



commerce  
undergraduate  
society

# COMM295 REVIEW SESSION

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## SUPPLY AND DEMAND, ELASTICITY

Market is in equilibrium when quantity supplied ( $Q_s$ ) is equal to quantity demanded ( $Q_d$ )

Movement along the demand/supply curve is caused by a change in price, while movement of the demand/supply curve is caused by other factors. E.g. Increase in income can shift demand curve.

### Example 1: Interpreting the following demand curves for printer

$$Q_d = 3000 - 20 \times P_{Printer} - 10 \times P_{Paper} + 30 \times P_{iPad}$$

What can you tell from the demand curve about the relationship between printers and paper and iPads?

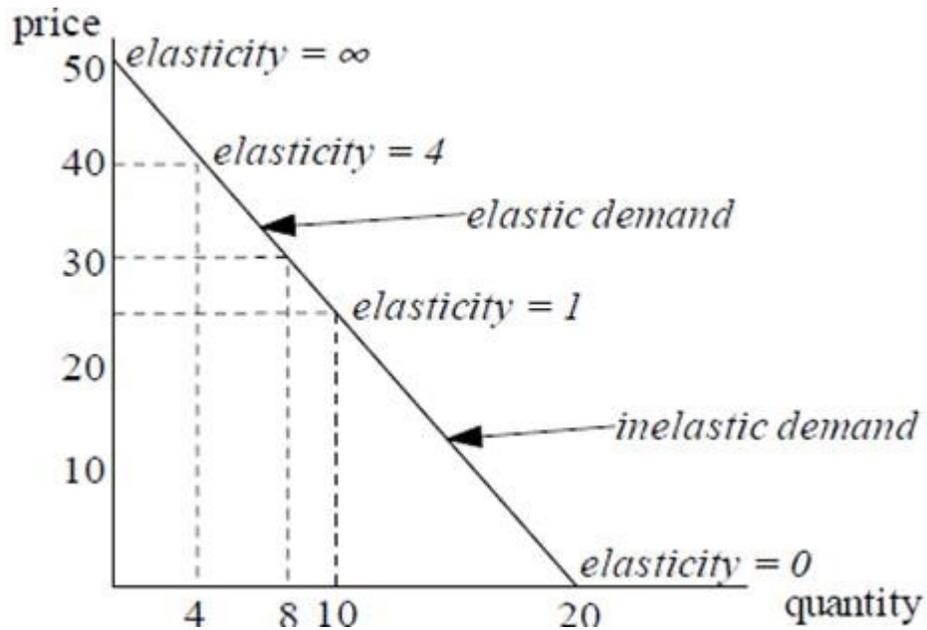
$$\text{Arc elasticity} = \frac{Q_2 - Q_1}{Q_{average}} * \frac{P_{average}}{P_2 - P_1}$$

$$\text{Point elasticity is the elasticity} = \frac{P}{Q} * \frac{dQ}{dP}$$

	ELASTICITY	IMPLICATION
$ E_p  > 1$	Price elastic	
$ E_p  < 1$	Price inelastic	
$ E_p  = 1$	Unit elastic	



## Elasticity of a demand Curve



$$\text{Income elasticity of demand} = \frac{\% \text{ Change in quantity demanded}}{\% \text{ change in income}}$$

Positive:

Negative:

$$\text{Cross elasticity of demand} = \frac{\% \text{ Change in quantity demanded for } X}{\% \text{ Change in price of } Y}$$

Positive:

Negative:

Zero:

## REGRESSION ANALYSIS

**Regression analysis** is a statistical process to estimate the mathematical relationship between a dependent variable and some explanatory variables.

For a regression model to find the demand curve:

$$Q_d = a + bP$$

Explanatory variable:

Dependent variable:

**Random Error** – Difference between \_\_\_\_\_ and the \_\_\_\_\_ that can't be explained by the explanatory variable.

**Ordinary Least Squares Regression** – the regression that makes the \_\_\_\_\_. (Residual is the difference between the predicted value and the actual value of the dependent variable)

**t-Statistic** – the larger the t-statistic for an explanatory variable, the larger the statistical significance.

\*\*Just because the coefficient of one explanatory variable is the largest doesn't mean that explanatory variable has the biggest statistical significance

## PRODUCTION AND COST CONCEPTS

Production is a function of labor and capital input

$$Q = f(L, K)$$

**Marginal Product of Labor** =  $\frac{dQ}{dL}$

**Diminishing Marginal product of labor:** increase in labor decreases the marginal product for each additional labor, since workers can get into each other's way.

**Isoquant** is the combination of \_\_\_\_\_ that can produce one particular output. This is similar to an indifference curve.

**Return to scale:** Rate at which output increases when input are increased. It can be

- 1.
- 2.
- 3.

**Example 2: Identify the return to scale of the following production functions**

- $Q = KL$
- $Q = K + L$
- $Q = \sqrt{K + L}$

## PROFIT MAXIMIZATION

Profit is maximized when **Marginal Revenue = Marginal Cost**

In order words, \_\_\_\_\_.

### Shutdown Rules:

Produce if \_\_\_\_\_ > \_\_\_\_\_. Shutdown if otherwise.

### Agency Problem:

When owners and managers pursue different goals  
→ How do we motivate managers to maximize profit?

Not all firms seek to maximize profits, this is a summary of possible company's objective:

Profit Maximization	MR=MC
Revenue Maximization	MR=0
Output maximization	P=0 [Price equal to zero]

**Example 3: A firm produces iPhone chargers, whose demand is given by  $Q_d = 3020 - 3P$ . It cost \$20 to produce a charger. What will be the profit maximizing output and price?**

**Example 4: A firm has a demand Curve of  $p=400-2q$  and the cost function of  $C=400-q$ . What will be the company's output under the different objectives?**

**Example 5: Which of the following has the potential to eliminate the agency problem?**

- 1. Stock Option: Managers can buy 2000 shares at a exercise price.**
- 2. Revenue Sharing: Managers get 1% of revenue**
- 3. Profit sharing: Managers get 1% of the profit**



## PERFECT COMPETITION

Number of assumptions:

1. Firms are price takers
2. Homogeneous products
3. No barriers to entry
4. Perfect information

Long run – no abnormal profit and there is not deadweight loss. ( $P=AC$ )

There will be no deadweight loss when all firms produce at  $MR=MC$ .

**Example 6: A taxi driver in the perfectly competitive taxi market has a cost function of  $C = 200 + 2Q^2$ , while the current market price is \$10. What will be the taxi driver's (firm) output?**

**Example 7: Suppose that there are many perfectly competitive coffee shops in Vancouver. Each of them has long run cost of  $C = 300 + Q^2$ . In the long run, what will be market price be?**



## MONOPOLY

Characteristics of a Monopoly:

1. There is only one seller and many buyers
2. There is barriers to entry
3. The product has no good substitutes
4. The monopoly has a great market power and ability to set price

**Example 8: Assume UBC is a monopoly in the university education market. Its  $MC=Q/2$  and faces an inverse demand curve of  $P=500-4Q$ . What will be the profit-maximizing price and quantity? ‘**



## OLIGOPOLY

**Oligopoly** is characterized by

1. Some barriers of entry
2. A few firms dominate the market

**Cartels** – a number of firms cooperate with each other to set prices and output to make the most profits.

**Cournot duopoly:** Two firms that sell identical products compete in choosing quantities

**Example 9:** Assume Starbucks and Tim Hortons are the only 2 firms selling coffee in Vancouver. The inverse demand for coffee is  $P=500-50Q$ . Each firm has the same marginal cost of 15. What is the Cournot Equilibrium and quantities? Illustrate this with the reaction curves.

Now assume the Starbucks employee of the month invented a system that can cut the marginal cost to \$10. How will this affect the Cournot Equilibrium and quantities? Illustrate the change with a graph.



## PRICE DISCRIMINATION

**Perfect price discrimination** can charge different customer the maximum price he/she is willing to pay.

**Peak-Load Pricing** – charge higher price during peak hours and lower during lean hours due to capacity constraint

**Two-part pricing** – charging an entry fee and usage fee

**Bundle** - By bundling, firms might be able to increase profit

**Example 10: A restaurant in UBC faces the demand of  $p=300-2q$  during the winter session school year, while the demand during summer is  $p=100-4q$ . The marginal cost of the firm is \$20. Will the firm charge the same price throughout the year? What will they charge for each period?**



**Example 11: Assume McDonalds is considering whether to bundle their products. Will it be beneficial for them to bundle? Assume cost is zero. What if they consider the option of mixed bundling? How will each of the method affect revenue?**

	<b>Drink</b>	<b>Burger</b>	<b>Meal (Bundle)</b>
<b>Customer A</b>	<b>\$4</b>	<b>\$1</b>	<b>\$5</b>
<b>Customer B</b>	<b>\$3</b>	<b>\$3</b>	<b>\$6</b>
<b>Customer C</b>	<b>\$3</b>	<b>\$3</b>	<b>\$6</b>
<b>Customer d</b>	<b>\$1</b>	<b>\$4</b>	<b>\$5</b>