Homework 1

Solutions

1. Which of the following statements represent positive analysis and which represent normative analysis? (8 Points)

   (a) A 50-cent-per-pack tax on cigarettes will lead to a 12 percent reduction in smoking by teenagers.
   `positive`

   (b) The government should spend more on AI research.
   `normative`

   (c) Rising paper prices will increase textbook prices.
   `positive`

   (d) The price of housing in China is too high.
   `normative`

2. The company that you manage has invested $5 million in developing a new product, but the development is not quite finished. At a recent meeting, your salespeople report that the introduction of competing products has reduced the expected sales of your new product to $3 million.

   (a) If it would cost $1 million to finish development and make the product, should you go ahead and do so? Why? (2 Points)
   `Yes`

   (b) What is the most that you should pay to complete development? (2 Points)
   `$3 million`

3. You are given two choices after college: work or go to law school. Suppose law school takes one year to complete and the tuition is $50,000. Having a law degree will increase your life-time earnings by $100,000. Studying law, however, is hard and you value the "enjoyment" of studying for one year at -$10,000. Suppose, on the other hand, that if you do not go to law school, you can work at a firm that pays you $60,000 per year. Suppose there are no other costs and benefits involved.

   (a) What is your opportunity cost of going to law school? (2 Points)
   `60,000 + 50,000 + 10,000 = 120,000`

   (b) What is your opportunity cost of working? (2 Points)
   `100,000 - 50,000 - 10,000 = 40,000`

   (c) Suppose your friend Tom faces the same two choices after college and he chooses to go to law school. What does Tom's choice say about how much he enjoys studying law? (2 Points)
   `Tom's enjoyment of studying law` $\geq$ `10,000`

4. The Stanford marshmallow test was a study conducted by Walter Mischel and Ebbe Ebbesen at Stanford University in 1970. In this study, children aged 3 to 5 were give a marshmallow and two choices: either they could eat the marshmallow immediately, or, if they wait 15 mintues without eating the marshmallow, they would be awarded with a second marshmallow so that they could have two.

   Let u_1 be the enjoyment of eating one marshmallow immediately, u_2 be the enjoyment of eating one marshmallow after 15 minutes, and c be the cost of waiting 15 minutes.

   (a) What is the opportunity cost of eating the marshmallow immediately? (2 Points)
   $2u_2 - c$

   (b) What is the opportunity cost of choosing to wait 15 minutes and then eat two marshmallows? (2 Points)
   $u_1 + c$

   (c) Assuming children behaved "rationally," what conclusion can you draw about the children who behaved differently (some chose to eat immediately, others chose to wait)? (2 Points)
   For those who chose to eat immediately, $u_1 > 2u_2 - c$, i.e. they valued the enjoyment of eating now much more than enjoyment in the future, or they really hate waiting.