accurate measure of the economic value of life? Explain. Use your comparison to calculate the economic value of life.

4. Suppose the value of a life is estimated to be \$7 million. Suppose that a new safety device saves lives as follows:

$$\text{Additional lives saved} = 18 - 4 \cdot Q,$$

where Q is the number of these devices installed. (Note: “Additional lives saved” means “marginal lives saved.”)

If the cost of each safety device is \$14 million, how many safety devices are socially optimal?

5. What do Type I and Type II errors have to do with the Food and Drug Administration’s (FDA) decisions?