BT243: Macroeconomics Notes

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1 Introduction

1.1 Basic Definitions

Scarcity is a situation in which resources are limited and can be used in different ways, so we *must sacrifice one thing for another*.

Labor is the primary source for providing goods and services.

Opportunity cost is what we give up when we make a choice or a decision.

Economics is the study of the choices made by people (*individuals and societies*) who are faced with scarcity. The two major fields are microeconomics and macroeconomics. *Microeconomics* studiees consumers and produces. *Macroeconomics* studies the economy as a whole.

1.1.1 Economic questions a society is faced with...

1. What will be produced?
2. How will it be produced?
3. Who consumes the goods and services produced?

1.2 Production Possibility Frontier (PPF)

The ***PPF*** is a graph that shows all possible combinations of goods and services that can be produced if all resources used efficiently. This is a limit that cannot be exceeded; it represents the best case scenario (in terms of efficiency).

Example 1.1 Consider two goods: defense goods and non-defense goods. With limited resources only certain combinations can be produced; these include the following:

A 200 units of defense goods and 0 units of non-defense goods

B 195 units of defense goods and 25 units of non-defense goods (opp. cost = 5)

C 188 units of defense goods and 50 units of non-defense goods (opp. cost = 7)

D 175 units of defense goods and 75 units of non-defense goods (opp. cost = 13)

E 155 units of defense goods and 100 units of non-defense goods (opp. cost = 20)

F 125 units of defense goods and 125 units of non-defense goods (opp. cost = 30)

G 75 units of defense goods and 150 units of non-defense goods (opp.cost = 50)

H 0 units of defense goods and 160 units of non-defense goods (opp. cost = 75)

Opportunity cost increases as specialization in inputs to the labor must be given up.

Graphically, the ***PPF*** represents the barrier between inefficient use of resources and unachievable levels of prdouction given the scenario. A coordinate under the PPF curve indicates under-utilization of resources A coordinate above the PPF is an impossible combination and, by definiton, unachievable.

The PPF can be shifted (in the positive direction) if there is an *increase in resurces* or an *improvement in technology*; this is called ***economic growth***. ***International trade*** can help a nation move beyond their maximum capabilities in terms of consumption (exceed their PPF).

2 Demand and Supply Model

Firms produce and supply their output to the ***consumers*** who demand the product.

2.1 Demand

The quantity (Q) ***demanded*** is the amount of a good or service that consumers are willing and able to buy. Willingness and ability are the primary determinants of demand. Price of a product is the main determinant of our willingness and ability to purchase a product.

Determinants of demand:

1. Price of the product (P)

   - As the price of a product increases, the quantity of the product demanded decreases.
   - As the price of a product decreases, the quantity of the product demanded increases.
   - The ***Law of Demand*** is the negative relationship between price and quantity.

2. Income (M)

    - As income increases, the quantity of products demanded (typcially) increases.
    - As income decreases, the quantity of products demanded decreases.
    - For some products these relationships are the opposite. These products are considered ***inferior goods***; such products are demanded more when income is lower due to the nature of the product (e.g. fast food or bus rides).

3. Prices of related goods

    - When an increase in the price of one good causes the demand for another good to increase, the two goods are called ***substitutes***.
    - For example eating at restaurants and at-home can be considered *substitutes*. If the price of eating at restaurants increases and causes a greater demand for eating-at-home/grocery-shopping (for example), then these two products are considered **substitutes**.
    - When an increase in the price of one good causes the demand for another good to decrease, the two goods are called ***complements***.
    - For example gasoline and big-cars can be considered *complements* because as the price of gasoline increases, the demand for big-cars (that burn a lot of gas!) decreases.

4. Taste and preferences of consumers
5. Expectations of consumers

    - This refers to consumers' beliefs about future income and prices.

Example 2.1 Ice-cream cones price-quantity relationship

P($)	**Q**
0	12
0.5	10
1	8
1.5	6
2	4
2.5	2
3	0

There is a *negative relationship* between P and Q. The graph of price vs. quantity is the **demand curve**. The *demand curve* is linear. If income changes, the original relationship between price and quantity changes; thus, the demand curve will shift.

Remark A change in price results in movement along the demand curve.

Remark Demand curve shifting...

- The demand curve shifts to the right when there is an increase in demand.
- The demand curve shifts to the left when there is a decrease in demand.

Definition 2.1 ***celeris paribus*** means "other things being equal". For example when modeling examples, we draw conclusions given that everything besides what we specifically study is constant.

Definition 2.2 (Market demand) the sum of all individual demands.

2.2 Supply

The ***quantity supplied*** is the amount of a good or service that sellers are willing and able to sell. Some determinants of the *quantity supplied* are as follows...

1. **Price (P)**: as the price (of the product/service) increases, the quantity supplied increases; as the price decreases, the quantity supplied decreases. This is called the ***law of supply***.
2. **Cost of production**: as the cost of production increases, the quantity supplied decreases; as the cost of production decreases, the quantity supplied increases.
3. **Number of producers**
4. **Expectations of the firms**: beliefs about future performance

The ***supply curve*** shows the positive relationship between price and quantity (P/Q). A change in the price results in movement along the supply curve. If any of the other determinants change then there is a shift of the supply curve.

Remark An increase in quantity supplied results in a *right-shift* of the supply curve. A decrease in the quantity supplied results in a *left-shift* of the supply curve.

Definition 2.3 (Market supply) the sum of all that is supplied by all producers.

Definition 2.4 (Market equilibrium) a situation in which the quantity demanded is equal to the quantity supplied.

$$Q_D = Q_S$$

The market equilibrium is—graphically—where the supply and demand curves intersect: when the quantity demanded and supplied are exactly the same.

Markets that are *not* in equilibrium are **inefficient**.

- ***Excess supply (surplus)*** refers to a scenario where producers are willing to produce more than consumers are willing to buy. In this case, the price will start to decrease and the quantity supplied decreases/quantity demanded increases until equilibrium is reached.

- ***Excess demand (shortage)*** refers to a scenario where the consumers are willing to buy more than producers are willing to produce. The price will start to increase and—thus—the quantity demanded will decrease and the quantity produced will increase until equilibrium is met.

Example 2.2 Solving for equilibrium
Demand curve: $Q_D = 1600 - 300P$
Supply curve: $Q_S = 1400 + 700P$
Equilibrium: $Q_D = Q_S$

$$1600 - 300P = 1400 + 700P$$

$$1000P = 200$$

$$P = 0.2$$

Substitute P into either Q_D or Q_S

$$Q_D = 1600 - 300(0.2) = 1540$$

$$Q_S = 1400 + 700(0.2) = 1540$$

2.3 Comparative Statics (changes in equilibrium)

The following describes different cases of changes in equilibrium and some of the results...

- Let's assume that the *income of the consumers* (M) *increases* and that we are analyzing a *normal* good. We can, thus, conclude that the demand curve is going to *shift to the right* (in the positive direction). The supply curve will remain unchanged, but there is a movement along the supply curve. The equilibrium point will increase in both price and quanity.

- Let's assume that the *cost of production decreases.* We see that the supply curve will shift to the right. There is also a movement along (down) the demand curve. The equilibrium will decrease in price and increase in quantity.

- Let's assume we are analyzing a normal good and that the *cost of production decreases.* The demand curve shifts to the right. The supply curve shifts to the right as well. The equilibrium will have an increase in quantity, but there is price change guaranteed; the price could increase, remain the same, or even decrease.

2.4 Applications of Demand-Supply Model

1. ***Price ceiling*** is a maximum price that sellers may charge for a good/service which is set by the government.

   Example: the market for gasoline in 1974. Due to supply issues (embargos), the government issues a price ceiling that prohibited increasing gasoline prices above a certain dollar amount. The price ceiling was set below the equilibrium price and this caused a significant shortage of gasoline.

   Example: rent controls which limit how much landlords can charge in monthly rent and how much they can increase rent.

2. ***Price floor*** is a minimum price below which exchange is not permitted.

   Example: the labor market. Imposing a minmum wage will increase the number of laborers willing to work but decrease firms demand for laborers due to increased price. This causes a surplus of labor which is called *unemployment*.

A ***price ceiling*** has to be placed below the equilibrium point or else the price will just fall back into equilibrium. The opposite is true for ***price floor*** in that it must be above the equilibrium point or else the price would just settle back into equilibrium.

3 Introduction to Macroeconomics

Microeconomics examines the functioning of individual industries and the behavior of individual decision-making units—that is, firms and households. ***Macroeconomics*** focuses on the economic behavior of aggregates—income, employment, output, and so on—on a national scale. Macroeconomics studies...

1. national income, not household income
2. the overall price level, not individual proces
3. total employment in the economy, not the demand for labor in specific markets

Aggregate behavior is the behavior of all housholds and firms together. GDP is an aggregae. So is national income. Macroeconomics study aggregate consumption and aggregate investment intesively.

The three major concerns of macroeconomics are output growth, unemployment, and inflation and deflation.

1. **Output growth**

- A ***business cycle*** is the cycle of short-term ups and downs in the economy.
- ***Aggregate output*** is the total quantity of goods and services produced in an economy in a given period. Aggregate output is usually measured by *gross domestic product* (GDP)
- A ***business cycle*** has four phases:
  - An ***expansion*** or boom is the period in the business cycle from a trough up to a peak during which output and employment grow
  - A ***contraction***, ***recesion***, or slump is the period in the business cycle from a peak down to a trough during which output and employment fall. A ***depression*** is prolonged and deep recession.
  - A ***peak*** is the transition from an expansion to a recession
  - A ***trough*** is the transition from a recession to an expansion

2. **Unemployment**
   - The ***unemployment rate*** is the ratio of the number of people unemployed to the total number of people in the labor force. People who are not acively seeking employment are not counted as unemployed because they are not in the labor force.
   - Unemployment above some minimum level implies the labor market is not in equilibrium
3. **Inflation** and **Deflation**
   - ***Inflation*** is an increase in the overall price level. ***Hyperinflation*** si a period of very rapid increases in the overall price level. A widely accepted definition of hyperinflation is inflation rates in excess of 50 percent per month.
   - ***Deflation*** is a decrease in the overall price level

There are three **market arenas**:

1. ***Goods-and-Services Markets***: households and the government purchase goods and services from firms
2. ***Labor market***: interaction in the labor market takes place when firms and the government purchase labor from households
3. ***Money market***: the money market is where households purchase stocks and bonds from firms.

Fiscal policy is the government's spending and taxing policies.

3.1 Gross Domestic Product (GDP)

Gross Domestic Product (GDP) is the total market value of all final goods and services produced within a given period by factors or production located within a country.

- ***Final goods and services*** are goods and services produced for final use
- ***Intermediate goods*** are goods that are produced by one firm for use in further processing or for resale by another firm
- ***Value added*** is the difference between the value of goods as they leave a stage of production and the cost of the goods as they entered that stage
- ***Gross national product (GNP)*** is the total market value of all final goods and services produced within a given period by factors of production owned by a country's citizens, regardless of where the output is produced.

GDP is measured *quarterly* in the United States.

Remark Used products that are resold do not count towards a country's GDP. GDP only accounts for new goods that are sold to consumers.

3.1.1 Calculating GDP

The ***expenditure approach*** is a method of computing GDP that measures the total amount spent on all final goods and services during a given period. The ***income approach*** is a method of computing GDP that measures the income—wages, rents, interest, and profits—received by all factors of production in producing final goods and services. We can say that

$$GDP = C + I + G + (EX - IM)$$

where C represents consumption, I represents investments, G represents government spending, EX represents exports and IM represents imports.

Definition 3.1 (Personal Consumption Expenditures (C)) expenditures by consumers on goods and services. There are three main categories:

1. ***Durable goods*** are goods that last a relatively long time, such as cars and household appliances
2. ***Nondurable goods*** are goods that are used up fairly quickly, such as food and clothing
3. ***Services*** are things we buy that do no involve the production of physical things, such as legal and medical services and education

Definition 3.2 (Gross Private Domestic Investment (I)) the total investment in capital—that is, the purchase of new housing, plants, equipment, and inventory by the private (or nongovernment) sector. ***Investment*** is the purchase of new capital—housing, plants, equipment, and inventory.

- ***Nonresidential investment*** includes expenditures by firms for machines, tools, plants, and so on
- ***Residential investment*** includes expenditures by households and firms on new houses and apartment buildings
- The ***change in business inventories*** is the amount by which firms' inventories change during a period. inventories are the goods that firms produce now but intend to sell later
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Definition 3.3 (Government Consumption and Gross Investment (G)) includes expenditures by federal, state, and local governments for final goods and services. It does not include government transfer payments or interest payments on the national debt because neither is a payment for any final goods or services.

Definition 3.4 (Net Exports ($EX - IM$)) the difference between exports (sales to foreigners of US-produced goods and services) and imports (US-purchases of goods and services from abroad). The figure can be positive or negative.

Definition 3.5 (Nominal GDP) GDP measured in *current dollars*, the current prices we pay for goods and services. This is **not** a **desirable** measure of production; nominal GDP can increase because the price level has increased with no change in output.

Definition 3.6 (Real GDP) nominal GDP but adjusted for price: value GDP at constant prices

Remark Nominal GDP is equal to the real GDP for the base year

Definition 3.7 (GDP Price Index) measures the current level of price relative to the base year.

$$GDP_{\text{price index}} = \frac{\text{nominal GDP}}{\text{real GDP}} \times 100$$