

### LECTURE 03: MARGINAL ANALYSIS

- I. 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
1 <sup>st</sup>	\$20	5 <sup>th</sup>	\$16	9 <sup>th</sup>	\$12
2 <sup>nd</sup>	\$19	6 <sup>th</sup>	\$15	10 <sup>th</sup>	\$11
3 <sup>rd</sup>	\$18	7 <sup>th</sup>	\$14	11 <sup>th</sup>	\$10
4 <sup>th</sup>	\$17	8 <sup>th</sup>	\$13	12 <sup>th</sup>	\$9
    - ii. Note that each item down the list would be worth less and less to you.
    - iii. Now suppose I give 11 oranges instead. Do you divvy up the orange, reducing each activity by a twelfth or do you give up an option on your list? If so, what option do you give up?
  - 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
1 <sup>st</sup>	\$8	5 <sup>th</sup>	\$12	9 <sup>th</sup>	\$16
2 <sup>nd</sup>	\$9	6 <sup>th</sup>	\$13	10 <sup>th</sup>	\$17
3 <sup>rd</sup>	\$10	7 <sup>th</sup>	\$14	11 <sup>th</sup>	\$18
4 <sup>th</sup>	\$11	8 <sup>th</sup>	\$15	12 <sup>th</sup>	\$19

## II. 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 7<sup>th</sup> orange, where the only price we can agree on is \$14.
  - iv. Note if we try to exchange an 8<sup>th</sup> orange, we wouldn't agree on a price.

ORANGE	UTILITY	COST	ORANGE	UTILITY	COST
1 <sup>st</sup>	\$20	\$8	7 <sup>th</sup>	<b>\$14</b>	<b>\$14</b>
2 <sup>nd</sup>	\$19	\$9	8 <sup>th</sup>	\$13	\$15
3 <sup>rd</sup>	\$18	\$10	9 <sup>th</sup>	\$12	\$16
4 <sup>th</sup>	\$17	\$11	10 <sup>th</sup>	\$11	\$17
5 <sup>th</sup>	\$16	\$12	11 <sup>th</sup>	\$10	\$18
6 <sup>th</sup>	\$15	\$13	12 <sup>th</sup>	\$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. This socially desirable result emerges without a central planner. Prices solve problems.

## III. Demand for labor

- a. The *marginal product of labor* (MPL) is the additional amount of revenue a firm gets by hiring one more person.

- i. Note that from the firm's perspective, this is the same as describing what their marginal benefit is.
  - ii. For firms, revenue equals benefit.
- b. Thus the demand for labor is the MPL. In the market for factory workers, the demand curve is the MPL for each additional worker a firm hires.

<i>Workers</i>	<i>Total Revenue</i>	<i>MPL</i>		<i>Workers</i>	<i>Total Revenue</i>	<i>MPL</i>
0	0			5	\$200	
1	\$50			6	\$225	
2	\$95			7	\$245	
3	\$135			8	\$260	
4	\$170			9	\$270	

- c. As always, you produce (in this case hire) until marginal cost equals marginal benefit (or when the wage equals MPL).
- i. If the wage is \$30, how many people do you hire?