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**NOTE 3: MARKET DEMAND AND SUPPLY\***

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**Market** – An institution or mechanism that brings buyers (a.k.a. demanders, consumers), and sellers (a.k.a. suppliers, producers, firms, farms, fishermen, etc.) of particular resources together.

This section will develop the building blocks of a market. To keep things simple initially, the market is assumed to consist of a large number of buyers and sellers, such as the wheat market. We will study less competitive markets at a later time.

**Demand** – schedule that shows the quantities that consumers are willing and able to purchase at each alternative price, at a specific point in time.

**Law of Demand** – there exists an inverse relationship between price (P) and quantity demanded ( $Q_D$ ). Thus, if the P of a good falls, the  $Q_D$  of the good rises and visa versa.

**Graph 1 An Ordinary Downward Sloping Demand Function**



## **Why is Demand Downward Sloping?**

- 1) **Simple Reasoning** – people would like to buy more units at lower prices and visa versa. Sort of a bargaining instinct, or an observed response to “sales” or “discounts”.
- 2) **Diminishing Marginal Utility (DMU)** – the consumer gets less and less additional satisfaction from consuming equal additional units of the same good. Thus, consumers will purchase additional units only if the price falls.

The law of demand (demand is downward sloping) can also be explained by a more rigorous economic reasoning, i.e. income and substitution effects.

- 3) **Substitution Effect** – if the price of one good falls relative to its substitutes, then consumers will buy more of it. Consumers will purchase more units of the good that is relatively cheaper.
- 4) **Income Effect** – as the price of a good falls, the consumer can afford more units of that good (and/or other goods). This is because as price for the good falls, the consumer’s “real” income, or purchasing power, increases and visa versa. The consumer’s “money” income is the “take-home pay” or “budget” that the consumer has. How much quantity the consumer can “get”, or purchase, with that “money” income is the consumer’s “real” income.<sup>1</sup>

**What causes “Quantity Demanded” ( $Q_D$ ) to change? PRICE** (of the good itself). For example, if the price of wheat falls, then the quantity of wheat demanded will rise and visa versa. If the price of jellybeans rises, then the quantity demanded of jellybeans will fall and visa versa. Changes in price will be shown as movements along one D-Curve. (See Graph 2 above, or Graph 1 on the last page).

## **Graph 2 Changes in Quantity Demanded**



<sup>1</sup> We will discuss in depth the income and substitution effects after the first midterm.

### “Ceteris Paribus” Assumptions for Demand

For one Demand Curve (D-Curve) all things other than Price (of the good itself) remain the same, or are held constant. For example, a particular demand curve for wheat is constructed with consumer income, prices of other related goods, i.e. corn, butter, etc. held constant.

**What causes “Demand” (D) to change?** Changes in the background variables (Changes in the “ceteris paribus” assumptions), that is, changes in any of the variables that were held constant to construct the original D-Curve.

### Graph 3 Changes in Demand (Shifts in the D-Curve)



$D_1 = +$  **in Demand** (rightward shift of the D-Curve) = consumers are willing and able to purchase **MORE** at each alternative price.

$D_2 = -$  **in Demand** (leftward shift of the D-Curve) = consumers are willing and able to purchase **LESS** at each alternative price.

### **What Shifts, or Changes, Demand?**

- 1) **Number of Consumers** – an  $\uparrow$  in the number of consumers causes demand to  $\uparrow$ , or shift right, and visa versa.
- 2) **Consumer Tastes and Preferences** -- an  $\uparrow$  in popularity for a product causes demand to  $\uparrow$ , or shift right, and visa versa.
- 3) **Consumer Income** – the effect of consumer income on demand depends on how consumers view the good relative to their income. The precise relationship between consumer income and demand is based on each individual consumer's viewpoint. (See "Class Materials", "Other Notes", "Types of Goods" document on the Class Web for an expanded discussion of this point).
  - a) **Superior/Normal Goods** – if income  $\uparrow$ s then consumers will purchase more of it at each alternative price and visa versa. Demand shifts right. Typical for luxury goods.
  - b) **Neutral Goods** – if income  $\downarrow$ s or  $\uparrow$ s then consumers will purchase the same amount of it at each alternative price. Demand does not shift. Typical for necessity goods.
  - c) **Inferior Goods** – if income  $\uparrow$ s then consumers will purchase less of it at each alternative price and visa versa. Demand shifts left.

### **Graph 4 Changes in Demand due to Changes in Income**

4) **Prices of Related Goods** – the effect of prices of other related goods on the demand depends on how consumers view the good relative to other goods. (See “Class Materials”, “Other Notes”, “Types of Goods” document on the Class Web for expanded discussion of this point).

a) **Complementary Goods** – goods or services that are used, or consumed, together. In general, if two goods say X and Y are viewed as complements, then if

$$P_X \uparrow \text{ or } \downarrow \Rightarrow D_Y \downarrow \text{ or } \uparrow \text{ and visa versa, or}$$

$$P_Y \uparrow \text{ or } \downarrow \Rightarrow D_X \downarrow \text{ or } \uparrow \text{ and visa versa}$$

**Graph 5 Changes in Demand due to Changes in the Price of a Complementary Good**



- b) **Substitute Goods** – goods or services that a consumer can use in place of each other. As a result the consumer will be indifferent between which good is used to satisfy a need. In general, if two goods say X and Z are viewed as substitutes, then if

$$P_X - s \quad \textcircled{R} \quad D_Z - s \quad \text{and visa versa, or}$$

$$P_Z - s \quad \textcircled{R} \quad D_Y - s \quad \text{and visa versa}$$

**Graph 6 Changes in Demand due to Changes in the Price of a Substitute Good**



- b) **Unrelated, or Independent, Goods** – goods or services that bear no relationship to each other for consumption purposes. In general, if two goods say X and R are viewed as unrelated, then if

$$P_X - s \text{ or } -s \quad \textcircled{R} \quad D_R \text{ stays the same} \quad \text{and visa versa, or}$$

$$P_R - s \text{ or } -s \quad \textcircled{R} \quad D_X \text{ stays the same} \quad \text{and visa versa}$$

**Graph 7 Changes in Demand due to Changes in the Price of an Unrelated Good**



5) **Consumer Expectations with respect to (w/r/t):**

- a) **Future Income** – If the consumer expects that future income will  $\uparrow$ , they will be more likely to  $\uparrow$  their consumption today and visa versa.

**Graph 8 Changes in Demand due to Future Income Expectations**



- b) **Future Prices** – If the consumer expects that future prices will  $\uparrow$ , they will be more likely to  $\uparrow$  their consumption today and visa versa.

**Graph 9 Changes in Demand due to Future Price Expectations**



**Supply** – schedule that shows the quantities that producers are willing and able to offer at each alternative price, at a specific point in time.

**Law of Supply** – there exists a direct relationship between price (P) and quantity supplied ( $Q_s$ ). Thus, if the P of a good rises, the  $Q_s$  of the good increases and visa versa.

### **Graph 10 An Ordinary Upward Sloping Supply Function**



### **Why is Supply Upward Sloping?**

- 1) **Simple Reasoning** – producers would like to sell more units at higher prices and visa versa. Producers would like to receive higher revenue by selling more at higher prices.
- 2) **Diminishing Marginal Returns (DMR)** – the producer gets less and less additional product, or returns, from applying additional variable resources, i.e. labor, materials, to fixed resources in the short run. In other words, it costs more to produce successive units of output. As a result, the producer will need to raise price to cover the higher costs.
- 3) **Scarcity of Inputs** – As the producer increases production, there are fewer resources remaining to continue to expand production in a relatively short time period. As the costs of the resources rise, the producer will need to raise price to cover higher costs.

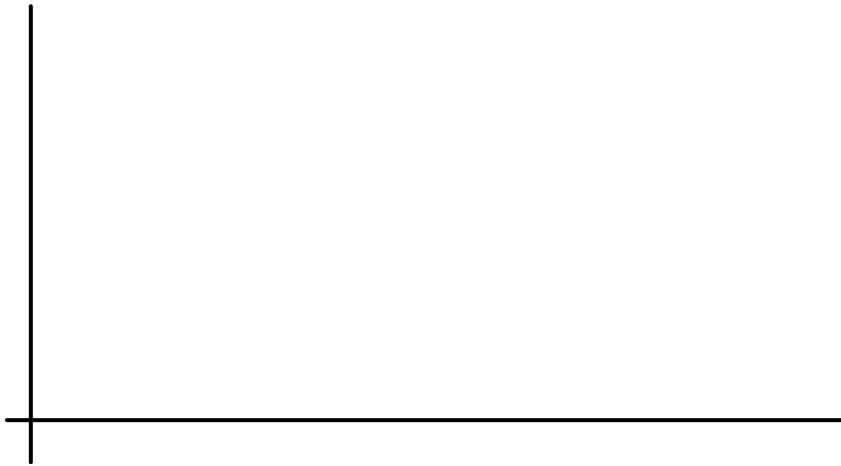
**What causes “Quantity Supplied” ( $Q_s$ ) to change? PRICE** (of the good itself). For example, if the price of wheat falls, then the quantity of wheat supplied will fall and visa versa. If the price of jellybeans rises, then the quantity of jellybeans supplied will rise and visa versa. Changes in price will be shown as movements along one S-Curve. (See Graph10 above).

## “Ceteris Paribus” Assumptions for Supply

For one Supply Curve (S-Curve) all things other than Price (of the good itself) remain the same, or are held constant. For example, a particular supply curve for wheat is constructed holding things such as weather factors, the number of farms, and production costs constant.

**What causes “Supply” (S) to change?** Changes in the background variables (Changes in the “ceteris paribus” assumptions), that is, changes in any of the variables that were held constant to construct the original S-Curve.

### **Graph 11 Changes in Supply (Shifts in the S-Curve)**



$S_1$  = - **in Supply** (rightward shift of the S-Curve) = producers are willing and able to offer **MORE** at each alternative price.

$S_2$  = - **in Supply** (leftward shift of the S-Curve) = producers are willing and able to offer **LESS** at each alternative price.

### What Shifts, or Changes, Supply?

- 1) **Number of Producers** – an  $\uparrow$  in the number of producers causes supply to  $\uparrow$ , or shift right, and visa versa. An  $\uparrow$  in the # of producers, or firms, farms, etc., is referred to as “entry” of firms. A  $\downarrow$  in the # of producers is referred to as “exit” of firms. Firms will either enter or exit the industry over time in response to the presence of economic profits or losses and other factors.
- 2) **Costs of Production (or Input Prices or Factor Prices)** -- an  $\uparrow$  in production costs will  $\downarrow$  supply, and visa versa.
- 3) **Technological Change** – improvements in technology will typically lower production costs and thus  $\uparrow$  supply.

4) **Prices of Other Produced Goods**

- a) **Production Complements** – things that are made together. If there are two production complements, i.e. R and T, then if

$$P_R - \otimes S_T - \text{ and visa versa, or}$$

$$P_T - \otimes S_R - \text{ and visa versa.}$$

**Graph 12 Changes in Supply due to Changes in the Price of Production Complements**



- b) **Production Substitutes** – goods that can be produced using the same inputs. If there are two production substitutes, i.e. A and B, then if

$$P_A - \otimes S_B - \text{ and visa versa, or}$$

$$P_B - \otimes S_A - \text{ and visa versa.}$$

**Graph 13 Changes in Supply due to Changes in the Price of Production Substitutes**



5) **Taxes and Subsidies** – taxes are like costs of production and subsidies are the opposite of taxes (a.k.a. depreciation allowances, rebates). Thus if taxes  $\uparrow$  the supply decreases, or shifts left and visa versa. If subsidies  $\uparrow$  the supply increases, or shifts right and visa versa.

6) **Producer Expectations:**

a) **Optimistic** – If producers expect that future prices for their product will  $\uparrow$ , and/or that future costs of production will  $\downarrow$ , and/or that resources will be more plentiful in the future, revenues or profits in the future will be higher. As a result, the supply today will  $\downarrow$  basically because the producers will hold back production in order to reap the benefits of future sales.

**Graph 14 Changes in Supply due to Optimistic Expectations**



- b) **Pessimistic** – If the producer expects that future prices will ↓, and/or that future costs of production will ↑, and/or that resources will be less plentiful in the future, revenues or profits in the future will be lower. The supply today will ↑ basically because the producers will increase production in order to reap the benefits of sales now.

**Graph 15 Changes in Supply due to Pessimistic Expectations**



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\* Materials come from Anne Bresnock's lecture notes.