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LECTURE 03: OPPORTUNITY COST AND MARGINAL ANALYSIS

I.   Consider this diagram:

Fluctuations in Grad Student Enrollment (Science & Engineering)

Fluctuations in the Unemployment Rate

Correlation Coefficient: $\rho = 0.75583$ (that's pretty high)

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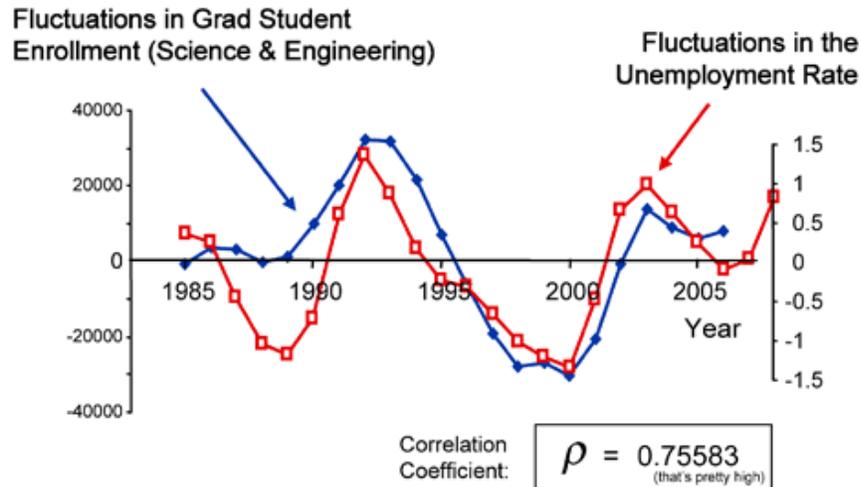
   a. Trade-offs are everywhere: it is a consequence of choice. For everything you choose, there is something you must give up.
   b. This is the *opportunity cost*—the net gain of the next best option.
        i. Note this is net gain: include the costs as well as the benefits.
        ii. When the opportunity cost is high, that means you are sacrificing a lot; when it is low, you are sacrificing little.
        iii. In that way, they are costs in the truest sense. Indeed, all costs are really opportunity costs. When you buy something, it doesn't cost you the money you spent. It cost you what you would have spent that money on.

II.   So what?
   a. *Efficiency*—Maximizing output with a given amount of input.
        i. Also known as minimizing waste.
   b. Efficiency seems like a dry, heartless concept but it isn't.
        i. By being able to do more with less, we can use what's saved to do other things—in effect we lower our opportunity cost and do the things we would normally forgo.
        ii. These other things are not just consumer items. Innovation, art, education, meditation, music, socializing, and traveling are all things we can do.
        iii. Indeed the history of humanity includes more of these higher pursuits as people save the time and money to not just make these

things but appreciate them. Efficiency helped bring about the works of Mozart, Shakespeare, Aristotle, and Confucius—people don't ponder art and philosophy when they're struggling to survive.

    iv. Greater wealth also opens the door for medicine, sanitation, a variety of food, safe streets, warm shelter, electricity, etc.

III. The Role of Prices

    a. Under capitalism, ownership—and thus decision-making authority—is decentralized. Because it's decentralized, there need to be a mechanism that allows coordination.

    b. Prices solve both problems socialism struggles with. The price for a good or service is information—it informs us how scarce something is—and it's an incentive—when prices change, then behavior changes.

    c. Imagine the price of cheese increases. Imagine people don't know why it's increasing—and it's important that they don't know why. Even in their ignorance as to the cause of higher cheese prices, we know the most important fact: cheese is becoming scarcer.

    d. At the same time, people who eat cheese will eat less cheese for the obvious reason that it's more expensive to eat cheese. This is desirable: if cheese is scarcer, we want people who value the cheese the least to not consume what's there. The people who value cheese the least are the most likely to see those higher prices and decide it's not worth it.

    e. At the same time, people who make cheese will have an incentive to make more cheese for the obvious reason that it's a more profitable good to sell. This is desirable; if cheese is getting scarcer, we want resources, like milk and effort, reallocated to making cheese. Their other uses, like yogurt and ice cream, are less valuable uses for milk.

    f. And so the great economic miracle. Without a central planner, without a great coordinator, resources are allocated efficiently. We live in a world of unprecedented abundance and no one is in charge!

IV. Applications

    a. Do disasters make us wealthier?

    b. Does war make us wealthier?

    c. Does a draft make us wealthier?

    d. Does job creation for the sake of job creation make us wealthier?

V. The Marginal Revolution

    a. The Diamond-Water Paradox

        i. Water is critical for life and diamonds are not. Why is water so cheap and diamonds so dear?

    b. The paradox was solved with the Marginal Revolution

  i. Margin: the change in total something, each individual units of something
  ii. Marginal analysis: decisions are made on the margin; a little bit more or a little bit less
  iii. People put value on something based on marginal analysis

c. Diminishing Marginal Utility
  i. *Utility*—economic lingo for satisfaction or benefit
  ii. Each additional unit—each marginal change—generates less and less utility (we call this diminishing marginal utility).
  iii. The first ice cream I eat is great, the second isn't as good as the first, the third is even less, the fourth starts tasting disgusting

d. Oranges example
  i. Suppose I hand you 12 oranges. What do you use them for and in what order?

ORANGE	UTILITY	ORANGE	UTILITY	ORANGE	UTILITY
1st	$20	*5th*	$16	*9th*	$12
2nd	$19	*6th*	$15	*10th*	$11
3rd	$18	*7th*	$14	*11th*	$10
4th	$17	*8th*	$13	*12th*	$9

  ii. Note that each item down the list would be worth less and less to you.

e. Marginal utility
  i. The value of one more gallon of water is very low but the value of one more diamond is quite high
  ii. Use the most valuable ends first, then go down the list

f. Marginal cost
  i. Marginal cost follows the same pattern as marginal utility, it just goes in the opposite direction
    1. Marginal cost *increases* (instead of *decreases*)
    2. Start with the *lowest cost* (instead of the *highest value*)

g. Oranges example, cont.
  i. Now suppose that I'm picking the oranges I'm handing you form a large tree. This time, I start with the lowest cost first.

ORANGE	COST	ORANGE	COST	ORANGE	COST
1st	$8	*5th*	$12	*9th*	$16
2nd	$9	*6th*	$13	*10th*	$17
3rd	$10	*7th*	$14	*11th*	$18

*4*th	$11	*8*th	$15	*12*th	$19

VI. Synthesis

   a. Suppose instead of giving or handing you the oranges, I sell you them.

      i. For the first orange, it costs me $8 to get the orange and you are willing to pay $20. Thus there are many opportunities for us to agree on price

      ii. For the next orange, it costs me $9 and you value it at $19. Again, there are many opportunities to agree on a price (though there are slightly fewer).

      iii. This continues until the 7th orange, where the only price we can agree on is $14.

      iv. Note if we try to exchange an 8th orange, we wouldn't agree on a price.

ORANGE	UTILITY	COST	ORANGE	UTILITY	COST
*1*st	$20	$8	*7*th	*$14*	*$14*
*2*nd	$19	$9	*8*th	$13	$15
*3*rd	$18	$10	*9*th	$12	$16
*4*th	$17	$11	*10*th	$11	$17
*5*th	$16	$12	*11*th	$10	$18
*6*th	$15	$13	*12*th	$9	$19

   b. The key idea behind marginal decision making is that people will engage in an action until marginal benefit equals marginal cost

   c. Again, the miracle of prices appears. If the price rises, then you will forgo your *least* valuable action. If it falls, the most costly item doesn't get produced. These socially desirable results emerge without a central planner. Prices solve problems.