Policy Evaluation – PMAP 4061
Quiz 4: Cost-Benefit Analysis

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1. (1 point) Which of the following rates of return makes the investment below worth pursuing?

Time	Cost	Benefit
0	$10,000	
1		$4,000
2		$4,000
3		$4,000

    A. 9%

    B. 10%

    C. Both of the above

    D. None of the above

> **Solution:** To solve, find the the rate of return which makes the NPV positive. That is, $-\$10,000 + \left[\frac{\$4,000}{(1+0.09)} + \frac{\$4,000}{(1+0.09)^2} + \frac{\$4,000}{(1+0.09)^3}\right] > 0$. The inequality is true for a 9% rate but not for a 10% rate.

2. (1 point) Move the $10,000 cost item down to time 1 (i.e., backloading costs). Which rate(s) would make the investment worth pursuing?

    A. 9%

    B. 10%

    C. Both of the above

    D. None of the above

> **Solution:** This time, a 10% rate would also work; i.e., $-\frac{\$10,000}{(1+0.1)} + \left[\frac{\$4,000}{(1+0.1)} + \frac{\$4,000}{(1+0.1)^2} + \frac{\$4,000}{(1+0.1)^3}\right] > 0$.

3. (1 point) Move the first $4,000 payment up to time 0 (i.e., frontloading payments). Which rate(s) would make the investment worth pursuing?

    A. 9%

    B. 10%

    C. Both of the above

    D. None of the above

> **Solution:** Same as before, both rates return a positive NPV. Hacking time of receipt is a very effective way of gaming cost-benefit analysis!

4. (1 point) Which of the following project(s) is amenable to cost-benefit analysis?

    A. The reform of US electoral colleges

    B. The implementation of a new high school curriculum

    C. The hire of a Summer intern to help on a Festival preparation

    D. Both B) and C)

> **Solution:** Cost-benefit analysis might only be used for projects which are limited in scope and scale. Also, we mostly want to use it for comparative purposes. The general equilibrium effects and unintended effects of options A) and B) would be too many for any sensible cost-benefit model to work. Conversely, running the cost-benefit calculations for hiring a Summer intern versus making do with current staff can be done neatly.

5. (1 point) Using the table below, calculate the hedonic price of the public park.

Feature	Apt. A	Apt. B	Apt. C	Apt. D
Gym	no	yes	yes	yes
Public Park	no	yes	no	yes
Rooftop	no	no	yes	yes
Cost	$80,000	$100,000	$140,000	00,000

    A. $20,000

    B. $40,000

    C. $60,000

    D. $80,000

> **Solution:** Apartments C and D might be compared because they have equivalent features but for the public park. To obtain the park's price, subtract out the price of apartment C from apartment D's; i.e., $200,000 - $140,000 = $60,000$.

6. (1 point) Calculate the Value of Statistical Life (VSL) using the table below. The table below reports the number of annual fatalities for 100,000 workers and salaries for two different jobs.

Job	Fatality rate	Salary
A	0.01	$150,000
B	0.02	$200,000

    A. $5 mln

    B. $10 mln

    C. $20 mln

    D. $50 mln

> **Solution:** To solve, use the VSL formula $VSL = \frac{\Delta wage}{\Delta risk} = \frac{\$200,000 - \$150,000}{0.02 - 0.01} = \$5 \; mln.$

7. (1 point) Hedonic price theory hinges upon an important principle in economic policy analysis. Which one is that?

    A. Time discounting

    B. Revealed preferences

    C. Bounded rationality

    D. Pareto efficiency

> **Solution:** Prices indirectly "reveal" the preference of agents in the economy. Answer choice B) is correct.

8. (1 point) Educational policy analysis is often involved with rate of return calculations for class size policies. People are interested in the rate of return for policies which reduce class size. What data points are needed to evaluate said policies?

    A. Current earnings of kids and future earnings of teachers

    B. Future earnings of kids and future earnings of teachers

    C. Current earnings of kids and current earnings of teachers

    D. Future earnings of kids and current earnings of teachers

> **Solution:** The potential benefit from the policy is increased student lifetime earnings at the cost of increased teacher salary payments. Option D) applies.

9. (1 point) Who is going to discount his future earnings the most?

	Opportunity Cost
Average Joe	Market historical rate of return
Government	US treasury bonds 2020 yearly return
Elon Musk	Tesla's 2020 yearly return
Warren Buffett	S&P500's 2020 yearly return

    A. Average Joe

    B. Government

    C. Elon Musk

    D. Warren Buffett

> **Solution:** Clearly, C) Elon Musk must be the correct choice. Tesla's 2020 stock market performance has been one to remember, therefore Elon is going to discount future earnings much more than the other options.

10. (1 point) Romans and behavioral economists have something in common. No cost-benefit analysis would ever convince them of taking down the Colosseum. They heed to the _____ of the amenity.

    A. Statistical value

    B. Hedonic value

    C. Time value

    D. Bequest value

Solution: Answer choice D) is correct as per definition of bequest value.