

**DISCUSSION QUESTION**

Name:

Instructor:

Course:

A government report titled "The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings" found that individuals with a college degree earn approximately \$900,000 more than individuals with only a high school degree over their working life. It also found that the net present value of a college degree is approximately \$250,000.<sup>1</sup>

- a) Why is the net present value of a college degree substantially lower than the additional lifetime earnings of individuals with a college degree?
  
  
  
  
  
  
  
  
  
  
- b) If a college degree is such a good investment, why doesn't everyone get a college degree?
  
  
  
  
  
  
  
  
  
  
- c) Suppose the number of people who earn a college degree were to double in the next four years. How would this likely impact the returns to a college degree? Would this be a positive or negative change for society?

<sup>1</sup> <https://www.census.gov/prod/2002pubs/p23-210.pdf>

**PEER GROUP PROBLEM SOLVING**

Name:

Instructor:

Course:

Suppose economists estimate that the Grand Canyon would add \$5 billion in value (benefits) to society each year over the next 5 years.

- a) One economist believes the discount rate should be 2%. Calculate the present value associated with the Grand Canyon given this discount rate.
  
  
  
  
  
  
  
  
  
  
- b) Another economist believes the discount rate should be 8%. Calculate the present value associated with the Grand Canyon given this discount rate.
  
  
  
  
  
  
  
  
  
  
- c) Which of these two economists values the present relatively more than the future?

**IN-CLASS EXPERIMENT / ACTIVE EXERCISE**

Have students split into pairs and consider the following hypothetical scenario.

Congratulations! You have won a completely hypothetical lottery! You have two options in terms of how you can collect your hypothetical winnings:

- a) You can receive \$600,000 in ten years, or
- b) You can receive \$300,000 today.

Which option would you select? Explain what factors you considered in making your choice.

If you selected the \$600,000 in ten years over the \$300,000 today, ask yourself how *high* would today's payment have to be before you would change your selection. In other words, if the payment today were equal to \_\_\_\_\_, you would be indifferent between the two options. Write this figure down on a blank sheet of paper.

If you selected the \$300,000 today over the \$600,000 in ten years, ask yourself how *low* would today's payment have to be before you would change your selection?

In other words, if the payment today were equal to \_\_\_\_\_, you would be indifferent between the two options. Write this figure down on a blank sheet of paper.

Exchange figures with the person you were paired with, then use these figures to calculate his or her discount rate.

## SOLUTIONS AND INSTRUCTOR NOTES

### Discussion Question

A government report titled "The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings" found that individuals with a college degree earn approximately \$900,000 more than individuals with only a high school degree over their working life. It also found that the net present value of a college degree is approximately \$250,000.

- a) Why is the net present value of a college degree substantially lower than the additional lifetime earnings of individuals with a college degree?

To calculate the net present value, we must adjust the additional lifetime earnings by inflation, and account for the cost of attending college and the opportunity cost of going to college (the earnings that could have been made while in college).

- b) If a college degree is such a good investment, why doesn't everyone get a college degree?

There are many factors that enter into the decision of whether or not to attend college. Some people can't afford to pay the direct costs of college or find the implicit costs to be too high. Others don't have the technical ability needed to earn a college degree.

- c) Suppose the number of people who earn a college degree were to double in the next 4 years. How would this likely impact the returns to a college degree? Would this be a positive or negative change for society?

This would increase the supply of college educated workers in the labor market and likely cause a decrease in the returns to a college degree.

Although this may decrease the returns to a college degree, it would represent a positive change from society's perspective, given that society would have a more highly skilled workforce.

### Peer Group Problem Solving

Suppose economists estimate that the Grand Canyon would add \$5 billion in value (benefits) to society each year for the next 5 years.

- a) One economist believes the discount rate should be 2%. Calculate the present value associated with the Grand Canyon given this discount rate.

*The present value is equal to:*

$$\begin{aligned} & \$5,000,000,000/(1.02) + \$5,000,000,000/(1.02)^2 + \$5,000,000,000/(1.02)^2 + \\ & \$5,000,000,000/(1.02)^3 + \$5,000,000,000/(1.02)^4 + \$5,000,000,000/(1.02)^5 \end{aligned}$$

$$= \$4,901,960,784 + \$4,805,843,906 + \$4,711,611,672 + \$4,619,227,130 + \$4,528,654,049$$

$$= \$23,567,297,541$$

- b) Another economist believes the discount rate should be 8%. Calculate the present value associated with the Grand Canyon given this discount rate.

$$\frac{\$5,000,000,000}{(1.08)} + \frac{\$5,000,000,000}{(1.08)^2} + \frac{\$5,000,000,000}{(1.08)^3} + \frac{\$5,000,000,000}{(1.08)^4} + \frac{\$5,000,000,000}{(1.08)^5}$$

$$= \$4,629,629,629 + \$4,286,694,102 + \$3,969,161,205 + \$3,675,149,263 + \$3,402,915,985$$

$$= \$19,963,550,184$$

- c) Which of these two economists values the present relatively more than the future?

*The economist that chooses the higher discount rate values the present relatively more than the economist that selects the lower discount rate.*

### In-Class Experiment / Active Exercise

Have students split into pairs and consider the following hypothetical scenario.

Congratulations! You have won a completely hypothetical lottery! You have two options in terms of how you can collect your hypothetical winnings:

- a) You can receive \$600,000 in ten years, or
- b) You can receive \$300,000 today.

Which option would you select? Explain what factors you considered in making your choice.

If you selected the \$600,000 in ten years over the \$300,000 today, ask yourself how *high* would today's payment have to be before you would change your selection. In other words, if the payment today were equal to \_\_\_\_\_, you would be indifferent between the two options. Write this figure down on a blank sheet of paper.

If you selected the \$300,000 today over the \$600,000 in ten years, ask yourself how *low* would today's payment have to be before you would change your selection? In other words, if the payment today were equal to \_\_\_\_\_, you would be indifferent between the two options. Write this figure down on a blank sheet of paper.

Exchange figures with the person you were paired with, then use these figures to calculate his or her discount rate.

*Students may have difficulty calculating the discount rate because it involves working with exponents. The instructor may wish to tell them how in advance or put this formula on the exercise sheet.*

*The formula for present value is given by:*

$$\text{Present Value} = \text{Future Value} / (1 + r)^t$$

*In this case:*

$$PV = \$600,000 / (1+r)^{10}$$

$$PV^{0.10} \times (1 + r) = \$600,000^{0.10}$$

$$PV^{0.10} + PV^{0.10} \times r = 3.7828$$

*So if the present value were equal to \$400,000, you can calculate the discount rate as:*

$$3.6325 + 3.6325r = 3.7828$$

$$r = 0.1503 / 3.632 = 0.0414$$

*For more in-class experiment and active learning ideas, visit [www.econedactive.com](http://www.econedactive.com).*