

LECTURE NOTES I: ABM 1101

I. A DEFINITION OF ECONOMICS

Economics is a social science. In other words, it is a systematic examination of human behavior, based on the scientific method, and reliant upon rigorous analysis of human behavior. Economics is the mother discipline from which most of the business disciplines arose, including business management and administration.

We can define economics as the science of **allocating scarce resources** to produce **goods and services** with an aim of meeting **unlimited human wants** for survival and improvement of living standards.

The key words in this definition are in **bold letters**. Because there are a finite number of resources available, the fact that human want exceed that (are unlimited) then the resources are scarce relative to the want for them. Because there are fewer resources than wants there must be allocation mechanism of some sort – markets, government, law of the jungle (*survival of the fittest which implies that those who are strong and apply ruthless self-interest will be most successful*), etc.

Key economic concepts in the definition

A. Goods and Bads

Economists talk about goods (anything that gives a person utility or satisfaction) and bads (anything that gives a person disutility or dissatisfaction). Goods can be either tangible or intangible. A computer is a tangible good; friendship and love are intangible goods. People want goods and they do not want bads. They will pay to get goods (e.g., \$1,000 for a computer), and they will pay to get rid of bads (e.g., paying a doctor for prescribing something to shorten the time you have the flu).

B. Resources

It takes resources to produce goods. Sometimes resources are referred to as inputs or factors of production. Economists divide resources into four broad categories: land, labor, capital, and entrepreneurship.

- **Land** includes natural resources, such as minerals, forests, water, and unimproved land. For example, oil, wood, and animals fall into this category. (Sometimes economists refer to this category simply as *natural resources*.)

- **Labor** consists of the physical and mental talents that people contribute to the production process. For example, a person building a house is using his or her own labor.

- **Capital** consists of produced goods that can be used as inputs for further production. Factories, machinery, tools, computers, and buildings are examples of capital. One country might have more capital than another; that is, it has more factories, machinery, tools, and the like.

- **Entrepreneurship** refers to the talent that some people have for organizing the resources of land, labor, and capital to produce goods, seek new business opportunities, and develop new ways of doing things.

C. Scarcity and a Definition of Economics

Scarcity is the condition where our wants for goods are greater than the limited resources available to satisfy them. Scarcity is the result of our infinite wants hitting up against finite resources. Many economists say that if scarcity didn't exist, neither would economics. In other words, if our wants weren't greater than the limited resources available to satisfy them, there would be no field of study called "economics."

Scarcity is the basic economic problem confronting **ALL** individuals and societies, including the poor and the rich. Everyone in the world has to face scarcity, even billionaires. Billionaires may be able to satisfy more of their wants for tangible goods (houses, cars) than most people, but they still may not have the resources to satisfy all their wants, which might include more time with their family, more friendship, good health, love and sleep, and hundreds of other things that they don't have the resources to "produce". For this reason, economics is defined as the science of scarcity—the science of how individuals and societies deal with the fact that wants are greater than the limited resources available to satisfy those wants.

Three effects of scarcity are (1) the need to make choices, (2) the need for a rationing device, and (3) competition.

Choices People have to make choices because of scarcity. Because our unlimited wants are greater than our limited resources, some wants must go unsatisfied. We must choose which wants we will satisfy and which we will not: Going to Dubai for vacation, or paying off the house loan earlier?"

Need for a Rationing Device A rationing device is a means of deciding who gets what of available resources and goods. Scarcity implies the need for a rationing device. If people have infinite wants for goods and if only limited resources are available to produce the goods, then a rationing device is needed to decide who gets the available goods and in what quantity. Dollar or Shilling price is a rationing device. For example, 100 cars are in the bond, and everyone wants a new car. How do we decide who gets what quantity of the new cars? The answer is to use the rationing device called Dollar or Shilling. The people who pay the Dollar or Shilling price for a new car end up with one.

Scarcity and Competition The competition we see in the world for jobs, businesses, grades in class and even boyfriends and girlfriends exists because of scarcity. If there were enough resources to satisfy all our seemingly unlimited wants, people would not have to compete for the available but limited resources.

Second, competition takes the form of people trying to get more of the rationing device. If the Dollar or Shilling price is the rationing device, people compete to earn the Dollar or Shilling. Look at your own case. You are a college student working for a degree. One reason (but perhaps not the only reason) you are attending University is to earn a higher income after graduation. But why do you want a higher income? You want it because it will allow you to satisfy more of your wants. Suppose muscular strength (*measured by lifting weights*) were the rationing device instead of dollar price. People with more muscular strength would receive more resources and goods than people with less muscular strength. In that case, people would compete for muscular strength. May be they would spend more time at the gym lifting weights. *What other rationing device can you think of that people compete for?*

D. The Counterintuitive in Economics

Does it mean that because there is scarcity the whole world is condemned to poverty? The answer is No. Scarcity can co-exist with wealth. A country facing scarcity can be a very wealthy, but there is no guarantee that it will be. Scarcity, a fact of life, can come with poverty or wealth, depending on the prevailing economic and political systems. The economic and political institutions under which a country operates play a very important role in determining the outcomes (poverty or wealth) that the country faces while dealing with scarcity.

Self Test

1. True or false? Scarcity is the condition of finite resources. Explain your answer.
2. How does competition arise out of scarcity?
3. How does choice arise out of scarcity?

OTHER KEY CONCEPTS IN ECONOMICS

(i) Opportunity Cost

The opportunity cost of anything is the most highly valued opportunity or alternative forfeited when a choice is made. Opportunity costs are incurred whenever choices are made because the resources used for those choices could have been used in other ways. Every time you make a choice, you incur an opportunity cost. For example, you have chosen to attend this lecture. In making this choice, you denied yourself the benefits of doing something else. You could have watched television, visited a friend or taken a nap. Whatever you *would have chosen* to do is the opportunity cost of attending this lecture. For example, if you would have watched television instead of attending this lecture—if this was your next best alternative—then the opportunity cost of attending the lecture is watching television.

(ii) Opportunity Cost and Behavior

The higher the opportunity cost of doing something, the less likely it will be done and Economists believe that a change in opportunity cost can change a person's behavior. For example, consider a first year University student who attends classes Monday through Thursday every week, but also has a part-time job of waiting at a Restaurant in town which he got during the lockdown. Every time he chooses to go to class, he gives up the opportunity of earn Ush 5,000 an hour working at the Restaurant. The opportunity cost of this student spending an hour in class is Ush 5,000. Now suppose the opportunity cost of attending class for this student rises suddenly. On Tuesday, he is paid Ush 30,000 per hour to work at the Restaurant because they have more customers. He knows that if he attends his class, he will forfeit Ush 30,000 per hour. What will he do? An economist would predict that as the opportunity cost of attending class increases relative to its benefits, this student is less likely to go to class. This is how economists think about behavior: *The higher the opportunity cost of doing something is, the less likely it will be done.*

(iii) Benefits and Costs

Economists are careful to think in terms of both costs and benefits of providing a good or eliminating a bad; while non-economists think in terms of one or the other. Think of a bad, such as pollution or Covid-19. If we could eliminate pollution or Covid-19, should we do it at whatever cost?

(iv) Decisions Made at the Margin

Although economists think in terms of both benefits and costs, the decisions or choices they make are made at the margin, by weighing additional (marginal) benefits of a change against the additional (marginal) costs of a change with respect to current conditions, not the total costs and benefits. For example, suppose you just finished eating a rolex and drinking a soda for lunch. You are still a little hungry and are considering whether to order another rolex. An economist would say that in deciding whether to order another rolex, you compare the additional benefits of the second rolex to its additional costs. In economics, the word *marginal* is a synonym for *additional*. So we say that you compare the **marginal benefits** (*MB*) of the (next) rolex to its **marginal costs** (*MC*). If the marginal benefits are greater than the marginal costs, you obviously expect a net benefit to ordering the next rolex, and therefore you order it. If, however, the marginal benefits are less than the marginal costs, you obviously expect a net cost to ordering the next rolex, and therefore you do not order another.

Condition

$MB \text{ of next rolex} > MC \text{ of next rolex}$

$MB \text{ of next rolex} < MC \text{ of next rolex}$

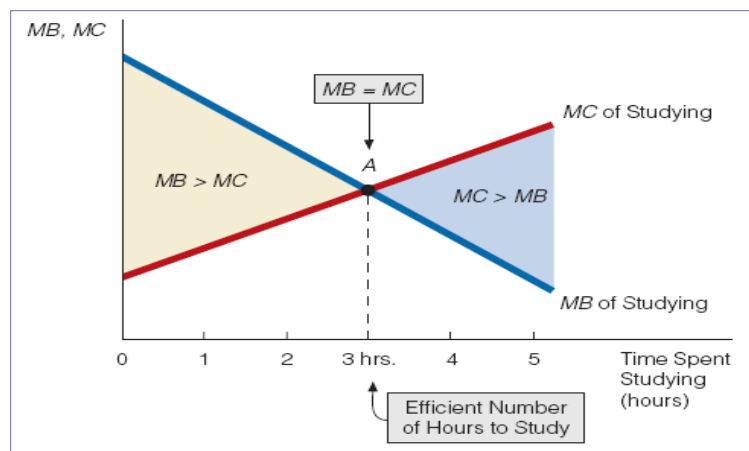
Action

Buy next rolex.

Do not buy next rolex.

(v) Efficiency

What is the right amount of time to study for a test, for example? In economics, the *right amount* of anything is the *optimal* or *efficient* amount—the amount for which the marginal benefits equal the marginal costs. Stated differently, you have achieved **efficiency** when the marginal benefits equal the marginal costs. Refer to the diagram below which is a plot of the marginal benefits (*MB*) and marginal costs (*MC*) of studying for a test against the time (in hours) spent studying.



Suppose you are studying for an economics test, and for the first hour of studying, the $MB > MC$:

$MB \text{ studying first hour} > MC \text{ studying first hour}$

Given this condition, you will certainly study for the first hour because it is worth it: The additional benefits are greater than the additional costs; so there is a net benefit to studying. Suppose for the second hour of studying, the marginal benefits are still greater than the marginal costs: ***MB studying second hour > MC studying second hour***. You will still study for the second hour because the additional benefits are still greater than the additional costs. In other words, studying the second hour is worthwhile. In fact, you will continue to study as long as the marginal benefits are greater than the marginal costs.

The marginal benefit (*MB*) curve of studying is downward sloping because we have assumed that the benefits of studying for the first hour are greater than the benefits of studying for the second hour and so on. The marginal cost (*MC*) curve of studying is upward sloping because we assume that studying the second hour costs a person more (in terms of goods forfeited—opportunity cost) than the first, the third costs more than the second, and so on. (*If we assumed that the additional costs of studying are constant over time, the MC curve is horizontal.*)

In the diagram, the marginal benefits of studying equal the marginal costs at three hours. So three hours is the optimal or *efficient* length of time to study in this situation. At fewer than three hours, the marginal benefits of studying are greater than the marginal costs; thus, at all these hours, studying has net benefits. At more than three hours, the marginal costs of studying are greater than the marginal benefits, and so studying beyond three hours is not worthwhile.

Net benefits are maximized when efficiency is achieved. Take another look at the diagram. Suppose you had stopped studying after the first hour (or after the 60th minute). Would you have given up anything? Yes, you would have given up the *net benefits* of studying longer. To illustrate, notice that between the first and the second hour, the marginal benefits (*MB*) curve lies above the marginal costs (*MC*). This means studying the second hour has net benefits. But if you hadn't studied that second hour—if you had stopped after the first hour—then you would have given up the opportunity to collect those net benefits. The same analysis holds for the third hour. We conclude that by studying three hours (but not one minute longer), you have maximized net benefits. In short, efficiency, which is consistent with $MB = MC$, is also consistent with maximizing net benefits. That is, net benefits are maximized when efficiency is achieved.

LECTURE NOTES II

(vi) Economics is about Incentives

An incentive is something that encourages or motivates a person to undertake an action. Often what motivates a person to undertake an action is the belief that by taking that action they can make themselves better off. For example, if we say that Jane has an incentive to study for her test, we imply that by studying Jane can make herself better off, probably in terms of receiving a higher grade on the test than if she didn't study. Incentives are closely related to benefits and costs. Individuals have an incentive to undertake actions for which the benefits are greater than the costs or, stated differently, for which they expect to receive net benefits (benefits greater than costs).

(vii) Unintended Effects

Economists are not only interested in the expected effects of an action, they are also interested in the unintended effects. For example passing (or increasing) a minimum wage law with the intended effect of increasing workers' incomes, but resulting in an unintended effect of increased rate of unemployment. Another example is a mandatory seatbelt law intended to reduce car-accident related deaths, but resulting in the unintended effect of increased number of such deaths. **How could this happen?**

(viii) Exchange

Exchange or trade is the process of giving up one thing for something else. People enter into exchanges in order to make themselves better off. When a person voluntarily trades Ush100,000 for a jacket, they are saying, "I prefer to have the jacket instead of the Ush100,000." And, of course, when the seller of the jacket voluntarily sells the jacket for Ush100,000, he is saying, "I prefer to have the Ush100,000 instead of the jacket." In short, through trade or exchange, each person gives up something he values less for something he values more.

(ix) *Ceteris Paribus* Thinking

Ceteris paribus means all other things held constant, or with the exception of the matter of interest, nothing else changes. For example, a known ice cream addict by the name of Samantha has eaten regular ice cream for years, but her weight has remained constant at 70kgs. One day, she decides she wants to lose weight, and switches from regular to fat-free ice cream, which has half the calories of regular ice cream. Samantha eats the fat-free ice cream for the next few months and weighs herself only to find that she has instead gained 2kgs. **Does this mean that fat-free ice cream causes people to gain weight and regular ice cream does not? What do you think is the plausible explanation for this counter-intuitive observation?**

The expectation is that "if Samantha has been eating regular ice cream and her weight has stabilized at 70kgs, then substituting fat-free ice cream for regular ice cream will lead to a decline in weight, *ceteris paribus* or other factors remaining constant (unchanged).

Using the *ceteris paribus* assumption is important because it allows us to clearly designate what we believe is the correct relationship between two variables—for example calorie intake and weight

gain. An Economist might say, *“If the price of Coca-Cola decreases, the quantity of it consumed increases, ceteris paribus.”* Meaning that if the price of Coca-Cola decreases, people will buy more of it, assuming that nothing else changes. But one may ask, “Why would economists want to assume that when the price of Coca-Cola falls, nothing else changes? Don’t other things change in the real world? Why make assumptions that we know are not true?”

(x) What is a Theory?

We just talked about a theory in health science, which specifies that a reduction in calorie consumption will result in weight loss and vice versa. Almost everyone, including you, builds and tests theories on a regular basis, any time they do not know the answer to a question. Someone asks, *“Why did Rukundo’s girlfriend break up with him?”* Or, *“Why some of the so-called powerful incumbent politicians in Uganda lost while others won during the in the 2021 elections?”* If you don’t know the answer to a question, you are likely to build a theory so that you can provide an answer.

What exactly is a theory? (*Are stereotypes theories?*) To an economist, a theory is an abstract representation of the world. When economists build a theory they leave out certain things and focus on the major factors or variables that they believe will explain the phenomenon they are trying to understand. A theory emphasizes only the variables that the theorist believes are the main or critical ones that explain an activity or event.

How are theories tested? As earlier mentioned, almost everyone builds theories, although not everyone tests them. Anytime you listen to someone talk about a theory, you should always ask a key question: *“If your theory is correct, what do you predict we will see in the world?”* In other words, correct theories should correctly predict what will most likely happen in the future.

The question (*“If your theory is correct, what do you predict we will see in the world?”*) gives us a way to figure out who might be closer to the truth when people disagree. It minimizes talk and maximizes the chances of establishing who is correct and who is incorrect.

Self Test

1. What is the purpose of building a theory?
2. How might a theory of the economy differ from a description of it?
3. Why is it important to test a theory? Why not simply accept a theory if it sounds right?
4. Your economics instructor says, “If the price of going to the movies goes down, people will go to the movies more often.” A student in class says, “Not if the quality of the movies goes down.” Who is right, the economics instructor or the student?

(xi) Economic Categories

Economics is majorly broken down into four broad categories: positive economics, normative economics, microeconomics and macroeconomics

(a) Positive and Normative Economics

Positive economics addresses what is, while normative economics attempts to determine what should be. Essentially, positive economics deals with **cause–effect** relationships that can be tested. Normative economics on the other hand deals with value judgments and opinions that cannot be tested.

Many topics in economics can be discussed in both a positive and a normative framework, but this course will be restricted to positive economics.

(b) Microeconomics and Macroeconomics

Microeconomics is the study of human behavior and choices as they relate to relatively small units, such as an individual, a firm, an industry, or a single market. Macroeconomics is the study of human behavior and choices as they relate to an entire economy. It has been said that the tools of microeconomics are microscopes, and the tools of macroeconomics are telescopes. Macroeconomics stands back from the trees to see the forest, while Microeconomics gets up close and examines the tree itself, its bark, its limbs, and its roots.

Microeconomists and macroeconomists ask different types of questions.

A microeconomist might be interested in answering such questions as:

- How does a market work?
- What level of output does a firm produce?
- What price does a firm charge for the good it produces?
- How does a consumer determine how much of a good to buy?
- Can government policy affect business behavior?
- Can government policy affect consumer behavior?

A macroeconomist might be interested in answering such questions as:

- How does the economy work?
- Why is the unemployment rate sometimes high and sometimes low?
- What causes inflation?
- Why do some national economies grow faster than others?
- What might cause interest rates to be low one year and high the next?
- How do changes in the money supply affect the economy?
- How do changes in government spending and taxes affect the economy?

Coursework Assignment #1: Due Date Monday April 12, 2021 5pm

1. Consider the income and consumption expenditure data for a consumer summarized in the Table below:

	Income in US Dollars	Consumption Expenditure in US Dollars
1	0	60
2	100	120
3	200	180
4	300	240
5	400	300
6	500	360

- (a) Plot a graph to show the relationship between income and consumption expenditure.
 - (b) What does the graph in (a) say about the relationship between income and consumption?
 - (c) Define directly and inversely related variables?
 - (d) Is the relationship in (b) between income and consumption direct or inverse?
 - (e) Calculate the slope of the line in (a) above and explain what it measures
2. The United States is considered a rich country because Americans can choose from an abundance of goods and services. How can there be scarcity in a land of abundance?
 3. What do economists mean when they say that institutions matter?
 4. What is the difference between the resource labor and the resource entrepreneurship?
 5. Is it possible for a person to incur an opportunity cost without spending any money? Explain.
 6. A friend pays for your lunch. Is this an example of a free lunch? Why or why not?
 7. A layperson says that a proposed government project simply costs too much and therefore shouldn't be undertaken. How might an economist's evaluation be different?
 8. A change in X will lead to a change in Y . The predicted change is desirable; so we should change X . Do you agree or disagree? Explain.
 9. The person who smokes cigarettes cannot possibly be thinking in terms of costs and benefits because it has been proven that cigarette smoking increases one's chances of getting lung cancer. Do you agree or disagree with the part of the statement that reads "the person who smokes cigarettes cannot possibly be thinking in terms of costs and benefits"? Explain your answer.
 10. Janice decides to go out on a date with Kyle instead of Robert. Do you think Janice is using some kind of rationing device to decide whom she dates? If so, what might that rationing device be?

LECTURE NOTES III

Production Possibilities Frontier Framework

KEY LESSONS

1. The PPF is a framework used to examine production and other phenomena. The PPF is not only a curve; it is a framework of analysis
2. The PPF can be used to demonstrate several economic concepts.
3. Individuals can make themselves better off by specializing in production according to their comparative advantages, and then trading for other goods.

□ I. THE PRODUCTION POSSIBILITIES FRONTIER

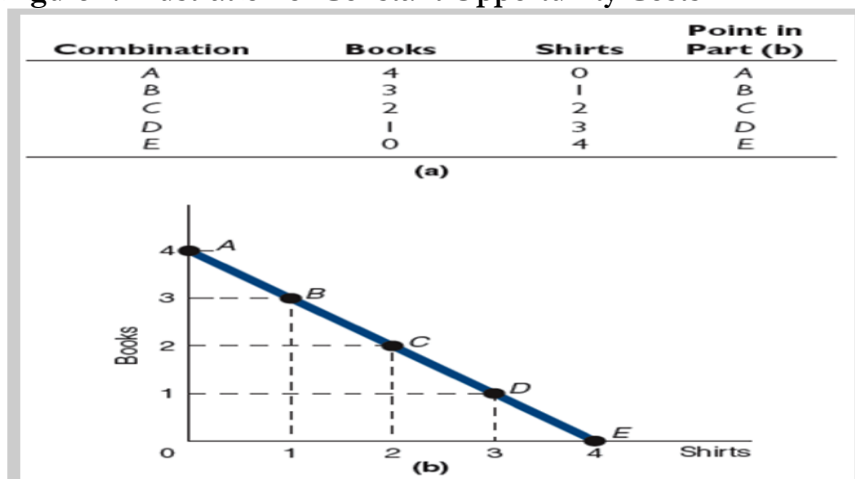
The production possibilities frontier is a framework in which to examine production; it represents the combination of two goods that can be produced in a certain period of time, under the conditions of a given state of technology and fully employed resources.

A. The Straight-Line PPF: Constant Opportunity Costs

A straight-line PPF indicates that the opportunity cost of producing additional units of output is fixed.

Imagine an economy that produces only two goods using its limited resources, namely books and shirts as illustrated in Figure 1 below. In Figure 1(a), there are five combinations of books and shirts that can be produced in this economy. For example, combination *A* is 4 books and 0 shirts, combination *B* is 3 books and 1 shirt, etc. Figure 1(b) shows a plot of the five combinations of books and shirts, with each combination representing a different point. For example, the combination of 4 books and 0 shirts is represented by point *A*. The line that connects points *A* to *E* is the PPF. **Note that the PPF in our example is a straight line because the opportunity cost of books and shirts is constant**

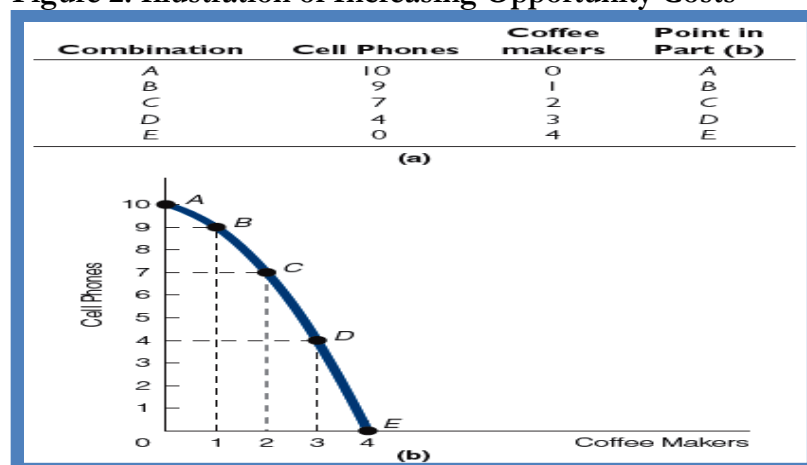
Figure 1: Illustration of Constant Opportunity Costs



B. The Bowed-Outward (Concave-Downward) PPF: Increasing Opportunity Costs

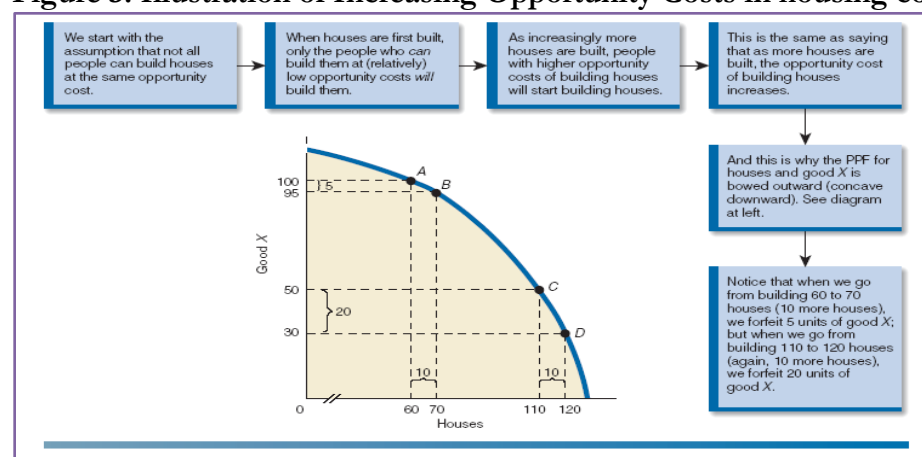
A bowed-outward PPF indicates that the law of increasing opportunity costs holds, that is, for most goods, opportunity costs increase as more of the good is produced. Consider another economy that produces mobile phones or cell phones and coffee makers in five possible combinations (A to E). Combination A is 10 cell phones and 0 coffee makers, combination B is 9 cell phones and 1 coffee maker, combination C is 7 cell phones and 2 coffee makers and so on as shown in Figure 2(a). Figure 2(b) shows a plot of the five combinations of cell phones and coffee makers. The curved line that connects points A to E is the PPF. In this example, the PPF is bowed outward (concave downward) because the opportunity cost of coffee makers increases as more coffee makers are produced.

Figure 2: Illustration of Increasing Opportunity Costs



C. Law of Increasing Opportunity Costs

Figure 3: Illustration of Increasing Opportunity Costs in housing construction



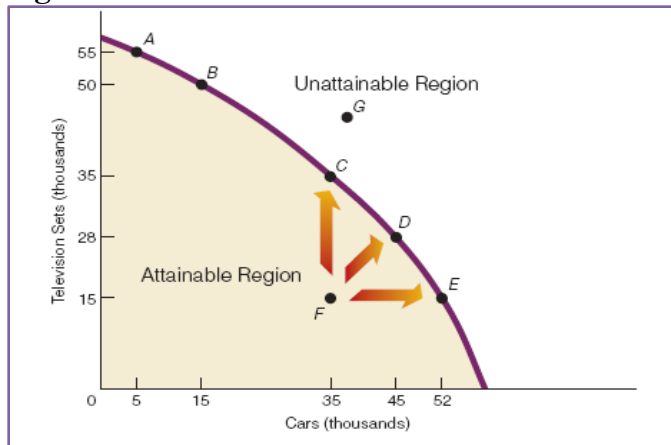
In the real world, most production possibilities frontiers are bowed outward, because for most goods, the opportunity costs *increase* as more of a good is produced. This is referred to as the **law of increasing opportunity costs**. The opportunity costs increase as more of most goods is produced because people have varying abilities. For example, some people are better suited to building houses than others are. When a construction company first starts building houses, it employs the most skilled people; because these can build houses at lower opportunity costs than others. But as the construction company builds more houses, it finds that the most skilled builders are no longer available in the job market; so it must employ those who are less skilled. The less skilled people build houses at higher opportunity costs.

D. Economic Concepts in a PPF Framework

The PPF can be used to illustrate seven economic concepts: choice, opportunity costs, productive inefficiency, and the four discussed in this section:

Attainable and unattainable regions of production in an economy

Figure 4: Illustration of finiteness of resources using the PPF



The frontier is the boundary marking the outer limit of how far one can go in making choices. It limits the choices to any combination of the two goods on the frontier or below it. **The PPF separates the production possibilities of an economy into two regions:** (1) *an attainable region, which consists of the points on the PPF itself and all points below it (this region includes points A–F),* and (2) *an unattainable region, which consists of the points above and beyond the PPF (such as point G).* Scarcity implies that some things are attainable and others are unattainable. Point A on the PPF is attainable, as is point F; point G is not.

PRODUCTIVE EFFICIENCY:

Economists often say that an economy is **productive efficient** if it is producing the maximum output with the given resources and technology. In Figure 4, points A, B, C, D, and E are all productive-efficient points. Notice that all these points lie on the PPF. In other words, we are getting the most (in terms of output) from what we have (the available resources and technology) when we are on the PPF.

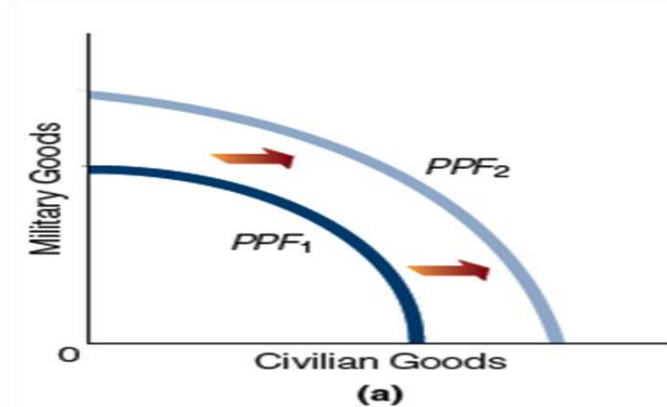
An economy is **productive inefficient** if it is producing less than the maximum output with given resources and technology. In Figure 4, point F is a productive inefficient point because it lies below the PPF; that is below the outer limit of what is possible. In other words, at point F, we can produce more goods with the available resources, or we can get more of one good without getting less of another.

TECHNOLOGY refers to the body of skills and knowledge involved in the use of resources in production. An advance in technology commonly increases the ability to produce more output with a fixed quantity of resources or the ability to produce the same output with a smaller quantity of resources.

ECONOMIC GROWTH refers to the increased productive capabilities of an economy. It is illustrated by a shift outward in the PPF. Two major factors that affect economic growth are (1) an increase in the quantity of resources and (2) an advance in technology. An increase in the quantity of resources (e.g., through a discovery of new resources) makes a greater quantity of output possible. For example In

Figure 5 (a), an increase in the quantity of resources makes it possible to produce both more military goods and more civilian goods. Thus, the PPF shifts outward from PPF_1 to PPF_2 .

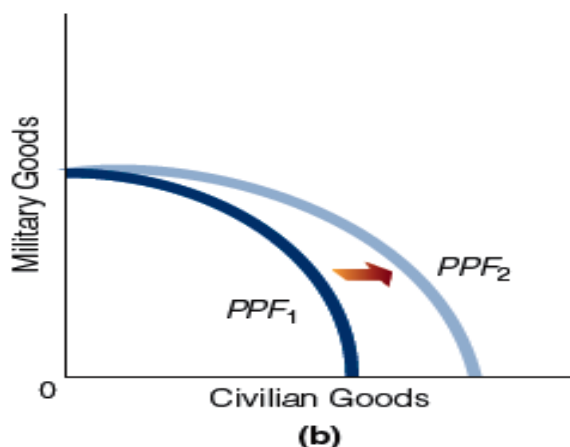
Figure 5 (a). Illustration of Balanced Economic Growth



Likewise, an advance in technology can allow the production of more of *both* military goods and civilian goods with the same quantity of resources. As a result, the PPF in Figure 5 shifts outward from PPF_1 to PPF_2 .

If the advance in technology allows only more of *one good* (instead of both goods) to be produced with the same quantity of resources, then the PPF shifts outward, but not in the same way as shown in Figure 5 (a). Suppose an advance in technology allows only more civilian goods to be produced, but not more military goods. The maximum amount of military goods that can be produced does not change, but the maximum amount of civilian goods rises. This gives us the shift from PPF_1 to PPF_2 shown in Figure 5(b).

Figure 5 (b). Illustration of unbalanced Economic Growth



SCARCITY is illustrated by the frontier itself. Implicit in the concept of scarcity is the idea that we can have some things but not all things, meaning that some things are attainable and others are not. The PPF separates an attainable region from an unattainable region.

CHOICE is represented by our having to decide among the many attainable combinations of the two goods. For example, will we choose the combination of goods represented by point *A* or by point *B*? Note that within the attainable region, individuals must choose the combination of the two goods they want to produce.

OPPORTUNITY COST is most easily seen as movement from one point to another along the PPF, such as movement from point *A* to point *B*. More cars are available at point *B* than at point *A*, but fewer television sets are available. In short, the opportunity cost of more cars is fewer television sets. Opportunity cost is illustrated as we move from one point to another on the PPF in **Figure 4**.

UNEMPLOYMENT (IN TERMS OF RESOURCES BEING UNEMPLOYED) exists at any productive inefficient point (such as *F*), whereas resources are fully employed at any productive efficient point (such as *A–E*) in **Figure 4**.

Self Test

1. What does a straight-line production possibilities frontier (PPF) represent? What does a bowed-outward PPF represent?
2. What does the law of increasing costs have to do with a bowed-outward PPF?
3. A politician says, “If you elect me, we can get more of everything we want.” Under what conditions is the politician telling the truth?
4. In an economy, only one combination of goods is productive efficient. True or false? Explain your answer.

SPECIALIZATION AND TRADE CAN MOVE US BEYOND OUR PPF

A country that specializes in the production of certain goods, and then trades those goods to countries for other goods, can make itself better off. Specialization and trade enables countries to consume at a level *beyond* their PPFs.

A Simple Two-Person PPF Model

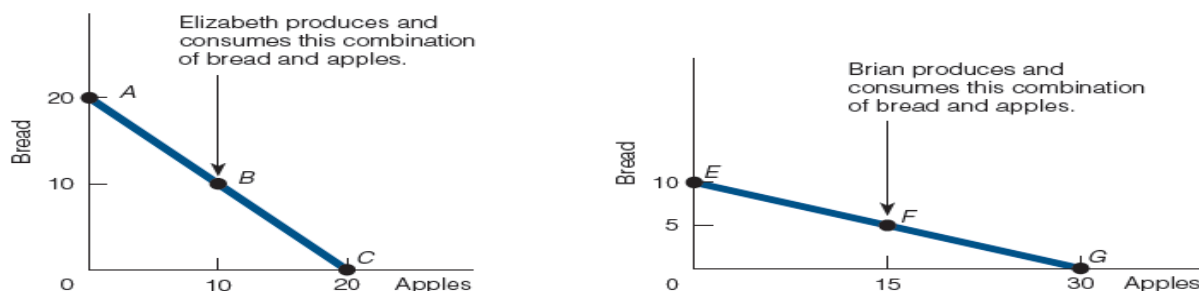
Two individuals, Elizabeth and Brian, live near each other, and each engages in two activities: baking bread and growing apples. Suppose that within a certain period of time, Elizabeth can use her limited resources to produce 20 loaves of bread and no apples, or 10 loaves of bread and 10 apples, or no bread and 20 apples as shown in Table 1.

Table 1. Elizabeth and Brian’s possibilities

Elizabeth		Brian	
Bread	Apples	Bread	Apples
20	0	10	0
10	10	5	15
0	20	0	30

Therefore, Elizabeth’s PPF has three points *A* (20 loaves of bread and no apples), *B* (10 loaves of bread and 10 apples), and *C* (no bread and 20 apples) as shown in Figure 5 below. As a consumer, Elizabeth likes to eat both bread and apples; so she decides to produce (and consume) 10 loaves of bread and 10 apples. This is represented by point *B* in Figure 6.

Figure 6: Elizabeth and Brian's PPFs and Consumption Before Trade (Ex Ante)



On the other hand, Brian can produce 10 loaves of bread and no apples, or 5 loaves of bread and 15 apples, or no bread and 30 apples as shown in Table 1 above; and Brian's PPF has three points E (10 loaves of bread and no apples), F (5 loaves of bread and 15 apples), and G (no bread and 30 apples) as shown in Figure 6 above. Like Elizabeth, Brian likes to eat both bread and apples; so he decides to produce and consume 5 loaves of bread and 15 apples. This is represented by point F in Figure 6.

Elizabeth thinks that both she and Brian may be better off if each specializes in producing only one of the two goods and trading it for the other. In other words, Elizabeth should produce either bread or apples, but not both. Brian thinks this may be a good idea but is not sure which good each person should specialize in producing. An economist would advise each to produce the good that he or she can produce at a lower cost. In economics, a person who can produce a good at a lower opportunity cost than another person is said to have a **comparative advantage** in the production of the good.

Comparing opportunity costs, we see that Elizabeth can produce bread at a lower opportunity cost than Brian can. (*Elizabeth forfeits 1 apple when she produces 1 loaf of bread, whereas Brian forfeits 3 apples for 1 loaf of bread.*) On the other hand, Brian can produce apples at a lower opportunity cost than Elizabeth. (*Brian forfeits $\frac{1}{3}$ loaf of bread when he produces 1 apple, whereas Elizabeth forfeits 1 loaf of bread when she produces 1 apple.*)

We conclude that Elizabeth has a comparative advantage in the production of bread, and Brian has a comparative advantage in the production of apples.

Suppose both specialize in the production of the good in which they have a comparative advantage. Elizabeth produces only bread and makes 20 loaves. Brian produces only apples, harvesting 30 of them. Suppose that Elizabeth and Brian decide to trade 8 loaves of bread for 12 apples, meaning that Elizabeth produces 20 loaves of bread and then trades 8 of them to Brian for 12 apples.

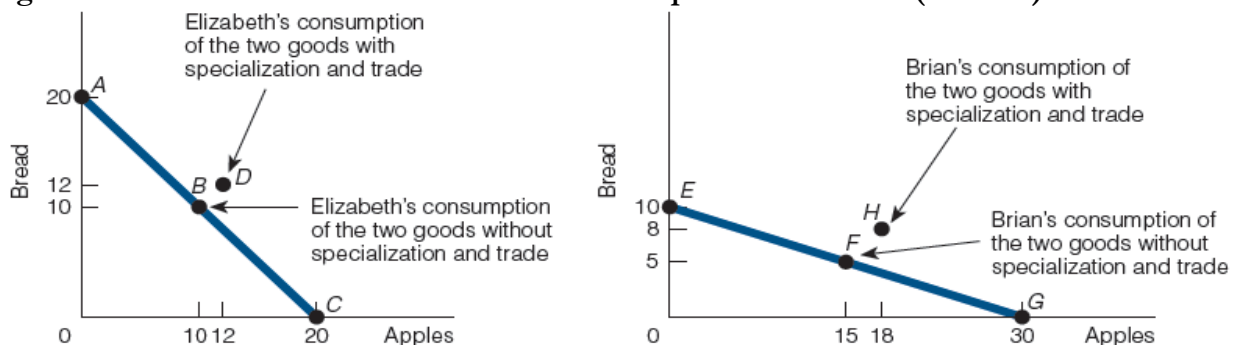
Table 2: Elizabeth and Brian's gains from specialization and trade

		No Specialization and No Trade	Specialization and Trade	Gains from Specialization and Trade
Elizabeth	Consumption of Loaves of Bread	10	12	+2
	Consumption of Apples	10	12	+2
Brian	Consumption of Loaves of Bread	5	8	+3
	Consumption of Apples	15	18	+3

After the trade, Elizabeth consumes 12 loaves of bread and 12 apples. However, when she didn't specialize and didn't trade she consumed 10 loaves of bread and 10 apples. Clearly, Elizabeth is better off when she specializes and trades than when she does not, because she ends up consuming 2 more apples and loaves of bread than before as shown in Table 2 below.

On the part of Brian, he produces 30 apples and trades 12 of them to Elizabeth for 8 loaves of bread; consuming 8 loaves of bread and 18 apples. Without specializing and trading, Brian consumed 5 loaves of bread and 15 apples. Thus, Brian is also better off when he specializes and trades than when he does not. Therefore both Elizabeth and Brian consumed beyond their PPFs.

Figure 6: Elizabeth and Brian's PPFs and Consumption After Trade (Ex Post)



Consuming On or Beyond the PPF?

Figure 6 shows the PPFs for Elizabeth and Brian. When Elizabeth was not specializing and not trading, she consumed the combination of bread and apples represented by point B (10 loaves of bread and 10 apples). When she did specialize and trade, her consumption of both goods increased, moving her to point D (12 loaves of bread and 12 apples). For Brian, when he was not specializing and not trading, he consumed the combination of bread and apples represented by point F (5 loaves of bread and 15 apples). When he specialized and traded, his consumption of both goods increased, moving him to point H (8 loaves of bread and 18 apples). Lesson learned: Through specialization and trade, both Elizabeth and Brian's consumption moved beyond their PPFs.

Coursework Assignment #2: Due Date Friday April 23, 2021 5pm

1. Describe how each of the following would affect the Uganda's production possibilities frontier:
 - (a) An increase in the number of illegal but productive immigrants entering the country,
 - (b) A war with Rwanda that takes place on Uganda's soil,
 - (c) The discovery of a new oil field in Nakasongola,
 - (d) A decrease in the unemployment rate, and
 - (e) The practice of nepotism that puts individuals to work in positions they are not qualified for

2. Explain how the following can be represented in a PPF framework:
 - (a) the finiteness of resources implicit in the scarcity condition;
 - (b) choice;
 - (c) opportunity cost;
 - (d) productive efficiency; and
 - (e) unemployed resources.
3. What condition must hold for the production possibilities frontier to be
 - (a) bowed outward (concave downward)?
 - (b) a straight line?
4. Give an example to illustrate each of the following:
 - (a) constant opportunity costs and
 - (b) increasing opportunity costs.
5. Why are most production possibilities frontiers for goods bowed outward (concave downward)?
6. Within the PPF framework, explain each of the following:
 - (a) a disagreement between a person who favors more domestic welfare spending and one who favors more national defense spending;
 - (b) an increase in the population; and
 - (c) a technological change that makes resources less specialized.
7. Explain how to derive a production possibilities frontier. For instance, how is the extreme point on the vertical axis identified? How is the extreme point on the horizontal axis identified?
8. If the slope of the production possibilities frontier is the same between any two points, what does this imply about costs? Explain your answer.
9. Suppose a nation's PPF shifts inward as its population grows. What happens, on average, to the material standard of living of the people? Explain your answer.
10. Can a technological advancement in sector X of the economy affect the number of people who work in sector Y of the economy? Explain your answer.
11. Use the PPF framework to explain something in your everyday life that not mentioned in the Lecture.
12. What exactly allows individuals to consume more if they specialize and trade than if they don't?

LECTURE NOTES IV

Demand

One of the most famous and widely used theories in economics is the theory of supply and demand. Supply and demand have been called the “bread and butter” of economics. In this and the next two lectures, we discuss them, first separately and then together.

Economists commonly use the term market, which is a means by which the exchange of goods and services occurs as a result of buyers and sellers being in contact with one another, either physically or virtually, either directly or indirectly through mediating agents or institutions. Every market has *two* sides: a buying side and a selling side. The buying side of the market is usually referred to as the *demand* side; the selling side is usually referred to as the *supply* side. This lecture focuses on the demand side of the market.

□ KEY IDEAS

1. Markets have two sides. One side of a market is the demand side and the other is the supply side.
2. Movements along a demand curve are called changes in quantity demanded, while shifts to new demand curves are called changes in demand.

WHAT IS DEMAND?

The word **demand** has a precise meaning in economics. It refers to:

1. The willingness and ability of buyers to purchase different quantities of a good.
2. At different prices,
3. During a specific time period (per day, week, etc.).

A. The Law of Demand

The law of demand states that as the price of a good rises, the quantity demanded of the good falls, and as price falls, quantity demanded rises, *ceteris paribus*.

Quantity demanded is the number of units of a good that individuals are willing and able to buy at a particular price during a time period.

B. Five Ways to Represent the Law of Demand

The law of demand can be represented in words, in symbols, in a demand schedule, as a demand curve in a price-quantity plane, and as an equation.

●● *In Words*. We can represent the law of demand in words; as the price of a good rises, quantity demanded falls, and as price falls, quantity demanded rises, *ceteris paribus*.

●● *In Symbols*. We can also represent the law of demand in symbols.

$P \uparrow Q_d \downarrow$.

$P \downarrow Q_d \uparrow$, *ceteris paribus*; where P = price and Q_d = quantity demanded.

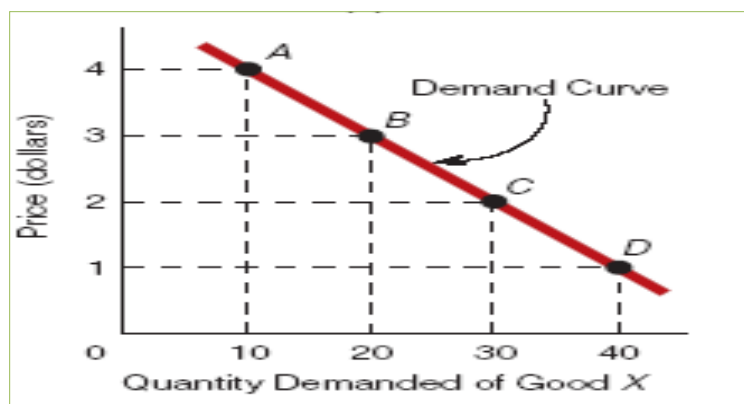
●● *In a Demand Schedule.* A **demand schedule** is the numerical representation of the law of demand. A demand schedule for good X is illustrated in Table 1 below

Table 1: Demand Schedule for Good X.

Price (\$)	Quantity Demanded	Point on the Demand Curve
4	10	A
3	20	B
2	30	C
1	40	D

●● *As a Demand Curve.* The four price–quantity combinations in Table 1 are plotted and the points are connected to produce a (downward-sloping) demand curve. A (downward-sloping) **demand curve** is the graphical representation of the inverse relationship between price and quantity demanded specified by the law of demand.

Figure 1: Derivation of the Individual Demand Curve



●● *As a Demand Function.* $Q_d = f(P)$ expressed as linear equation: $Q_d = a - bP$ where a = intercept and b = slope (*the negative sign of the slope implies an inverse relationship between price and quantity demanded specified by the law of demand*).

C. Why Does Quantity Demanded Go Down as Price Goes Up?

There are mainly two reasons:

1. The first reason for the inverse relationship between price and quantity demanded is that people substitute lower priced goods for higher priced goods. Often, many goods serve the same purpose.
2. The second reason has to do with the law of diminishing marginal utility, which states that for a given time period, the marginal (or additional) utility gained by consuming equal successive units of a good will decline as the amount consumed increases.

What does this have to do with the law of demand? Economists state that the more utility you receive from a unit of a good, the higher the price you are willing to pay for it; the less utility you receive from a unit of a good, the lower the price you are willing to pay for it.

D. Individual Demand Curve and Market Demand Curve

An individual demand curve represents the price-quantity combinations of a particular good for a single buyer, while a market demand curve represents the same thing for all buyers.

There is a difference between an individual demand curve and a market demand curve. An individual demand curve represents the price–quantity combinations of a particular good for a *single buyer*.

A market demand curve is derived by “adding up” individual demand curves, as shown in Table 3

Table 3: Market Demand Schedule for Jones, Smith and Other Buyers

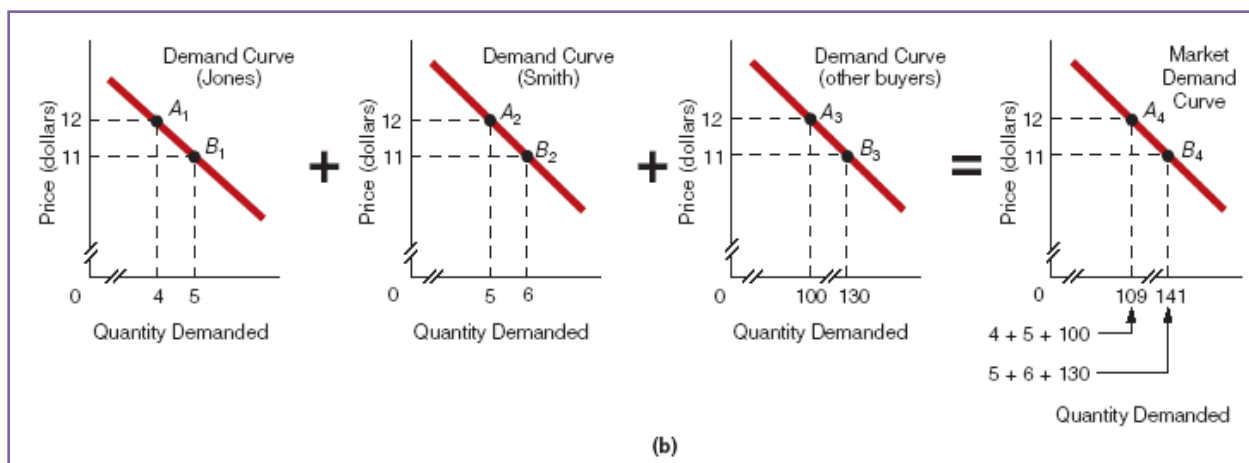
Price	Quantity Demanded						
	Jones		Smith		Other Buyers		All Buyers
\$15	1		2		20		23
14	2		3		45		50
13	3		4		70		77
12	4	+	5	+	100	=	109
11	5	+	6	+	130	=	141
10	6		7		160		173

(a)

The market demand schedule for Jones, Smith, and other buyers is obtained by adding the quantities demanded at each price. For example, at \$12, the quantities demanded are 4 units for Jones, 5 units for Smith, and 100 units for other buyers. Thus, a total of 109 units are demanded at \$12.

In figure 2 below, the data points for the **individual demand schedules** are plotted and added to produce a **market demand curve**. The market demand curve could also be drawn directly from the market demand schedule.

Figure 2: Derivation of the market demand curve



E. A Change in Quantity Demanded Versus a Change in Demand

Economists often talk about (1) a change in quantity demanded and (2) a change in demand. As stated earlier, although the phrase *quantity demanded* may sound like *demand*, the two are not the same.

A CHANGE IN QUANTITY DEMANDED The X-axis of Figure 1 shows the “Quantity Demanded of Good X.” Notice that quantity demanded is a *number*—such as 10, 20, 30, 40, and so on. More specifically, it is the number of units of a good that individuals are willing and able to buy at a particular price during a particular time period. If the price is \$4, then quantity demanded is 10 units of good X; if the price is \$3, then quantity demanded is 20 units of good X.

Quantity demanded = The number of units of a good that individuals are willing and able to buy at a particular price

The only thing that changed for the quantity demanded of the good to change is its price, which is called **own price**.

Therefore, *Change in quantity demanded* = A movement from one point to another point on the same demand curve caused by a change in the price of the good

A CHANGE IN DEMAND Focusing on the demand curve in Figure 1, Demand is represented by the *entire* curve. When talking about a change in demand, an economist is actually talking about a change—or shift—in the entire demand curve. *Change in demand* = *Shift in demand curve*

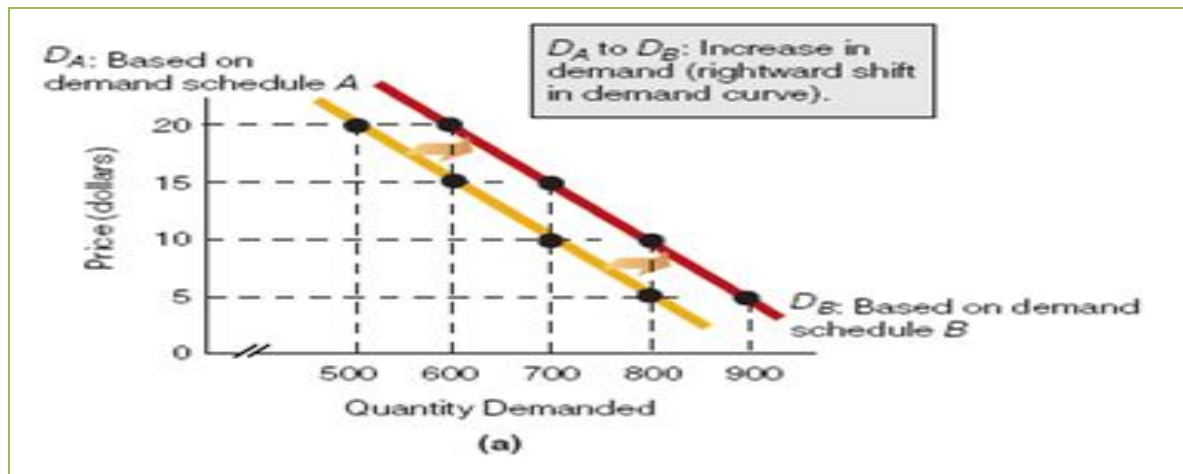
Demand can change in two ways: Demand can increase, and demand can decrease. Suppose we have demand schedules captured in Table 4 below:

Table 4: Demand Schedules A and B

Price (\$)	Quantity Demanded (Schedule A)	Quantity Demanded (Schedule B) (<i>Increase in Demand</i>)
20	500	600
15	600	700
10	700	800
5	800	900

The demand curve for this demand schedule will look like the demand curve labeled *DA* in Figure 3

Figure 3: Demand Curve for Schedules A and B



Whereas individuals were willing and able to buy 500 units of the good at \$20, now they are willing and able to buy 600 units of the good at \$20; whereas individuals were willing and able to buy 600 units of the good at \$15, now they are willing and able to buy 700 units of the good at \$15; and so on. As shown in Figure 3, the demand curve that represents demand schedule B (D_B) lies to the right of the demand curve that represents demand schedule A (D_A). We conclude that *an increase in demand is represented by a rightward shift in the demand curve and means that individuals are willing and able to buy more of a good at each and every price*. **Increase in demand = Rightward shift in the demand curve**

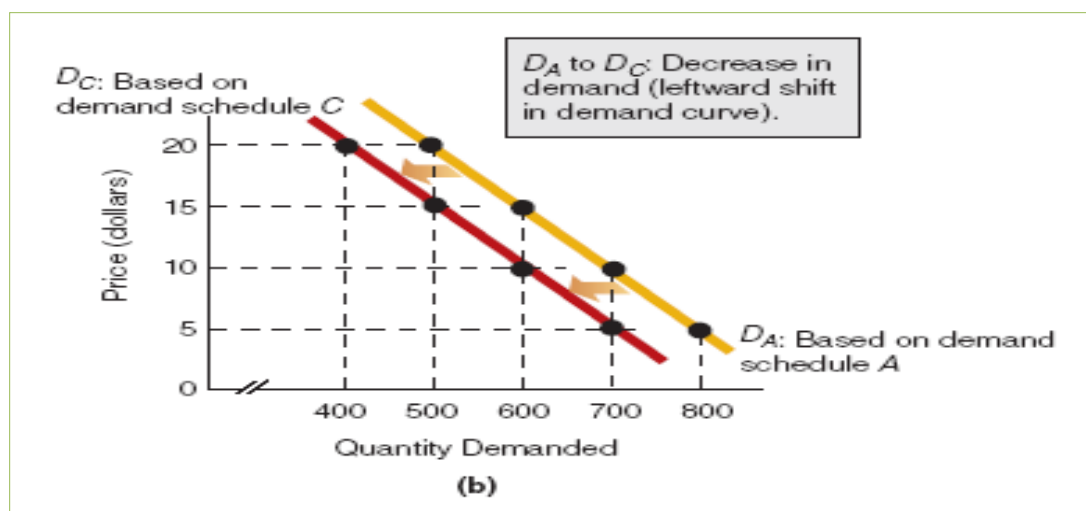
A decrease in demand means that individuals are willing and able to buy less of a good at each and every price. In this case, demand schedule A will change as shown in Table 5 below to schedule C:

Table 5: Demand Schedule C

Price (\$)	Quantity Demanded (Schedule C) (<i>Decrease in Demand</i>)
20	400
15	500
10	600
5	700

As shown in Figure 4 below, the demand curve that represents demand schedule C (D_C) lies to the left of the demand curve that represents demand schedule A (D_A). We conclude that *a decrease in demand is represented by a leftward shift in the demand curve and means that individuals are willing and able to buy less of a good at each and every price*. **Decrease in demand = Leftward shift in the demand curve**

Figure 4: Demand Curve for Schedules A and C



F. What Factors Cause the Demand Curve to Shift?

They include (1) income, (2) preferences, (3) prices of related goods, (4) the number of buyers, and (5) expectations of future prices.

INCOME As a person's income changes (increases or decreases), that individual's demand for a particular good may rise, fall, or remain constant.

X is a normal good: *If Income $\uparrow$ then $D_X \uparrow$ and if Income $\downarrow$ then $D_X \downarrow$*

For an **inferior good**, demand falls as income rises, and demand rises as income falls.

Y is an inferior good: *If Income $\uparrow$ then $D_Y \downarrow$ and if Income $\downarrow$ then $D_Y \uparrow$*

For a **neutral good**, demand does not change as income rises or falls.

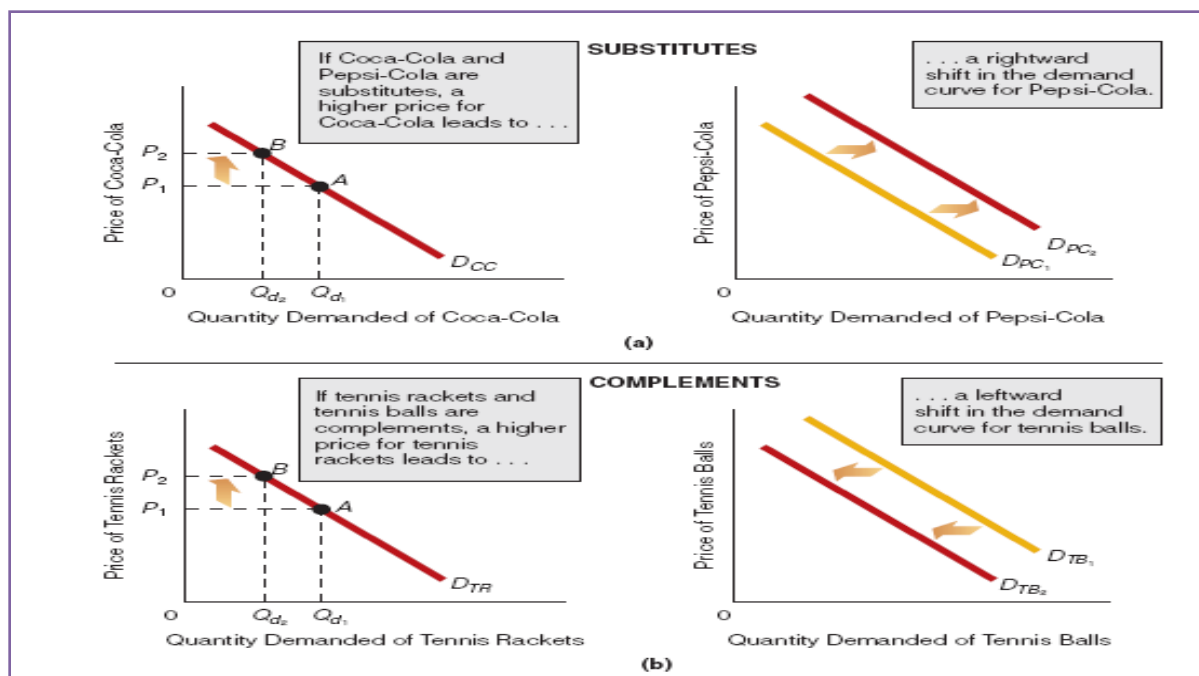
PREFERENCES: People's preferences affect the amount of a good they are willing to buy at a particular price. A change in preferences in favor of a good shifts the demand curve rightward. A change in preferences away from the good shifts the demand curve leftward.

PRICES OF RELATED GOODS There are two types of related goods: **substitutes and complements**. Two goods are **substitutes** if they satisfy similar needs or desires. For many people, Coca-Cola and Pepsi-Cola are substitutes. If two goods are substitutes, as the price of one rises (falls), the demand for the other rises (falls).

X and Y are substitutes: *If $P_X \uparrow$ then $D_Y \uparrow$ and if $P_X \downarrow$ then $D_Y \downarrow$*

Two goods are **complements** if they are consumed jointly. For example, tennis rackets and tennis balls are used together to play tennis. If two goods are complements, as the price of one rises (falls), the demand for the other falls (rises).

Figure 5: Demand Shifts for Substitutes and Complements



NUMBER OF BUYERS The demand for a good in a particular market area is related to the number of buyers in the area: more buyers, higher demand; fewer buyers, lower demand.

EXPECTATIONS OF FUTURE PRICE Buyers who expect the price of a good to be higher next month may buy it now, thus increasing the current (or present) demand for the good. Buyers who expect the price of a good to be lower next month may wait until next month to buy it, thus decreasing the current (or present) demand for the good.

Self Test

1. As Andy's income rises, his demand for popcorn rises. As Mark's income falls, his demand for prepaid telephone cards rises. What kinds of goods are popcorn and telephone cards for the people who demand each?
2. Why are demand curves downward sloping?
3. How is a market demand curve for two or more individuals derived?
4. What factors can change demand? What factors can change quantity demanded?

Coursework Assignment #3: Due Date Friday April 30, 2021 5pm

1. What is wrong with this statement? Demand refers to the willingness of buyers to purchase different quantities of a good at different prices during a specific time period.
2. What is the difference between *demand* and *quantity demanded*?
3. True or false? As the price of oranges rises, the demand for oranges falls, *ceteris paribus*. Explain your answer.

4. “The price of a bushel of wheat, which was \$3.00 last month, is \$3.70 today. The demand curve for wheat must have shifted rightward between last month and today.” Discuss.
5. “Some goods are bought largely because they have ‘snob appeal.’ For example, the residents of Naguru Hills gain prestige by buying expensive items. In fact, they won’t buy some items unless they are expensive. The law of demand, which holds that people buy more at lower prices than at higher prices, obviously doesn’t hold for the residents of Naguru Hills. The following rules apply in Naguru Hills: high prices, buy; low prices, don’t buy.” Discuss.
6. “The price of T-shirts keeps rising and rising, and people keep buying more and more. T-shirts must have an upward-sloping demand curve.” Identify the error.
7. With respect to each of the following changes, identify whether the demand curve will shift rightward or leftward:
 - a. An increase in income (the good under consideration is a normal good)
 - b. A rise in the price of a substitute good
 - c. A fall in the price of a complementary good
 - d. A fall in the number of buyers
8. What does a sale on shirts have to do with the law of demand (as applied to shirts)?
9. A Dell computer is a substitute for a Hewlett-Packard computer. What happens to the demand for Hewlett-Packard computers and the quantity demanded of Hewlett-Packard computers as the price of a Dell falls?
10. Describe how each of the following will affect the demand for personal computers: (a) A rise in incomes (assuming computers are a normal good); (b) A lower expected price for computers; (c) Cheaper software; (d) Simpler-to-operate computers.
11. Use the law of diminishing marginal utility to explain why demand curves slope downward.

LECTURE NOTES V

Supply

□ KEY IDEAS

1. Markets have two sides. One side of a market is the demand side and the other is the supply side.
2. Movements along a supply curve are called changes in quantity supplied, while shifts to new supply curves are called changes in supply.

WHAT IS SUPPLY?

Just as the word *demand* has a specific meaning in economics, so does the word *supply*.

Supply refers to

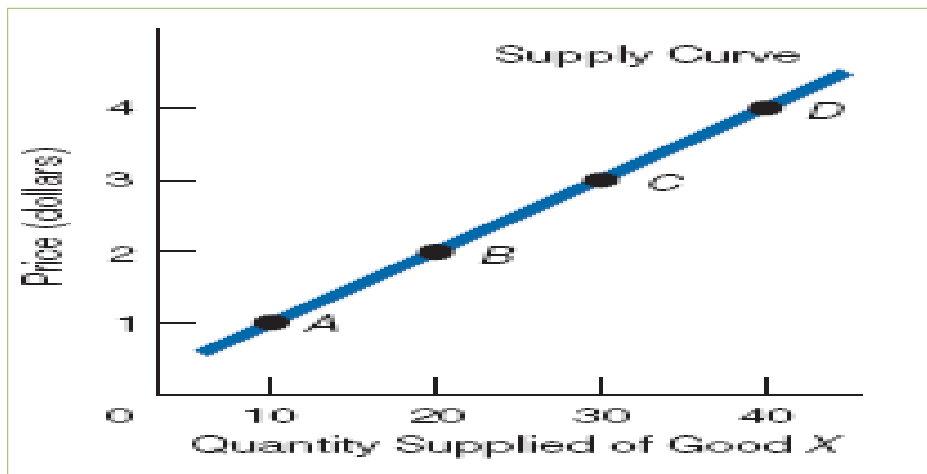
1. the willingness and ability of sellers to produce and offer to sell different quantities of a good
2. at different prices
3. during a specific time period (per day, week, etc.).

A. The Law of Supply

The **law of supply** states that as the price of a good rises, the quantity supplied of the good rises, and as the price of a good falls, the quantity supplied of the good falls, *ceteris paribus*.

The **(upward-sloping) supply curve** is the graphical representation of the law of supply (*see Figure 1*).

Figure 1: Upward Sloping Supply Curve



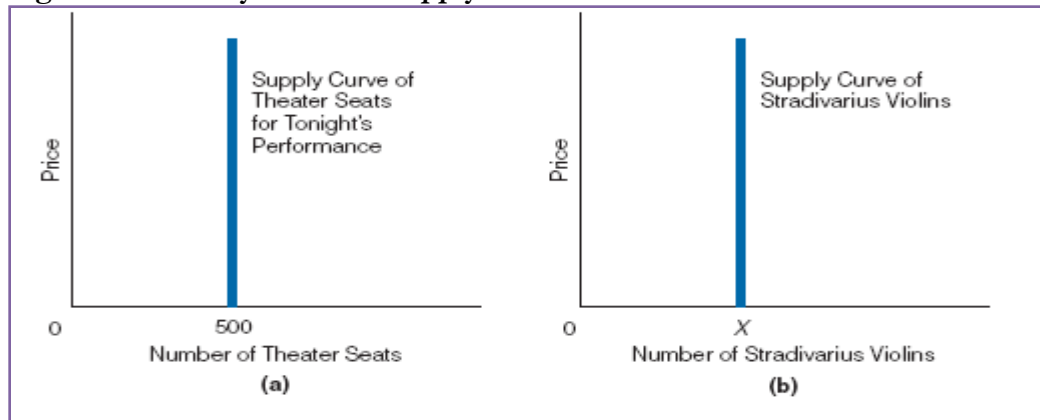
The law of supply can be summarized as follows:

$$P \uparrow Q_S \uparrow$$
$$P \downarrow Q_S \downarrow, \text{ ceteris paribus; where } P = \text{price and } Q_S = \text{quantity supplied.}$$

The law of supply holds for the production of most goods. However, the law of supply does not hold:

- (1) When there is no time to produce more units of a good. For example, suppose the National Theatre is sold out for tonight's play. Even if ticket prices increased from Ush 10,000 to Ush 20,000, the theatre would have no additional seats and no time to produce more. The supply curve for theater seats is illustrated in Figure 2(a).
- (2) For goods that cannot be produced over any period of time. For example, the violin maker Antonio Stradivari died in 1737. A rise in the price of Stradivarius violins does not affect the number of Stradivarius violins supplied, as Figure 2 (b) illustrates.

Figure 2: Perfectly Inelastic Supply Curve



B. Why Most Supply Curves are Upward Sloping

Most supply curves are upward sloping. The fundamental reason for this involves the *law of diminishing marginal returns*, which states that as larger amounts of a **variable input** are combined with **fixed inputs**, eventually the **marginal physical product** of the variable input will decline.

The other explanation for an upward-sloping supply curve is the fact that, under certain conditions, a higher price is an incentive to producers to produce more of the good.

An upward sloping supply curve also reflects the fact that costs rise when more units of a good are produced.

C. Individual Demand Supply and Market Supply Curve

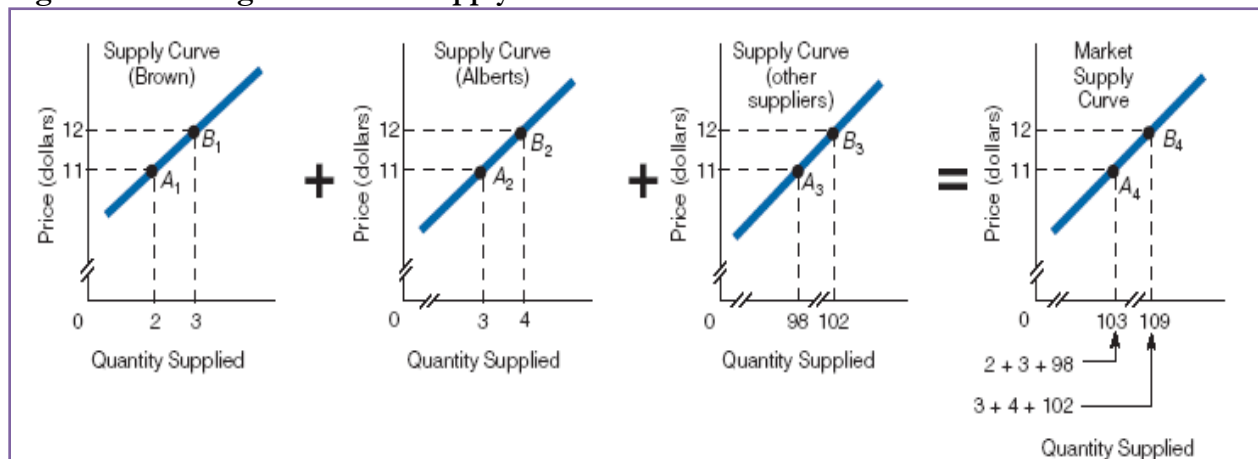
An individual supply curve represents the price-quantity combinations for a single seller. The market supply curve represents the price-quantity combinations for all sellers of a particular good.

Table 1: Individual Supply Schedules for Brown, Alberts & Other Suppliers AND the Market Supply Schedule for ALL Suppliers

Price	Quantity Supplied				All Suppliers
	Brown		Alberts	Other Suppliers	
\$10	1		2	96	99
11	2	+	3	98	= 103
12	3	+	4	102	= 109
13	4		5	106	115
14	5		6	108	119
15	6		7	110	123

(a)

Figure 3: Deriving the Market Supply Curve



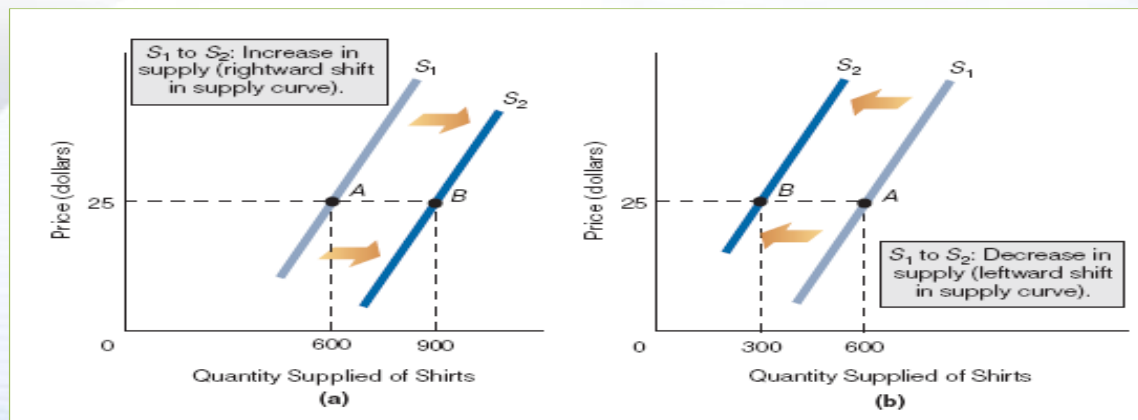
D. Changes in Supply Mean Shifts in Supply Curves

Just as demand can change, so can supply. The supply of a good can rise or fall. An increase in the supply of a good means that suppliers are willing and able to produce and offer to sell more of the good at all prices.

When supply decreases, the entire supply curve shifts leftward. The supply of a good decreases if sellers are willing and able to produce and offer to sell less of the good at all prices.

Figure 4: Change in Supply

Change in Supply



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E. What Factors Cause the Supply Curve to Shift?

The factors that can change supply include (1) the prices of relevant resources, (2) technology, (3) the prices of other goods, (4) the number of sellers, (5) expectations of future price, (6) taxes and subsidies, and (7) government restrictions.

PRICES OF RELEVANT RESOURCES: Resources are needed to produce goods. For example, wood is needed to produce doors. If the price of wood falls, producing doors becomes less costly. How will door producers respond? Will they produce more doors, the same number, or fewer? With lower costs and prices unchanged, the profit from producing and selling doors has increased; as a result, the (monetary) incentive to produce doors is increased.

TECHNOLOGY: Technology was earlier on defined as the body of skills and knowledge concerning the use of resources in production. Also, an advance in technology was said to refer to the ability to produce more output with a fixed amount of resources, reducing per-unit production costs.

If the per-unit production costs of a good decline, we expect the quantity supplied of the good at each price to increase. Why?

PRICES OF OTHER GOODS: A change in the price of one good can lead to a change in the supply of another good.

NUMBER OF SELLERS: If more sellers begin producing a good, perhaps because of high profits, the supply curve will shift rightward. If some sellers stop producing a good, perhaps because of losses, the supply curve will shift leftward.

EXPECTATIONS OF FUTURE PRICE: If the price of a good is expected to be higher in the future, producers may hold back some of the product today (if it is not perishable) Then they will have more to sell at the higher future price. Therefore, the *current* supply curve will shift leftward.

TAXES AND SUBSIDIES: A rough rule of thumb is that we get more of what we subsidize and less of what we tax. Some taxes increase per-unit costs. Suppose a shoe manufacturer must pay a \$2 tax per pair of shoes produced. This tax leads to a leftward shift in the supply curve, indicating that the manufacturer wants to produce and offer to sell fewer pairs of shoes at each price. If the tax is eliminated, the supply curve shifts rightward.

Subsidies have the opposite effect. Suppose the government subsidizes the production of maize by paying maize farmers Ush 200 for every kilogram of maize they produce. Because of the subsidy, the quantity supplied of maize is greater at each price, and the supply curve of maize shifts rightward. The removal of the subsidy shifts the supply curve of maize leftward.

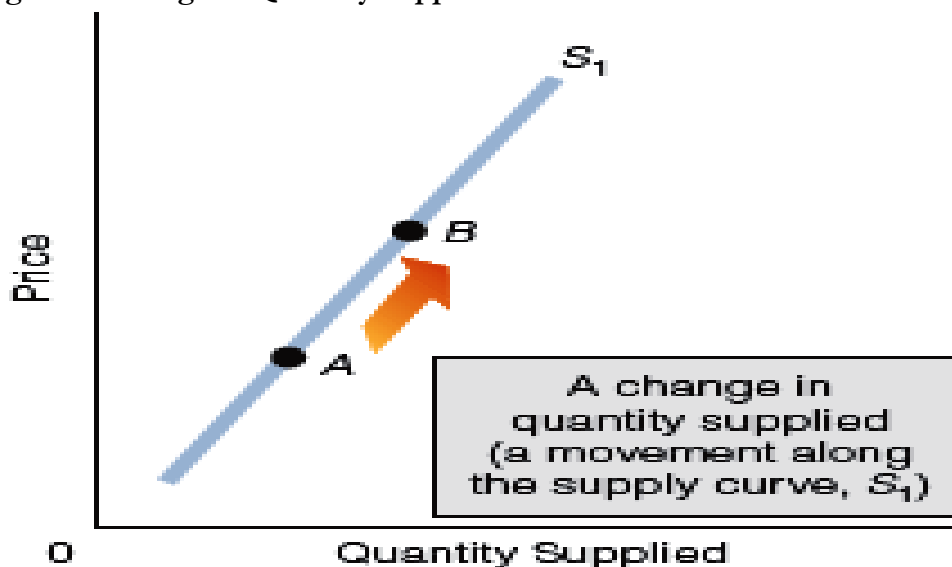
GOVERNMENT RESTRICTIONS: Sometimes government acts to reduce supply. Consider a Uganda government policy of BUBU imposes an import quota on foreign furniture. Such an import quota, or a quantitative restriction on foreign furniture, reduces the supply of imported sofa sets in Uganda. It shifts the supply curve leftward. The elimination of the import quota allows the supply of foreign sofa sets in Uganda to shift rightward.

F. A Change in Supply versus a Change in Quantity Supplied

A change in *supply* is not the same as a change in *quantity supplied*. A change in supply refers to a shift in the supply curve, as illustrated in Figure 4.

A change in quantity supplied refers to a movement along a supply curve, as in Figure 5.

Figure 5: Change in Quantity Supplies



Self Test

1. What would the supply curve for houses Kampala look like in the next (a) 12 hours (b) the next six months?
2. What happens to the supply curve if each of the following occurs?
 - a. The number of sellers decreases.
 - b. A per-unit tax is placed on the production of a good.
 - c. The price of a relevant resource falls.
3. If the price of apples rises, the supply of apples will rise” True or false? Explain your answer.

Coursework Assignment #4: Due Date Friday May 7, 2021 5pm

1. What is wrong with this statement: As the price of a good falls, the supply of that good falls, *ceteris paribus*.
2. In the previous Lectures you learned about the law of increasing opportunity costs. What does this law have to do with an upward-sloping supply curve?
3. How might the price of maize affect the supply of wheat?
4. What is the difference between supply and quantity supplied?
5. Describe how each of the following will affect the supply of personal computers:
 - (a) A rise in wage rates;
 - (b) An increase in the number of sellers of computers;
 - (c) A tax placed on production of computers;
 - (d) A subsidy placed on the production of computers.
6. What does it mean to say that “the market” feeds Kampala, Entebbe, Mukono, or Jinja?

LECTURE NOTES VI

The Market: Putting Supply and Demand Together

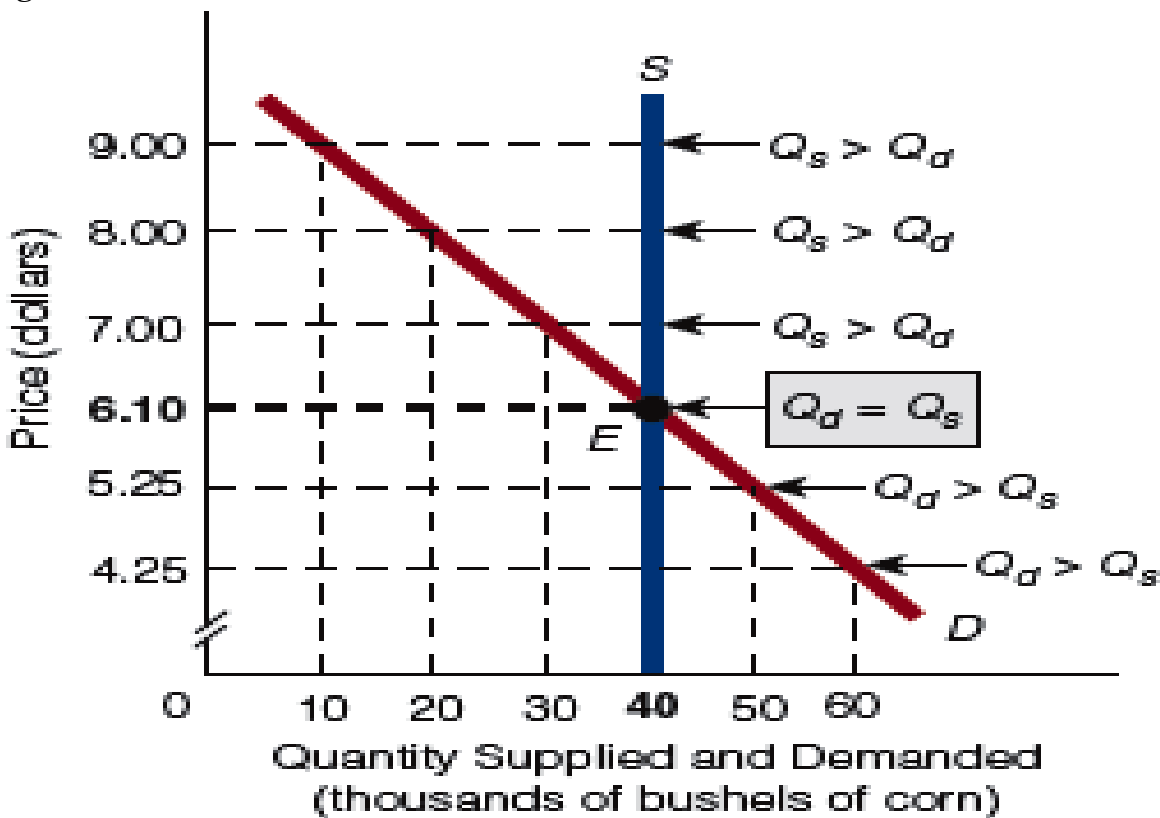
□ KEY IDEAS

1. Markets have two sides. One side of a market is the demand side and the other is the supply side.
2. Market adjustment will eliminate shortages and surpluses.
3. A change in a factor of demand or a factor of supply (or both) will change the point of market equilibrium in a predictable way.

In this Lecture, we put supply and demand together and discuss the market. The purpose of the discussion is to gain some understanding about how prices are determined.

A. Supply and Demand at Work at an Auction

Figure 1. Illustration of Auction at Work in a Market



In Figure 1 above, the supply curve of corn/maize is vertical (meaning it is perfectly inelastic). It intersects the horizontal axis at 40,000 bushels (*1 Bushel of corn = 56 pounds = 25.4 kgs*); that is, the quantity supplied is 40,000 bushels. The demand curve for corn is downward sloping.

Suppose you are at a computerized auction where corn is bought and sold in bushels. At this auction, the auctioneer will adjust the corn price up to the point where all the corn offered for sale (supply) is equal to the quantity demanded and actually sold (market clearing condition).

B. The Language of Supply and Demand: A Few Important Terms

If the quantity supplied is greater than the quantity demanded, a **surplus**, or **excess supply**, exists. If the quantity demanded is greater than the quantity supplied, a **shortage**, or **excess demand**, exists. In Figure 1, a surplus exists at \$9.00, \$8.00, and \$7.00. A shortage exists at \$4.25 and \$5.25.

The price at which the quantity demanded equals the quantity supplied is the **equilibrium price**, or **market-clearing price**. In our example, \$6.10 is the equilibrium price. The quantity that corresponds to the equilibrium price is the **equilibrium quantity**. In our example, it is 40,000 bushels of corn. Any price at which quantity demanded is not equal to quantity supplied is a **disequilibrium price**.

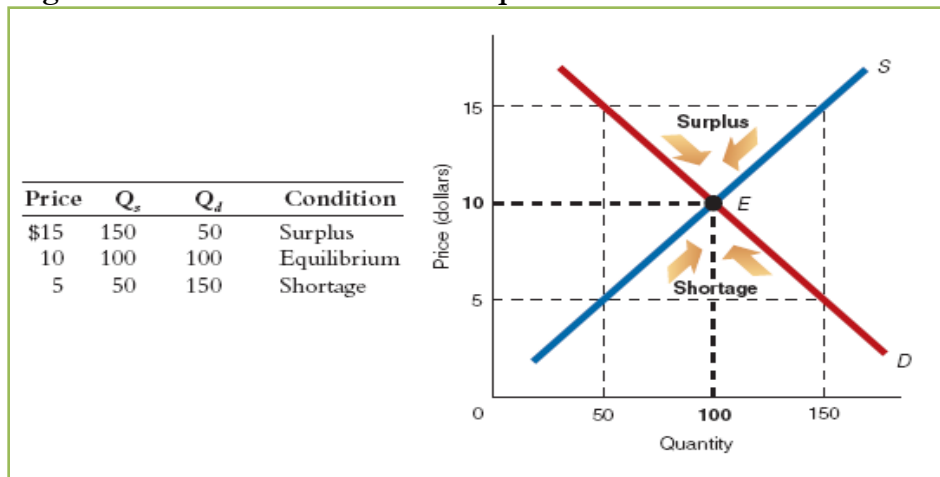
A market that exhibits either a surplus ($Q_s > Q_d$) or a shortage ($Q_d > Q_s$) is said to be in **disequilibrium**. A market in which the quantity demanded equals the quantity supplied ($Q_d = Q_s$) is said to be in **equilibrium** (point *E* in Figure 1).

C. Moving to Equilibrium: What Happens to Price When There is a Surplus or Shortage?

The behavior of the auctioneer can be summarized this way: If a surplus exists, lower the price; if a shortage exists, raise the price. This is how the auctioneer is able to move the corn market into equilibrium.

WHY DOES PRICE FALL WHEN THERE IS A SURPLUS? In Figure 2, there is a surplus at a price of \$15: The quantity supplied (150 units) is greater than the quantity demanded (50 units). Suppliers will not be able to sell all they had hoped to sell at \$15. As a result, their stock will grow beyond the level they hold in preparation for demand changes. Sellers will want to reduce their stock. Some will lower prices to do so, some will cut back on production, others will do a little of both. As shown in Figure 2, price and output tend to fall until equilibrium is achieved.

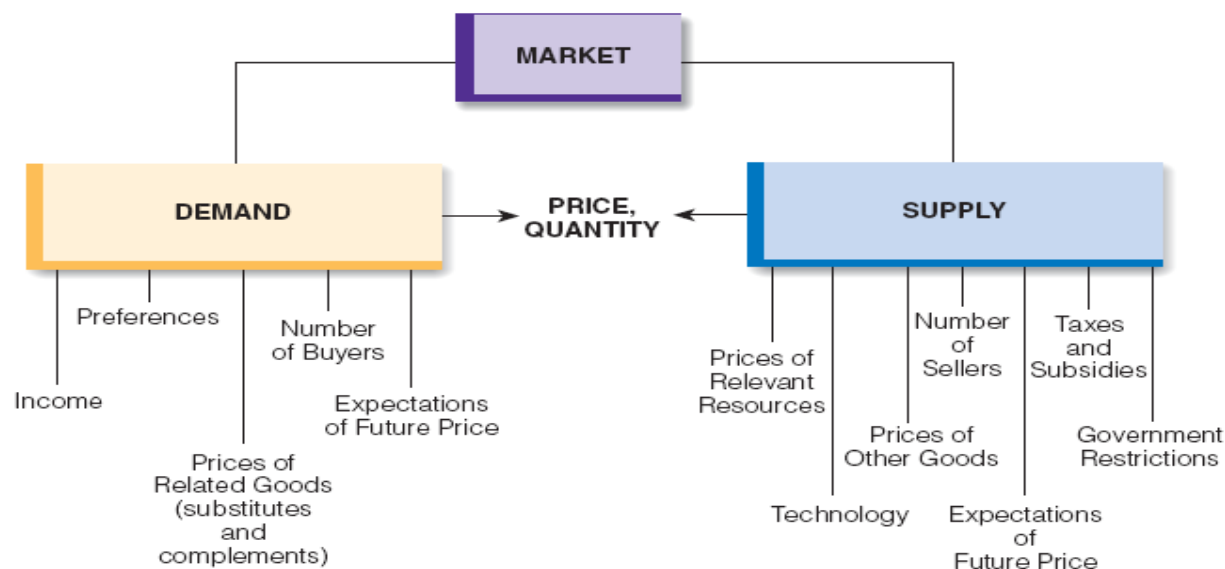
Figure 2. Illustration of a move to equilibrium



WHY DOES PRICE RISE WHEN THERE IS A SHORTAGE? In Figure 2, there is a shortage at a price of \$5: The quantity demanded (150 units) is greater than the quantity supplied (50 units). Buyers will not be able to buy all they had hoped to buy at \$5. Some buyers will bid up the price to get sellers to sell to them instead of to other buyers. Some sellers, seeing buyers clamor for the goods, will realize that they can raise the price of the goods they have for sale. Higher prices will also call forth added output. Thus, price and output tend to rise until equilibrium is achieved. Simply put, prices rise to eliminate shortage.

Figure 3 brings together much of what we have discussed about supply and demand. It shows that market is composed of both supply and demand, and there are the factors that affect supply and demand and therefore indirectly affect the equilibrium price and quantity of a good.

Figure 3: Summary of key things to note about supply, demand and the market



D. Speed of Moving to Equilibrium

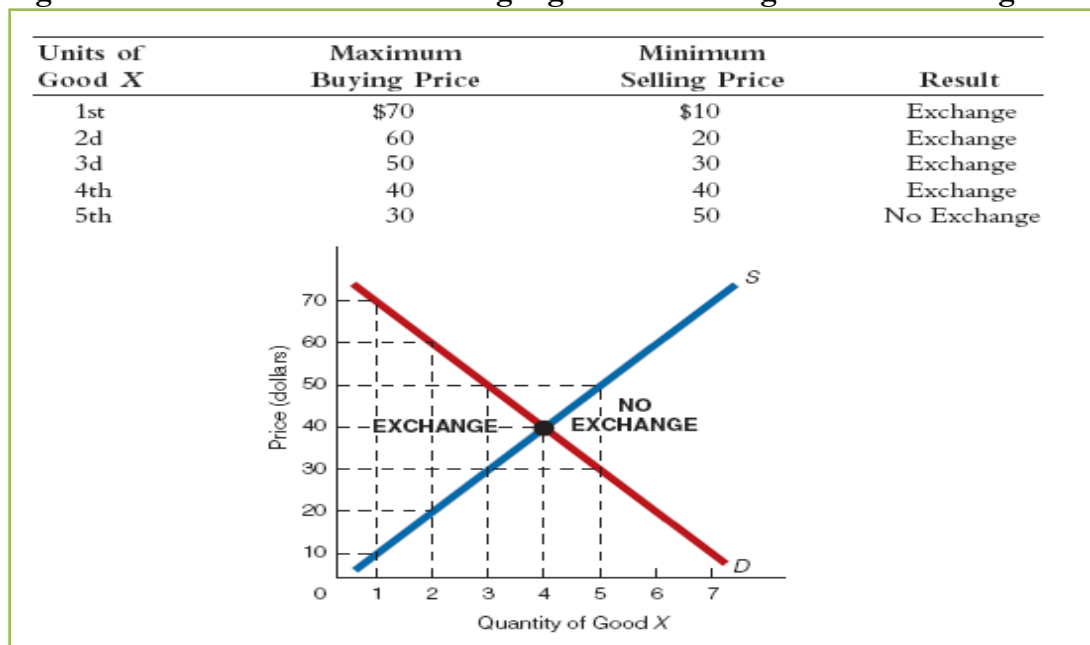
Not all markets equilibrate at the same speed. The stock market may take only seconds to go from surplus or shortage to equilibrium, while the housing market may take months to do so.

E. Moving to Equilibrium: Maximum and Minimum Prices

There is another way to demonstrate how a market moves to equilibrium. Figure 4 shows the market for good X. For the first unit of good X, the buyers are willing to pay a *maximum price of \$70*. For the first unit of good X, the sellers are willing to sell at a *minimum price of \$10*. Because the maximum buying price is greater than the minimum selling price, the first unit of good X will be exchanged.

For the second unit, buyers are willing to pay a maximum price of \$60, and sellers are willing to receive a minimum price of \$20, so the second unit of good X will be exchanged. In fact, exchange will occur as long as the maximum buying price is greater than the minimum selling price. Figure 4 shows that a total of four units of good X will be exchanged. The fifth unit will not be exchanged because the maximum buying price (\$30) is less than the minimum selling price (\$50).

Figure 4: Market for Good X showing regions of exchange and no exchange



F. The Connection Between Equilibrium and Predictions

The economist's concept of equilibrium is related to the economist's predictions. It is a two-step process:

- (1) The economist compares the what-is with what would exist in equilibrium. Example: The market shortage is compared to market equilibrium.
- (2) If the what-is is not what would exist in equilibrium, then the economist predicts the path the market will take to get from what-is to equilibrium. Example: Price will rise until quantities demanded and supplied are equal.

Economists use the concepts of disequilibrium and equilibrium in much the same way as a person uses a map. We are at point X and we want to go to point Y. The shortest route is this way. The economist says, "The market is in disequilibrium, and soon it will be in equilibrium. Here is the path (I predict) that the market will take to get from disequilibrium to equilibrium."

G. Equilibrium in Terms of Consumers' and Producers' Surplus

Equilibrium can be viewed in terms of two important economic concepts: consumers' surplus and producers' (or sellers') surplus. **Consumers' surplus** is the difference between the maximum buying price and the price paid by the buyer. *Consumers' surplus = Maximum buying price - Price paid*

For example, if the highest price you would pay to see a movie is \$10 and you pay \$7 to see it, then you have received a \$3 consumers' surplus. Obviously, the more consumers' surplus that consumers receive, the better off they are. If you had paid only \$4, your consumers' surplus would have been \$6 instead of \$3.

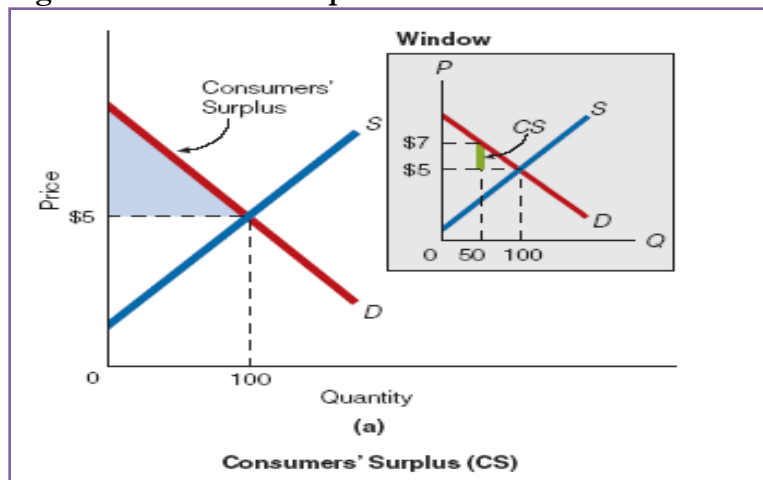
Producers' (or sellers') surplus is the difference between the price received by the producer or seller and the minimum selling price. *Producers' (sellers') surplus = Price received - Minimum selling price*
 Suppose the minimum price the owner of the movie theater would have accepted for admission is \$5. But she sells admission for \$7, not \$5. Her producers' or sellers' surplus is \$2. A seller prefers a large producers' surplus to a small one. The theater owner would have preferred to sell admission to the movie for \$8 instead of \$7 because then she would have received a \$3 producers' surplus.

Total surplus is the sum of the consumers' surplus and producers' surplus.

Total surplus = Consumers' surplus + Producers' surplus

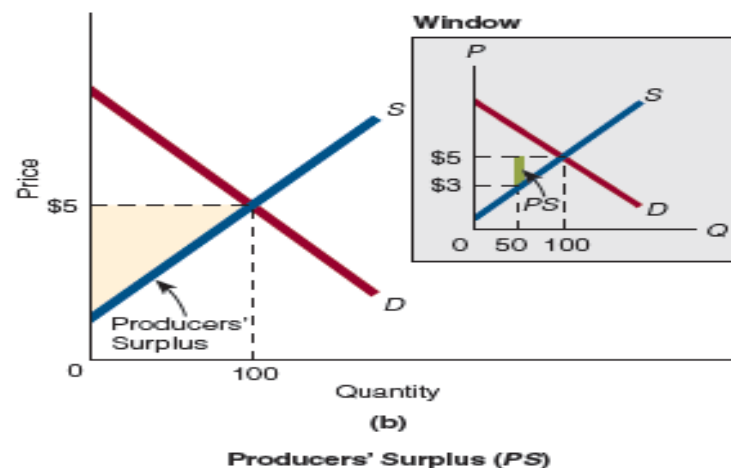
In Figure 5, consumers' surplus is represented by the shaded triangle, which includes the area under the demand curve and above the equilibrium price (\$5).

Figure 5: Consumer Surplus



In Figure 6, producers' surplus is also represented by a shaded triangle. This triangle includes the area above the supply curve and under the equilibrium price.

Figure 6: Producer Surplus



Now consider the Total Surplus (*the sum of consumers' surplus and producers' surplus*) at the equilibrium quantity

Figure 7: Total Surplus

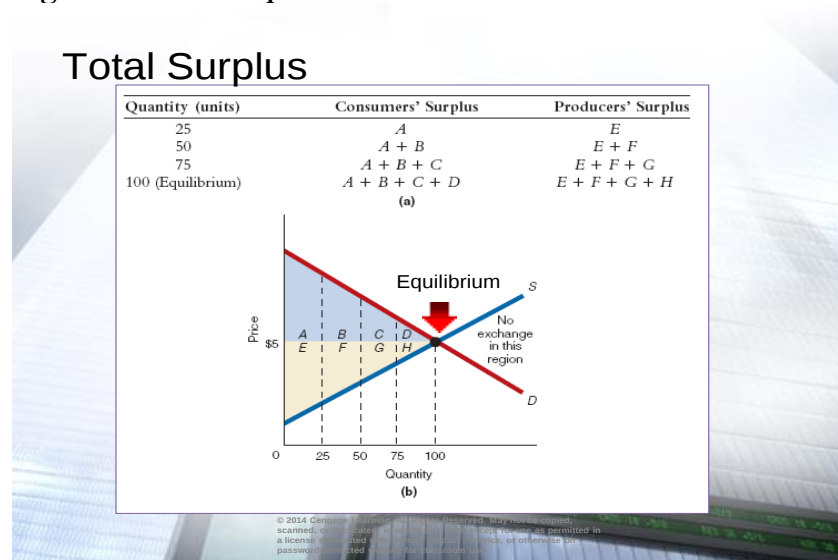


Figure 7 shows that the consumers' surplus at equilibrium is equal to areas $A + B + C + D$, and the producers' surplus at equilibrium is equal to areas $E + F + G + H$. At any other exchangeable quantity, such as at 25, 50, or 75 units, both consumers' surplus and producers' surplus are less.

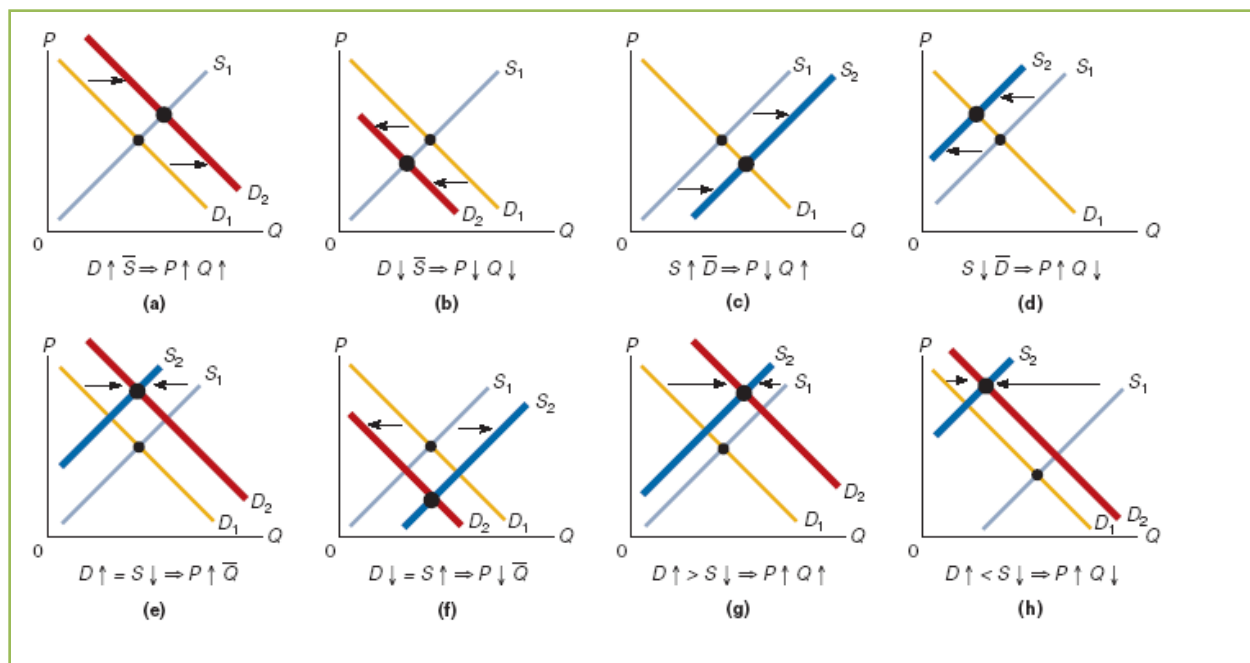
H. What Can Change Equilibrium Price and Quantity?

Equilibrium price and quantity are determined by supply and demand. Whenever one changes or both change, equilibrium price and quantity change. Figure 8 illustrates eight different cases where this occurs. Cases (a)–(d) illustrate the four basic changes in supply and demand, where either supply or demand changes. Cases (e)–(h) illustrate changes in both supply and demand.

●● *Case (a).* Demand rises (*the demand curve shifts rightward from D_1 to D_2*), and supply is constant (the supply curve does not move). As a result of demand rising and supply remaining constant, the equilibrium price rises from P_1 to P_2 , and the equilibrium quantity rises from 10 to 12 units. Remember, **quantity supplied** (*not supply*) changes if *price* changes. As price rises from P_1 to P_2 , quantity supplied rises from 10 to 12 units. We see this as a movement up the supply curve from point 1 to point 2, which corresponds (on the horizontal axis) as a change from 10 to 12 units.

●● *Case (b).* Demand falls (*the demand curve shifts leftward from D_1 to D_2*), and supply is constant. As a result, the equilibrium price falls from P_1 to P_2 , and the equilibrium quantity falls from 10 to 8 units. As a result of price falling from P_1 to P_2 , we move down the supply curve from point 1 to point 2, and the **quantity supplied** (*not supply*) falls from 10 to 8 units.

Figure 8: Changes in Equilibrium Price and Quantity following changes in Supply & Demand



●● Case (c). Supply rises (the supply curve shifts rightward from S_1 to S_2), and demand is constant. As a result, the equilibrium price falls from P_1 to P_2 , and the equilibrium quantity rises from 10 to 12 units. As a result of price falling from P_1 to P_2 , we move down the demand curve from point 1 to point 2, and the **quantity demanded** (not demand) rises from 10 to 12 units.

●● Case (d). Supply falls (the supply curve shifts leftward from S_1 to S_2), and demand is constant. As a result, the equilibrium price rises from P_1 to P_2 , and the equilibrium quantity falls from 10 to 8 units. As a result of price rising from P_1 to P_2 , we move up the demand curve from point 1 to point 2, and **quantity demanded** (not demand) falls from 10 to 8 units.

●● Case (e). Demand rises (the demand curve shifts from D_1 to D_2), and supply falls (the supply curve shifts leftward from S_1 to S_2) by an equal amount. As a result, the equilibrium price rises from P_1 to P_2 , and the equilibrium quantity remains constant at 10 units.

●● Case (f). Demand falls (the demand curve shifts leftward from D_1 to D_2), and supply rises (the supply curve shifts rightward from S_1 to S_2) by an equal amount. As a result, the equilibrium price falls from P_1 to P_2 , and the equilibrium quantity is constant at 10 units.

●● Case (g). Demand rises (the demand curve shifts rightward from D_1 to D_2) by a greater amount than supply falls (the supply curve shifts leftward from S_1 to S_2). As a result, the equilibrium price rises from P_1 to P_2 , and the equilibrium quantity rises from 10 to 12 units.

●● Case (h). Demand rises (the demand curve shifts rightward from D_1 to D_2) by a smaller amount than supply falls (the supply curve shifts leftward from S_1 to S_2). The equilibrium price rises from P_1 to P_2 and the equilibrium quantity falls from 10 to 7 units.

I. Demand and Supply Equations

1. Consider a demand equation: $Q_d = 1,500 - 32P$.

To see what this equation says, we let price (P) in the equation equal \$10 and then solve for quantity demanded Q_d . We get 1,180. $Q_d = 1,500 - 32(10) = 1,180$

So this equation says that if price is \$10, it follows that quantity demanded is 1,180 units. We could find other quantities demanded by plugging in different dollar amounts for price (P).

2. Now consider a supply equation: $Q_s = 1,200 + 43P$

To find the quantity supplied (Q_s) at a particular price, we let \$5 equal price (P) and solve for quantity supplied. We get 1,415. $Q_s = 1,200 + 43(5) = 1,415$

3. Now suppose we want to find equilibrium price and quantity given our demand and supply equations. How would we do it?

First, we know that in equilibrium, the quantity demanded (Q_d) of a good is equal to the quantity supplied (Q_s). So we set the two equations equal to each other.

$$1,500 - 32P = 1,200 + 43P$$

To solve the simultaneous equations for P we do the following:

- (i) Add $32P$ to both sides of the equation, and
- (ii) Subtract 1,200 from both sides.

$$\text{We get: } 75P = 300 ; \text{ and } P = 300/75 \text{ or } \$4.00.$$

Once we know equilibrium price is \$4.00, we can plug this value in either the demand or supply equation to find the equilibrium quantity. Placing $P = \$4$ in the demand equation:

$$Q_d = 1,500 - 32(4.00) = 1,372$$

To make sure that 1,372 is also the quantity supplied, we put the equilibrium price of \$4.00 into the supply equation:

$$Q_s = 1,200 + 43(4.00) = 1,372$$

Self Test

1. When a person goes to the grocery store to buy food, no auctioneer calls out prices for bread, milk, and other items. Therefore, supply and demand cannot be operative. Do you agree or disagree? Explain your answer.
2. The price of a given-quality personal computer is lower today than it was five years ago. Is this necessarily the result of a lower demand for computers? Explain your answer.
3. What is the effect on equilibrium price and quantity of the following?
 - a. A decrease in demand that is greater than the increase in supply
 - b. An increase in supply
 - c. A decrease in supply that is greater than the increase in demand
 - d. A decrease in demand

4. At equilibrium quantity, what is the relationship between the maximum buying price and the minimum selling price?
5. If the price paid is \$40 and the consumers' surplus is \$4, then what is the maximum buying price? If the minimum selling price is \$30 and the producers' surplus is \$4, then what is the price received by the seller?

Coursework Assignment #5: Due Date Friday May 12, 2021 5pm

1. Predict what would happen to the equilibrium price of marijuana if it were legalized.
2. Compare the ratings for television shows with prices for goods. How are ratings like prices? How are ratings different from prices? (Hint: How does rising demand for a particular television show manifest itself?)
3. At equilibrium in a market, the maximum price buyers would be willing to pay for the good is equal to the minimum price sellers need to receive before they are willing to sell the good. Do you agree or disagree with this statement? Explain your answer.
4. Must consumers' surplus equal producers' surplus at equilibrium price? Explain your answer.
5. Many movie theaters charge a lower admission price for the first show on weekday afternoons than for a weeknight or weekend show. Explain why.
6. Explain how the market moves to equilibrium in terms of shortages and surpluses and in terms of maximum buying prices and minimum selling prices.
7. Identify what happens to equilibrium price and quantity in each of the following cases:
 - (a) Demand rises and supply is constant
 - (b) Demand falls and supply is constant
 - (c) Supply rises and demand is constant
 - (d) Supply falls and demand is constant
 - (e) Demand rises by the same amount that supply falls
 - (f) Demand falls by the same amount that supply rises
 - (g) Demand falls less than supply rises
 - (h) Demand rises more than supply rises
 - (i) Demand rises less than supply rises
 - (j) Demand falls more than supply falls
 - (k) Demand falls less than supply falls
8. Suppose the demand curve for a good is downward-sloping and the supply curve is upward-sloping. Now suppose demand rises. Will producers' surplus rise or fall? Explain your answer.
9. What does it mean to say that "the market" feeds Kampala, Entebbe, Mukono, or Jinja?

LECTURE NOTES VII

Prices: Free, Controlled, and Relative

In the previous lectures, we discussed supply and demand. Mainly, we saw how supply and demand work together to determine prices. In this lecture, we discuss prices at greater length. First, we discuss two of the key “jobs” that price performs: (1) rationing resources and goods and (2) transmitting information. Second, we discuss government controls (price ceilings and price floors) that can be imposed on price. Third, we discuss two types of price: absolute (or money) price and relative price.

□

KEY IDEAS

1. Price performs two major jobs: (1) rationing resources and goods and (2) transmitting information.
2. Sometimes the government intervenes in the market, preventing price to be a rationing device.
3. Economists often distinguish the absolute, or money, price of a good from the relative price of a good.

I. PRICE

Price performs two major jobs: It acts (1) as a rationing device and (2) as a transmitter of information.

A. Price as a Rationing Device

In the first Lecture we said that wants (for goods) are unlimited and resources are limited; so scarcity exists. As a result of scarcity, a rationing device is needed to determine who gets what of the available limited resources and goods. Price serves as a rationing device. It rations resources to the producers who pay the price for the resources. It rations goods to those buyers who pay the price for the goods. It is true that dollar/shilling price discriminates against the poor, but every rationing device discriminates against someone, and none is clearly superior to dollar/shilling price. Also, without dollar/shilling price as a rationing device there would be no incentive for anyone to produce the good.

B. Price as a Transmitter of Information

Price transmits information that often relates to the relative scarcity of a good. A market system is powerful enough to have people respond in appropriate ways to the information that price is transmitting, even if the people do not fully hear or understand it. When relative scarcity drives up a good's price, people cut back on the consumption of that good, conserving that good.

Self Test

1. Why is there a need for a rationing device, whether it is price or something else?
2. If price is not the rationing device used, then individuals won't have as sharp an incentive to produce. Explain.
3. What kind of information does price often transmit?

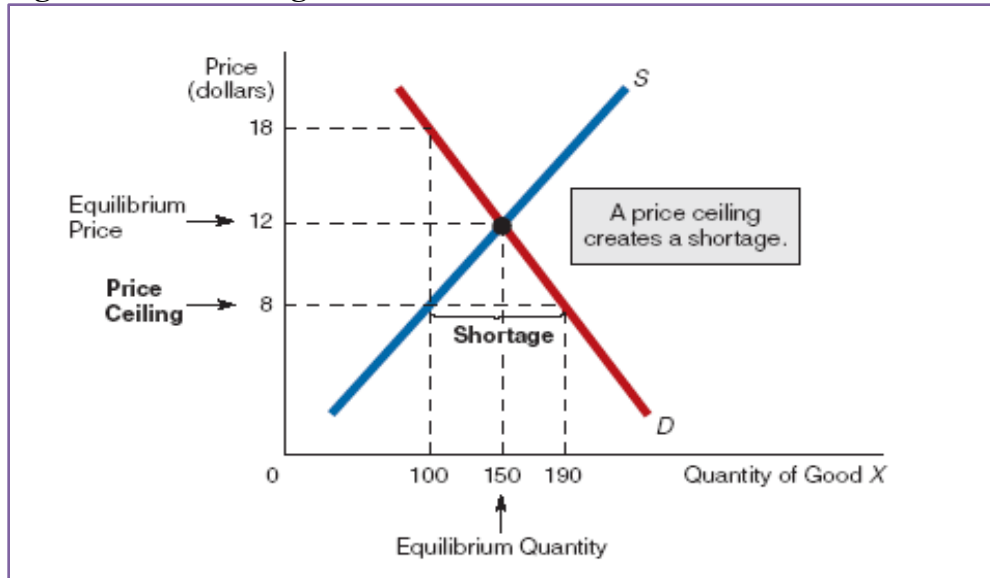
II. PRICE CONTROLS

A rationing device—such as shilling or dollar price—is needed because scarcity exists. But price is not always allowed to be a rationing device. Sometimes price is controlled. There are two types of price controls: **price ceilings and price floors**.

A. Price Ceiling

DEFINITION AND EFFECTS: A **price ceiling** is a government-mandated maximum price above which legal trades cannot be made. For example, suppose the government mandates that the maximum price at which good X can be bought and sold is \$8. **The \$8 limit is a price ceiling.** If \$8 is below the equilibrium price of good X, as in Figure 1, any or all of the following effects may arise: shortages, fewer exchanges, non-price-rationing devices, buying and selling at prohibited prices, and tie-in sales.

Figure 1: Price Ceiling



Shortages At the \$12 equilibrium price in Figure 1, the quantity demanded of good X (150) is equal to the quantity supplied (150). At the \$8 price ceiling, a shortage exists. The quantity demanded (190) is greater than the quantity supplied (100).

Fewer Exchanges At the equilibrium price of \$12 in Figure 1, 150 units of good X are bought and sold. At the price ceiling of \$8, 100 units of good X are bought and sold. **(Buyers would prefer to buy 190 units, but only 100 are supplied.)** We conclude that price ceilings cause fewer exchanges to be made.

Nonprice-Rationing Devices If the equilibrium price of \$12 fully rations good X before the price ceiling is imposed, then a lower price of \$8 only partly rations this good. In short, price ceilings prevent price from rising to the level sufficient to ration goods fully. But if price is responsible for only part of the rationing, what accounts for the rest?

Buying and Selling at a Prohibited Price (Illegal trade) Buyers and sellers may regularly circumvent a price ceiling by making their exchanges under the table. For example, some buyers may offer some sellers more than \$8 per unit for good X. No doubt, some sellers will accept the offers. But why would some buyers offer more than \$8 per unit when they can buy good X for \$8? Because not all buyers can buy the amount of good X they want at \$8. As Figure 1 shows, there is a shortage. Buyers are willing to buy 190 units at \$8, but sellers are willing to sell only 100 units.

Tie-In Sales In Figure 1, the maximum price buyers would be willing and able to pay per unit for 100 units of good X is \$18. (This is the price on the demand curve at a quantity of 100 units.) The

maximum legal price, however, is \$8. This difference between the two prices often prompts a **tie-in sale**, a sale whereby one good can be purchased only if another good is also purchased. For example, if Shell Gasoline Station sells gasoline to customers only if they buy a car wash, the two goods are linked in a tie-in sale.

B. Buyers and Higher and Lower Prices

Do buyers prefer lower to higher prices? “Of course,” you might say, “buyers prefer lower prices to higher prices. What buyer would want to pay a higher price for anything?” **Even though price ceilings are often lower than equilibrium prices, does it follow that buyers prefer price ceilings to equilibrium prices?** Not necessarily. Price ceilings have effects that equilibrium prices do not: shortages, use of first-come- first-served as a rationing device, tie-in sales, and so on. A buyer could prefer to pay a higher price (an equilibrium price) than to pay a lower price and have to deal with the effects of a price ceiling. **All we can say for certain is that buyers prefer lower prices to higher prices, *ceteris paribus*.** As in many cases, the *ceteris paribus* condition makes all the difference.

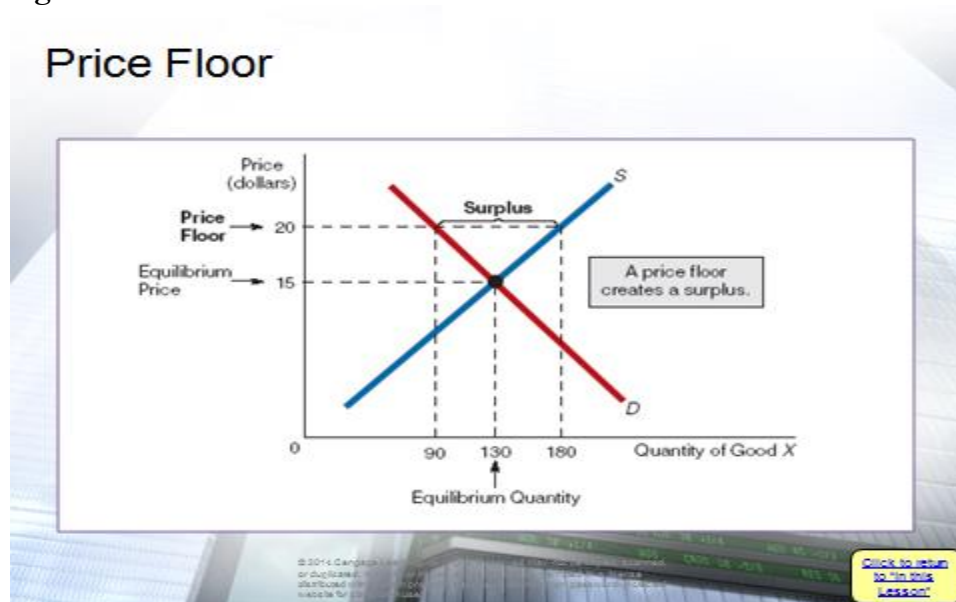
C. Price Ceilings and False Information

Price ceilings distort the flow of accurate information to buyers. Buyers get a false view of reality; they then base their buying behavior on incorrect information. Problems follow, and the unintended, unexpected and undesirable effects of price ceilings are soon incurred. For example, a price ceiling policy intended to lower prices for the poor may cause shortages, and the use of non-price rationing devices, such as FCFS, illegal market transactions, and tie-in sales. When we consider both the price ceiling and its effects, at the end of the day, it is not clear whether the poor have been helped by the price ceilings.

D. Price Floor: Definition and Effects

A **price floor** is a government-mandated minimum price below which legal trades cannot be made. For example, suppose the government mandates that the minimum price at which good X can be sold is \$20. The \$20 minimum is a price floor (see Figure 3).

Figure 3: Price Floor



EFFECTS OF A PRICE FLOOR

If the price floor is above the equilibrium price, the following two effects arise: surpluses and fewer exchanges. (If the price floor is below the equilibrium price (say, \$20 is the price floor and \$25 is the equilibrium price), it has no effects. Usually, however, a price floor is above the equilibrium price)

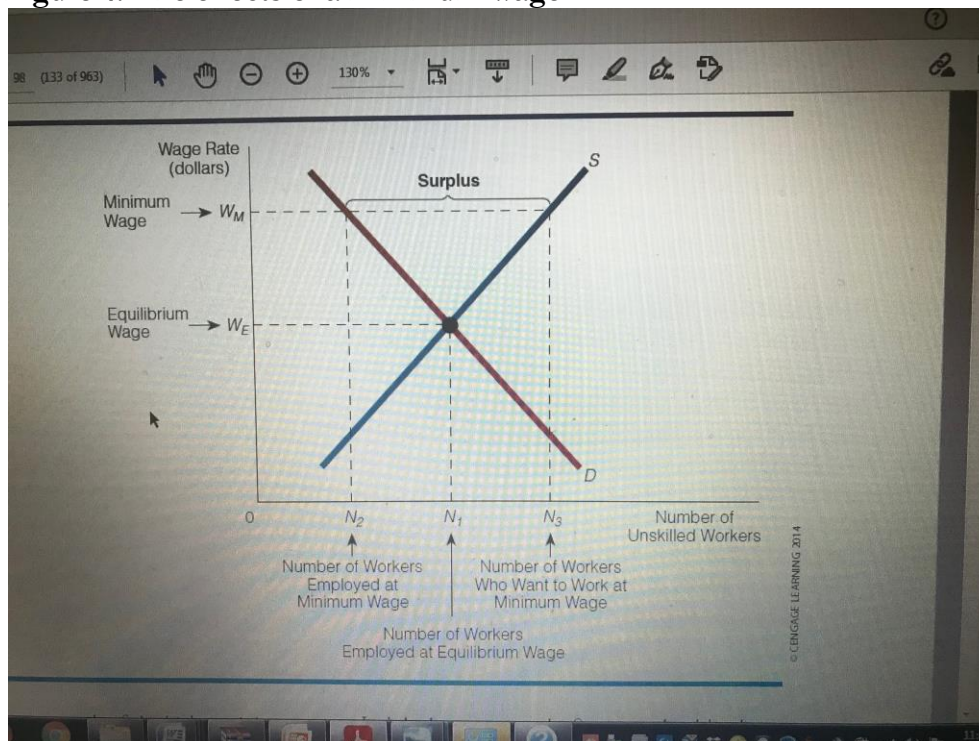
Surpluses At the \$15 equilibrium price in Figure 3, the quantity demanded of good X (130) is equal to the quantity supplied (130). At the \$20 price floor, a surplus exists. The quantity supplied (180) is greater than the quantity demanded (90)

Fewer Exchanges At the equilibrium price in Figure 3, 130 units of good X are bought and sold. At the price floor, 90 units are bought and sold. (Sellers want to sell 180 units, but buyers buy only 90.) Thus price floors cause fewer exchanges to be made.

E. Minimum Wage

If a price floor is a legislated minimum price below which trades cannot legally be made, then the *minimum wage* is a price floor—a government-mandated minimum price for labor. It affects the market for unskilled labor. In Figure 4, we assume the minimum wage is W_M and the equilibrium wage is W_E . At the equilibrium wage, N_1 workers are employed. At the higher minimum wage, N_3 workers want to work, but only N_2 actually do work. There is a surplus of workers equal to $N_3 - N_2$ in this unskilled labor market. In addition, fewer workers are working at the minimum wage (N_2) than at the equilibrium wage (N_1). Overall, the effects of the minimum wage are (1) a surplus of unskilled workers and (2) fewer workers employed.

Figure 4: The effects of a minimum wage

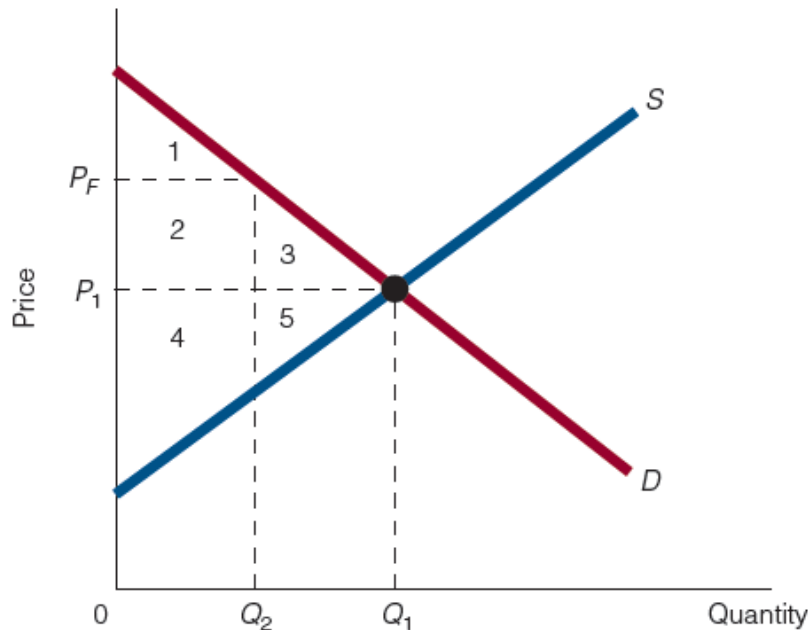


F. Price Floors, Changes in Consumers' and Producers' Surplus, and Deadweight Losses

What is the effect of a price floor on an agricultural foodstuff? What do (1) consumers lose, (2) producers gain, and (3) society (*the sum of consumers and producers*) lose?

Figure 5 shows the demand for and supply of an agricultural foodstuff (*maize, wheat, soybeans, etc.*).

Figure 5: Agricultural Price Floors: Demand and Supply of Agricultural Food Stuffs



If the market is allowed to move to equilibrium, the equilibrium price will be P_1 , and the equilibrium quantity will be Q_1 . Consumers' surplus will equal the area under the demand curve and above the equilibrium price: areas 1 + 2 + 3. Producers' surplus will equal the area under the equilibrium price and above the supply curve: areas 4 + 5. Total surplus, of course, is the sum of consumers' surplus and producers' surplus: areas 1 + 2 + 3 + 4 + 5.

Now suppose that the suppliers of the foodstuff argue for (and receive) a price floor, P_F . At this higher price, consumers do not buy as much as they once did. They now buy Q_2 , whereas they used to buy Q_1 . In addition, consumers' surplus is now only area 1, and producers' surplus is areas 2 + 4. Obviously, consumers have been hurt by the increased (government-mandated) price of P_F ; specifically, they have lost consumers' surplus equal to areas 2 + 3.

How have suppliers fared? Whereas their producers' surplus was equal to areas 4 + 5 at P_1 , it is now equal to areas 2 + 4. (*Area 2, which used to be part of consumers' surplus, has been transferred to producers and is now part of producers' surplus.*) Whether producers are better off depends on whether area 2 (*what they gain from P_F*) is larger than area 5 (*what they lose from P_F*). Visually, we can tell that area 2 is larger than area 5; so producers are better off.

What is the overall effect of the price floor? *Have producers gained more than consumers have lost, or have consumers lost more than producers have gained?* To answer this question, we note that consumers lose areas 2 + 3 in consumers' surplus; producers gain area 2 in producers' surplus and lose area 5 in producers' surplus. So the gains and losses are: Part of the loss to consumers is offset by the gain to

producers (area 2); so net losses amount to areas 3 + 5. In other words, the total surplus—the sum of consumers’ surplus and producers’ surplus—is lower than it was. Whereas it used to be areas 1 + 2 + 3 + 4 + 5, it now is areas 1 + 2 + 4. The total surplus lost is in areas 3 + 5. In short, (1) consumers lose, (2) producers gain, and (3) society (*the sum of consumers and producers*) loses.

G. What Some People Get Wrong

Some people argue that a price floor creates a situation in which (1) someone wins and someone loses and (2) the gains for the winner are equal to the losses for the loser (e.g., one person loses \$5, and another person wins \$5). A quick look at Figure 5 tells us that (2) is not true. The losses (for consumers) are not offset by the gains (for producers). A price floor ends with a *net loss*, or *deadweight loss*, of areas 3 + 5.

Self Test

1. Do buyers prefer lower prices to higher prices?
2. “When there are long-lasting shortages, there are long lines of people waiting to buy goods. It follows that the shortages cause the long lines.” Do you agree or disagree? Explain your answer.
3. Who might argue for a price ceiling? A price floor?

H. Two Prices: Absolute and Relative

In everyday language, we often use the word *price* without specifying the kind of price. Economists often distinguish the *absolute*, or *money*, *price* of a good from the *relative price* of a good.

Absolute (Money) Price and Relative Price

The **absolute (money) price** is the price of the good in money terms. For example, the absolute price of a car might be \$30,000.

The **relative price** is the price of the good *in terms of another good*.

To illustrate, suppose the absolute price of a car is \$30,000 and the absolute price of a computer is \$2,000. The relative price of the car—that is, the price of the car *in terms of computers*—is 15 computers.

Relative price of a car (*in terms of computers*) = *Absolute price of a car* / *Absolute price of a computer* = $\$30,000 / \$2,000 = 15$. A person gives up the opportunity to buy 15 computers when buying a car. **So the opportunity cost of a car is 15 computers**

The relative price of a computer in this example is 1/15 of a car

Relative price of a computer (*in terms of cars*) = *Absolute price of a computer* / *Absolute price of a car* = $\$2,000 / \$30,000 = 1/15$. A person gives up the opportunity to buy 1/15 of a car when buying a computer.

Now consider this question: What happens to the relative price of a good if its absolute price rises and nothing else changes? For example, if the absolute price of a car rises from \$30,000 to \$40,000, what happens to its relative price? Obviously, the relative price rises from 15 computers to 20 computers. In short, if the absolute price of a good rises and nothing else changes, then its relative price rises too.

I. Taxes on Specific Goods and Relative

Price Changes: Suppose that the equilibrium price of good X is \$10 and that the equilibrium price of good Y is \$20. The relative price of good X is therefore $\frac{1}{2}$ unit of good Y, and the relative price of good Y is 2 units of good X. **$1X = \frac{1}{2}Y$ and $1Y = 2X$**

Given these relative prices of X and Y, consumers will buy some combination of the two goods. For example, a given consumer might end up buying 10 units of X each week and 12 units of Y.

Now suppose that the government imposes a tax only on the purchase of good X. The tax effectively raises the price the consumer pays for the good from \$10 to \$15. Because no tax is placed on good Y, its price remains at \$20. The tax thus changes the relative prices of the two goods. The after-tax relative prices are: **$1X = \frac{3}{4}Y$ and $1Y = 1.33X$**

Self Test

1. If the absolute (or money) price of good A is \$40 and the absolute price of good B is \$60, what is the relative price of each good?
2. Someone says, "The price of good X has risen; so good X is more expensive than it used to be." In what sense is this statement correct? In what sense is this statement either incorrect or misleading?

Coursework Assignment #6: Due Date Friday May 21, 2021 5pm

1. "If price were outlawed as the rationing device (used in markets), there would be no need for another rationing device to take its place. We would have reached utopia." Discuss.
2. What kind of information does price transmit?
3. Should grades in an economics class be "rationed" according to dollar price instead of how well a student does on the exams? If they were and prospective employers learned of this, what effect might this have on the value of your college degree?
4. Think of ticket scalpers at a rock concert, a baseball game, and an opera. Might they exist because the tickets to these events were originally sold for less than the equilibrium price? Why or why not? In what way is a ticket scalper like and unlike your retail grocer, who buys food from a wholesaler and then sells it to you?
5. Many of the proponents of price ceilings argue that government-mandated maximum prices simply reduce producers' profits and do not affect the quantity supplied of a good on the market. What must the supply curve look like before a price ceiling does not affect quantity supplied?
6. James lives in a rent-controlled apartment and has for the past few weeks been trying to get the supervisor to fix his shower. Why does waiting to get one's shower fixed have to do with a rent-controlled apartment?
7. Explain why fewer exchanges are made when a disequilibrium price (below equilibrium price) exists than when the equilibrium price exists.
8. Buyers always prefer lower prices to higher prices. Do you agree or disagree with this statement? Explain your answer.

9. What is the difference between a price ceiling and a price floor? What effect is the same for both a price ceiling and a price floor?
10. If the absolute price of good X is \$10 and the absolute price of good Y is \$14, then what is (a) the relative price of good X in terms of good Y and (b) the relative price of good Y in terms of good X?
11. Give a numerical example that illustrates how a tax placed on the purchase of good X can change the relative price of good X in terms of Y.

LECTURE NOTES VIII

Supply, Demand and Price: Applications

In the previous Lectures, we discussed supply, demand, and price. In this Lecture, we look at some real life applications supply, demand, and price. The theory of supply and demand is not very useful to you unless you can use it to explain some of the things you see around you in everyday life. The key to finding your own supply and demand applications is to observe things around you and then ask questions (what role do the laws of supply and demand play in what I am observing today? Or are there shortages or surpluses about the things I am observing.

The following applications have all been chosen to show how supply and demand can be used to either explain or predict things.

I. GOVERNMENT, EASIER LOANS, AND HOUSING PRICES

If the Uganda government wants to make it easier for people to buy houses, one thing it can do is push for lowered lending standards. For example, suppose lenders require individuals who want a mortgage loan to buy a house to make a down payment of 20 percent of the sale price. The government passes a law stating that no lender can require more than a 5 percent down payment before granting a loan.

Will this make it easier for individuals to buy homes? Not necessarily. The interest rate on a mortgage loan that requires only a 5 percent down payment might be higher than the rate on one that requires a 20 percent down payment.

Can government do anything now? It could undertake specific monetary actions that have the effect of lowering interest rates by increasing the supply of money in the economy.

Then what happens? The government seems to have met its objective of making it easier for individuals to buy houses. After all, prospective buyers now have only to come up with a 5 percent down payment (instead of 20 percent), and they end up paying lower interest rates for the loans they receive.

So, are home buyers necessarily better off with this kind of government assistance? Not exactly. By making mortgage loans easier to get, the government has indirectly increased the demand for houses. As the demand for houses rises, so do house prices.

Lower down payments + Lower interest rates → Easier-to-obtain loans → Higher
demand for houses → Higher house prices

Self Test

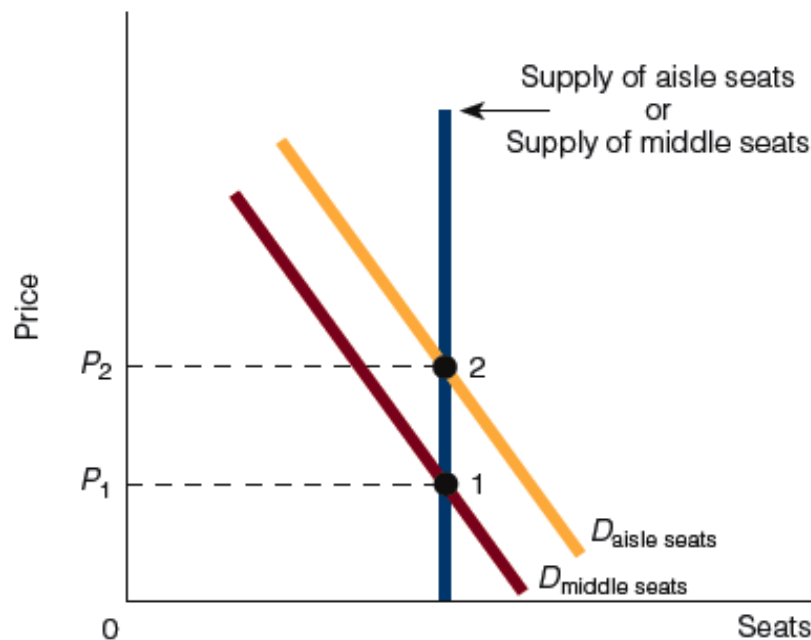
If lowering lending standards can indirectly raise housing prices, can increasing lending standards lower housing prices? Explain.

2. Suppose anyone who buys a house in year 1 gets to pay \$1,000 less in income taxes (assuming the tax owed is greater than \$1,000). Would the tax credit affect house prices? Explain your answer.

II. AIRLINES AND THE PRICE OF AN AISLE SEAT

Most airlines will reserve an assigned seat for you when you buy a ticket. For example, if you want to buy an airline ticket from U.S. Airways, you can go online, purchase the ticket, and then look at a graphic that shows unreserved seats. If seat 13A is the one you want and no one has chosen it, then it is yours if you click on it. Southwest Airlines does things differently. You do not reserve a seat when you book a flight. You choose a seat when you board the plane. If you are one of the first to board, you have your pick of many seats; if you are one of the last, you have your pick of very few seats. Usually, for every aisle seat there is a middle seat. So, if the plane has 50 aisle seats, it also has 50 middle seats. In other words, the supply of middle seats equals the supply of aisle seats. However, the demand for aisle seats is higher than the demand for middle seats. If price were to equilibrate the middle seats market and the aisle seats market, we would expect the price of an aisle seat to be higher than that of a middle seat (see Figure 1).

Figure 1: Supply and Demand for Seats on an airplane



The demand for aisle seats is higher than the demand for middle seats on airplanes. Rather than ration seats by setting different prices for aisle seats and middle seats, Southwest Airlines rations its seats by charging extra for priority boarding, realizing that the people who board the plane first will probably choose the aisle seats.

Self Test

1. If the equilibrium price is \$400 for an aisle seat and \$350 for a middle seat but an airline company charges \$350 for each seat, we would expect a shortage to appear in the aisle seat market. (More people will want aisle seats than there are aisle seats available.) How will the airline decide who gets an aisle seat?
2. Suppose the supply of aisle, middle, and window seats is each 100 seats but the demand for aisle seats is greater than the demand for window seats, which, in turn, is greater than the demand for middle seats. If the equilibrium price of an aisle seat is \$300, where do the equilibrium prices of middle and window seats stand in relation to this price?

III. WHAT WILL HAPPEN TO THE PRICE OF MARIJUANA IF THE PURCHASE AND SALE OF MARIJUANA ARE LEGALIZED?

Decriminalizing the purchase and sale of marijuana is likely to shift both the demand and supply curves to the right. What happens to the price of marijuana depends on the relative sizes of the shifts.

Three possibilities exist:

1. The demand curve shifts to the right by the same amount as the supply curve shifts to the right. In this case, the price of marijuana will not change.
2. The demand curve shift to the right is greater than the supply curve shift to the right. In this case, the price of marijuana will rise.
3. The supply curve shift to the right is greater than the demand curve shift to the right. In this case, the price of marijuana will fall.

Self Test

1. What will happen to the price of marijuana if the supply increases by more than the demand for it?
2. What will happen to the quantity of marijuana (purchased and sold) if the demand for it rises more than its supply falls?

IV. SPECULATORS, PRICE VARIABILITY, AND PATTERNS

Think of a good, X. Suppose that the price of good X initially varies over a month. Sometimes it is \$10, other times it is \$13, and at other times it is \$12. Usually, when prices fluctuate, speculators enter the market because when prices fluctuate, there is profit to be earned by buying low and selling high. In our example, a profit can be earned by buying at \$10 and selling at \$13. The common view of speculators is that they somehow hurt others by trying to make themselves better off. They are certainly trying to make themselves better off, but they are not necessarily making others worse off.

To understand why, suppose that on Monday through Wednesday of every week the price of good X is \$10 and that on Thursday of every week the price of good X rises to \$14. Obviously the price varies over part of the week. How do speculators respond to this price variability?

They obviously buy good X on Monday through Wednesday and sell it on Thursday. But their buying good X on Monday through Wednesday drives up the price of good X on these days, and their selling good X on Thursday drives down the price. In other words, speculators end up changing the Monday–Thursday pattern of the price of good X. No longer will the pattern be \$10 on Monday through Wednesday and \$14 on Thursday. The price will be higher than \$10 on Monday through Wednesday and lower than \$14 on Thursday. In fact, speculators will continue to buy and sell good X until the price of good X is the same on every day. For example, the price of good X may end up being \$11 every day of the week.

Self Test

1. Speculators can benefit themselves and others at the same time. Do you agree or disagree with this statement? Explain your answer with an example.
2. Price (for a given good) is likely to be less variable with than without speculators. Explain.

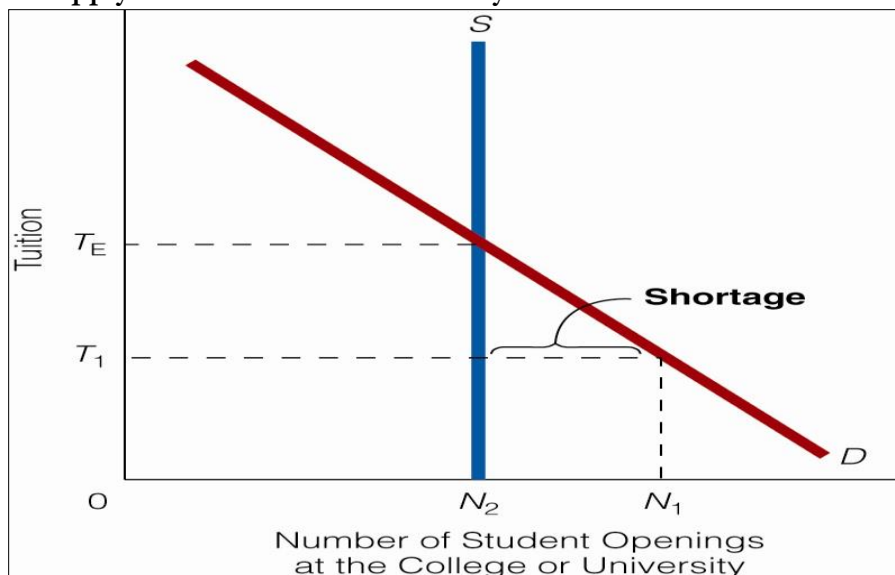
V. WHY DO COLLEGES USE GPAs, ACTs, AND SATs FOR PURPOSES OF ADMISSION?

At many colleges and universities, students pay part of the price of their education (*in the form of tuition payments*), and taxpayers and private donors pay part (*by way of tax payments and charitable donations, respectively*). Thus, the tuition that students pay to attend colleges and universities is usually less than the equilibrium tuition.

To illustrate, suppose a student pays tuition T_1 at a given college or university. As shown in Figure 2, T_1 is below the equilibrium tuition, T_E . At T_1 , the number of students who want to attend the university (N_1) is greater than the number of openings at the university (N_2); that is, quantity demanded is greater than quantity supplied. The university receives more applications for admission than there are places available.

Something has to be done. The college or university is likely to ration its available space by a combination of money price and some non-price-rationing devices. The student must pay the tuition, T_1 , and meet the standards of the non-price-rationing devices. Colleges and universities typically use such things as GPAs (*Grade Point Average*), ACT (*American College Test*) scores, and SAT (*Scholastic Assessment Test*) scores as non-price rationing devices.

Figure 2: Supply and Demand for University Education



Self Test

1. The demand rises for admission to a university, but both the tuition and the number of openings in the entering class remain the same. Will this change affect the admission standards of the university? Explain your answer.

2. Administrators and faculty at state colleges and universities often say that their standards of admission are independent of whether there is a shortage or surplus of openings at the university. Do you think this is true? Do you think that faculty and administrators ignore surpluses and shortages of openings when setting admission standards? Explain your answer.

VI. SUPPLY AND DEMAND ON A FREEWAY (TOLL FREE)

What does a traffic jam on a busy freeway (toll-free) road in Kampala have to do with supply and demand? Actually, it has quite a bit to do with supply and demand. Look at the question this way: There is a demand for driving on the freeway and a supply of freeway space. The supply of freeway space is fixed (**roadways do not expand and contract over a day, week, or month**). The demand, however, fluctuates; it is higher at some times than at others. For example, we would expect the demand for driving on the freeway to be higher at 8 a.m. (the rush hour) than at 11 p.m. But even though the demand may vary, the money price for driving on the freeway is always the same: zero. A zero money price means that motorists do not pay tolls to drive on the freeway.

Figure 3: Supply of Freeway Road Space and Demand for Driving on Freeway Road

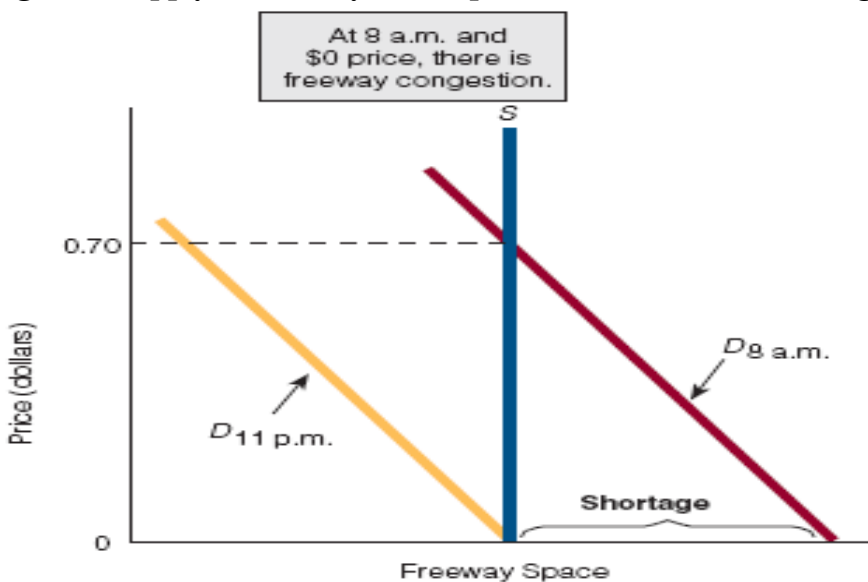


Figure 3 shows two demand curves for driving on the freeway: $D_{8 \text{ a.m.}}$ and $D_{11 \text{ p.m.}}$. We have assumed the demand at 8 a.m. to be greater than at 11 p.m. We have also assumed that at $D_{11 \text{ p.m.}}$ and zero money price, the freeway market clears: The quantity demanded of freeway space equals the quantity supplied at zero price. At the higher demand, $D_{8 \text{ a.m.}}$, this is not the case. At zero money price, a shortage of freeway space exists: The quantity demanded of freeway space is greater than the quantity supplied. The shortage appears as freeway congestion and bumper-to-bumper traffic. One way to eliminate the shortage is through an increase in the money price of driving on the freeway at 8 a.m. For example, as Figure 3 shows, a toll of 70 cents (\$0.7) would clear the freeway market at 8 a.m.

Self Test

1. In Figure 3 above, at what price is there a surplus of freeway space at 8 a.m.?
2. If the driving population increases in an area and the supply of freeway space remains constant, what will happen to freeway congestion? Explain your answer.

VI. ARE RENTERS BETTER OFF WITH EVICTION LAWS?

Consider the market for rental apartments under two laws related to the eviction of a renter.

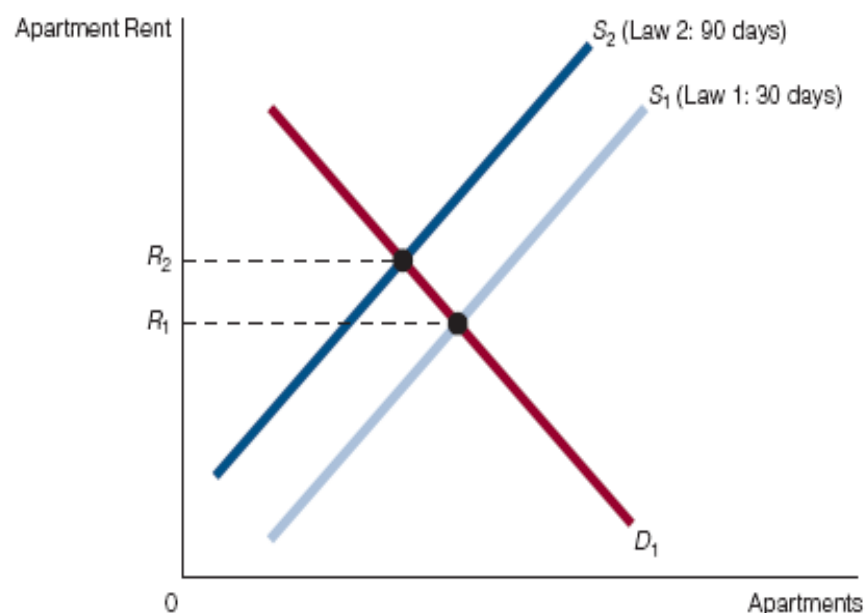
- Under law 1, a renter has 30 days to vacate an apartment after being served with an eviction notice.
- Under law 2, the renter has 90 days to vacate.

Landlords will find it less expensive to rent apartments under law 1 than under law 2. Under law 1, the most money a landlord can lose after serving an eviction notice is 30 days' rent. Under law 2, a landlord can lose up to 90 days' rent. A different supply curve of apartments exists under each law. The supply curve under law 1 (S_1 in Figure 4) lies to the right of the supply curve under law 2 (S_2), because it is less expensive to supply apartments under law 1 than under law 2. If the supply curve is different under the two laws, the equilibrium rent will be different too. As shown in Figure 4, the equilibrium rent will be lower under law 1 (R_1) than under law 2 (R_2).

So: ●● Under law 1, a renter pays lower rent (good) and has fewer days to vacate the apartment (bad).

●● Under law 2, a renter pays a higher rent (bad) and has more days to vacate the apartment (good).

Figure 4: Supply and Rental Price of Apartments Under Different Eviction Laws



VII. DO YOU PAY FOR GOOD WEATHER OR CLEANER AIR?

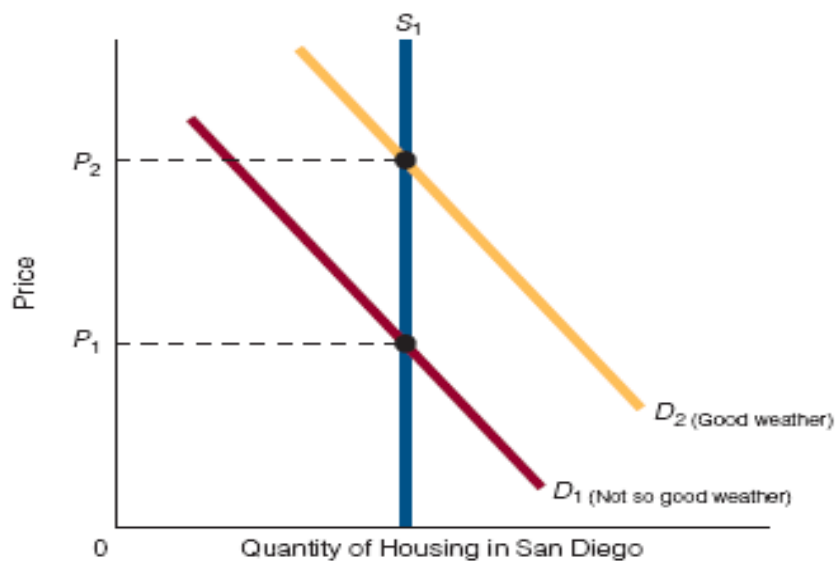
Some places in a city or a country are considered to have better weather or cleaner environment than others. For example, most people would say the weather in San Diego, California, is better than the weather in Fargo, North Dakota.

Often, a person in San Diego will say, “You can’t beat the weather today. And the good thing about it is that you don’t have to pay a thing for it. It’s free.” In one sense, this person from San Diego is correct: There is no weather market. Specifically, no one comes around each day and asks the residents of San Diego to pay a certain dollar amount for the weather.

But in another sense person from San Diego is incorrect: the residents of San Diego indirectly do pay for their good weather. How do they pay? To enjoy the weather in San Diego on a regular basis, you have to live there; you need to have housing. There is a demand for housing in San Diego just as there is a demand for housing in other places.

Is the demand for housing in San Diego higher than it would be if the weather were not so good? Without the good weather, living in San Diego would not be as pleasurable, and therefore the demand to live there would be lower. See Figure 5. In short, the demand for housing in San Diego is higher because the city enjoys good weather. It follows that the price of housing is higher too (P_2 as opposed to P_1 in Figure 5). Thus, asks the residents of San Diego indirectly pay for their good weather because they pay higher housing prices than they would if the area had bad weather.

Figure 5: Demand and Prices of Houses under in Good and Bad Weather Conditions



Self Test

1. Give an example to illustrate that someone may “pay” for clean air in much the same way as she “pays” for good weather.
2. If people pay for good weather, who ultimately receives the “good-weather payment”?

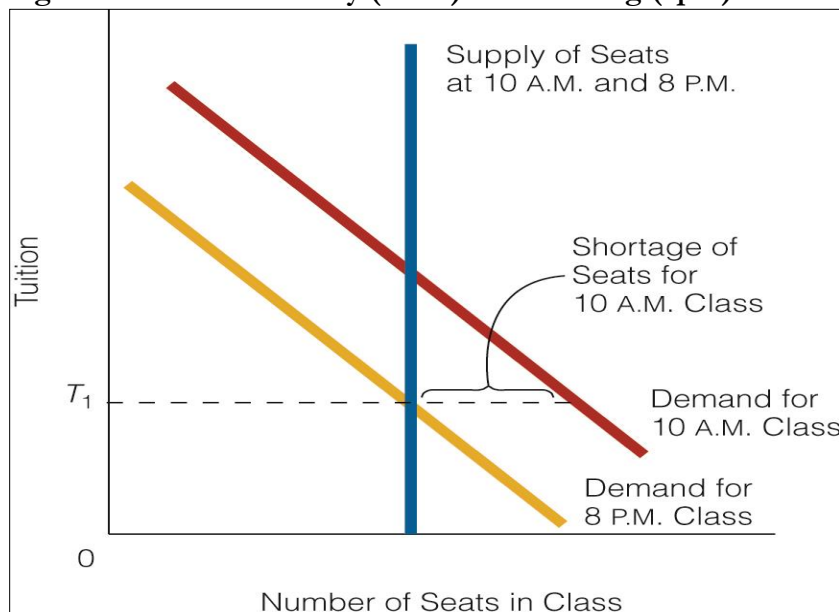
VIII. 10 A.M. VERSUS 8 P.M. CLASSES AT THE UNIVERSITY

Suppose the Business Economics class is offered in the same classroom twice in a day: at 10 a.m. in the morning and at 8 p.m. at night. Most students would prefer the 10 a.m. class to the 8 p.m. class. So, in Figure 6, the supply of seats in the class is the same at each time, but the demand to occupy those seats is not. Because the demand is greater for the 10 a.m. class than for the 8 p.m. class, the equilibrium price for the morning class is higher than the equilibrium price for the evening class. But the university charges the same tuition no matter what time students choose to take the class. The university doesn’t charge students a higher tuition if they enroll in 10 a.m. classes than if they enroll in 8 p.m. classes.

Suppose that tuition T_1 is charged for all classes and that T_1 is the equilibrium tuition for 8 p.m. classes (see Figure 6). T_1 is therefore below the equilibrium tuition for 10 a.m. classes. At T_1 , the quantity demanded of seats for the morning classes will be greater than the quantity supplied; more students will want the earlier class than there is space available.

How will the university allocate the available seats? It may do it in the same way as airlines ration aisle seats: on a first-come-first-served basis. Students who are first to register get the 10 a.m. class; the latecomers have to take the 8 p.m. class. Or the university could ration the high-demand classes by giving students with higher University Entry Points (UACE) first priority.

Figure 6: Demand for Day (10am) and Evening (8pm) Classes



Self Test

1. Suppose college students are given two options. With option A, the price a student pays for a class is always the equilibrium price. For example, if the equilibrium price to take Economics 101 is \$600 at 10 a.m. and \$400 at 4 p.m., then students pay more for the early class than they do for the later class. With option B, the price a student pays for a class is the same regardless of the time the class is taken. When given the choice between options A and B, many students would say they prefer option B to option A. Is this the case for you? If so, why would this be your choice?
2. How is the analysis of the 10 a.m. class similar to the analysis of a price ceiling in a market?

IX. SALSA, CHIPS, AND BEER

At many Mexican restaurants, the server customarily brings customers a plate of salsa and chips (salty snacks) as soon as they sit down at the table. The salsa and chips are free, and, upon completion of the first round of salsa and chips, the server often asks customers if they would like more. Why doesn't the Mexican restaurant charge at least a small fee for the salsa and chips? After all, you would think that at least some people would be willing to pay something for them.

The answer probably has to do with goods that are complements. Recall that two goods are complements if they are used jointly in consumption. The demand for one complement rises as the price of the other falls (or the demand for one falls as the price of the other rises).

Coursework Assignment #7: Due Date Friday May 28, 2021 5pm

1. Explain how lower lending standards and lower interest rates can lead to higher house prices.
2. Harvard, Stanford, and Yale all charge relatively high tuition. Still, each uses ACT and SAT scores as admission criteria. Is charging relatively high tuition and using standardized test scores (as admission criteria) inconsistent? Explain your answer.
3. Suppose the purchase and sale of marijuana are legalized and the price of marijuana falls. What is the explanation?
4. What do the applications about freeway congestion and 10 A. M. classes have in common?
5. The Application on weather explains that even though no one directly and explicitly pays for good weather, you may pay for good weather indirectly, such as through housing prices. Identify three other things (besides good weather) that you believe people pay for indirectly.

6. Suppose there exists a costless way to charge drivers on the freeway. Under this costless system, tolls on the freeway would be adjusted according to traffic conditions. For example, when traffic is usually heavy, such as from 6:30 A.M. to 9:00 A.M. on a weekday, the toll to drive on the freeway would be higher than when traffic is light. In other words, freeway tolls would be used to equate the demand for freeway space and the supply of freeway space. Would you be in favor of such a system to replace our current (largely, zero-price) system? Explain your answer.
7. Wilson walks into his class ten minutes late because he couldn't find a place to park. Because of his tardiness, he doesn't hear the professor tell the class there will be a quiz at the next session. At the next session, Wilson is unprepared for the quiz and ends up failing it. Might Wilson's failing the quiz have anything to do with the price of parking? Explain your answer.
8. University A charges more for a class for which there is high demand than for a class for which there is low demand. University B charges the same for all classes. All other things being equal between the two universities, which university would you prefer to attend? Explain your answer.
9. Consider the theater in which a popular play is performed. If tickets for all seats are the same price (say, \$70), what economic effect might arise?
10. What is the relationship between the probability of a person being admitted to the college of his choice and the tuition the college charges?
11. Samantha is flying from Entebbe, Uganda to Johannesburg, South Africa on Uganda Airlines. She asks for an aisle seat but only middle-of-the-row seats are left. Why aren't any aisle seats left? (Hint: The airlines charge the same price for an aisle seat as a middle-of-the-row seat).
12. Speculation (on prices) leads to gains for the speculator and losses for others. Do you agree or disagree? Explain your answer.
13. Why do some bars offer free peanuts and pretzels to their patrons?
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 5. The Application on weather explains that even though no one directly and explicitly pays for good weather, you may pay for good weather indirectly, such as through housing prices. Identify three other things (besides good weather) that you believe people pay for indirectly.
 6. Suppose there exists a costless way to charge drivers on the freeway. Under this costless system, tolls on the freeway would be adjusted according to traffic conditions. For example, when traffic is usually heavy, such as from 6:30 A.M. to 9:00 A.M. on a weekday, the toll to drive on the freeway would be higher than when traffic is light. In other words, freeway tolls would be used to equate the demand for freeway space and the supply of freeway space.

Would you be in favor of such a system to replace our current (largely, zero-price) system? Explain your answer.

7. Wilson walks into his class ten minutes late because he couldn't find a place to park. Because of his tardiness, he doesn't hear the professor tell the class there will be a quiz at the next session. At the next session, Wilson is unprepared for the quiz and ends up failing it. Might Wilson's failing the quiz have anything to do with the price of parking? Explain your answer
8. University A charges more for a class for which there is high demand than for a class for which there is low demand. University B charges the same for all classes. All other things being equal between the two universities, which university would you prefer to attend? Explain your answer.
9. Consider the theater in which a popular play is performed. If tickets for all seats are the same price (say, \$70), what economic effect might arise?
10. What is the relationship between the probability of a person being admitted to the college of his choice and the tuition the college charges?
11. Samantha is flying from Entebbe, Uganda to Johannesburg, South Africa on Uganda Airlines. She asks for an aisle seat but only middle-of-the-row seats are left. Why aren't any aisle seats left? (Hint: The airlines charge the same price for an aisle seat as a middle-of-the-row seat).
12. Speculation (on prices) leads to gains for the speculator and losses for others. Do you agree or disagree? Explain your answer.
13. Why do some bars offer free peanuts and pretzels to their patrons?

LECTURE NOTES IX & X

Elasticity

The law of demand states that price and quantity demanded are inversely related, *ceteris paribus*. But it doesn't tell us anything about the magnitude of change, i.e., by what percentage the quantity demanded changes as price changes. For example, suppose price rises by 10%, we have seen that as a result, the quantity demanded falls, but by what percentage does it fall? The notion of price elasticity of demand can help answer this question. The general concept of elasticity provides a technique for estimating the response of one variable to changes in another. It has numerous applications in economics.

□ KEY IDEAS

1. Elasticity provides a technique for estimating the response of one variable to changes in some other variable, and has numerous applications in economics.
2. Price elasticity of demand measures the responsiveness of quantity demanded of a product to a change in the price of that product.
3. There are four major determinants of price elasticity of demand.
4. Cross elasticity of demand measures the responsiveness of the quantity demanded of one good to a change in the price of another good.
5. Income elasticity of demand measures the responsiveness of the quantity demanded of a good to a change in income.
6. Price elasticity of supply measures the responsiveness of quantity supplied of a good to a change in the price of that good.
7. The laws of supply and demand determine who actually pays a tax.

A. Price Elasticity of Demand

The **price elasticity of demand** measures the responsiveness of quantity demanded to changes in price. It addresses the percentage change in quantity demanded for a given percentage change in price. The percentage change in quantity demanded divided by the percentage change in price gives the *coefficient of price elasticity of demand* (E_d).

$$E_d = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in Price}} = \frac{\% \Delta Q_d}{\% \Delta P}$$

In the formula, E_d = *coefficient of price elasticity of demand*, % = *percentage*, and Δ stands for “change in.” If the quantity demanded of computers changes by 20% and price changes by 10%—we get $E_d = 2$. An economist would say, “*The Price elasticity of demand is 2.*” This expression means that the percentage change in quantity demanded will be 2 times any percentage change in price.

Where Is the Missing Minus Sign? Price and quantity demanded move in opposite directions: When price rises, quantity demanded falls (and vice versa). In our example, where price rises by 10% and the quantity demanded falls by 20%, when you divide a *minus 20%* by a *positive 10%*, you don't get 2; you get -2. Instead of saying that the price elasticity of demand is 2, you might think the price elasticity of demand is -2. However, economists simplify things by using the absolute value of the price elasticity of demand; thus they drop the minus sign.

Formula for Calculating Price Elasticity of Demand Using percentage changes to calculate price elasticity of demand can lead to conflicting results depending on whether price rises or falls. Therefore, economists use the following formula to calculate price elasticity of demand:

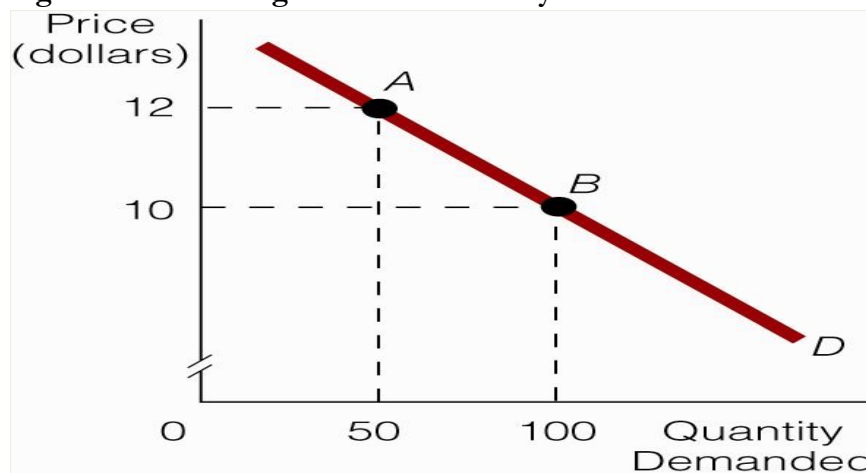
$$E_d = \frac{\frac{\Delta Q_d}{Q_{d \text{ average}}}}{\frac{\Delta P}{P_{\text{average}}}}$$

In the formula, ΔQ_d stands for the absolute change in Q_d . For example, if Q_d changes from 50 units to 100 units, then ΔQ_d is 50 units. ΔP stands for the absolute change in price. For example, if price changes from \$12 to \$10, then ΔP is \$2. $Q_{d \text{ average}}$ stands for the average of the two quantities demanded, and P_{average} stands for the average of the two prices. For this price and quantity demanded data, the calculation is:

$$E_d = \frac{\frac{50}{75}}{\frac{2}{11}} = 3.67$$

Because we use the average price and average quantity demanded in the price elasticity of demand equation, 3.67 may be considered the price elasticity of demand at a point *midway between the two points identified on the demand curve*. In Figure 1 below, 3.67 is the price elasticity of demand between points A and B on the demand curve.

Figure 1: Calculating the Price Elasticity of Demand



- For a linear demand function (straight line) slope is constant $\frac{\Delta P}{\Delta Q_d}$
- Elasticity (E_d) changes along the demand curve.

B. Elasticity is Not Slope

The slope of the demand curve and price elasticity of demand are not the same. Suppose we identify a third point (C) on the demand curve in Figure 1. Table 1 below shows the price and quantity demanded for three points, A, B, and C.

Table 1. Quantity Demanded at different Prices

Point	Price (\$)	Quantity Demanded
A	12	50
B	10	100
C	8	150

To calculate the *price elasticity of demand* between points *A* and *B*, we divide the percentage change in quantity demanded (between the two points) by the percentage change in price (between the two points). Using the price elasticity of demand formula, we got 3.67.

The *slope of the demand curve* between points *A* and *B* is the ratio of the change in the variable on the vertical axis to the change in the variable on the horizontal axis. The slope of the demand curve reflects the change, not a percentage change.

$$\text{Slope} = \frac{\Delta \text{Variable on the vertical axis}}{\Delta \text{Variable on the horizontal axis}} = \frac{-2}{50} = -0.04$$

Calculating the price elasticity of demand and the slope between points *B* and *C* gives:

$$\text{Between points } B \text{ and } C, \text{ the } E_d = \frac{\frac{50}{125}}{\frac{2}{9}} = 1.80$$

The price elasticity of demand between points *B* and *C* is 1.80; yet the slope is still -0.04.

C. From Perfectly Elastic to Perfectly Inelastic Demand

Demand can range from being perfectly elastic to being perfectly inelastic. Looking back at the equation for the elasticity coefficient, we can think of it in terms of numerator and denominator

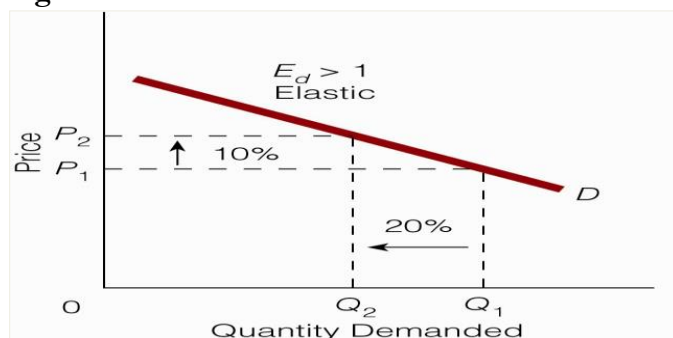
$$E_d = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in Price}} = \frac{\text{Numerator}}{\text{Denominator}}$$

Focusing on the numerator and denominator, we realize that the numerator can be (1) greater than, (2) less than, or (3) equal to the denominator, which translates into the fact that demand may be elastic, inelastic, unit elastic, perfectly elastic, or perfectly inelastic.

1.Elastic Demand ($E_d > 1$)—If the percentage change in quantity demanded is greater than the percentage change in price, demand is said to be elastic. That is, if the numerator is greater than the denominator, the elasticity coefficient is greater than 1, and demand is elastic (see Figure 2).

Percentage change in quantity demanded > Percentage change in price $\rightarrow E_d > 1 \rightarrow$ Demand is elastic

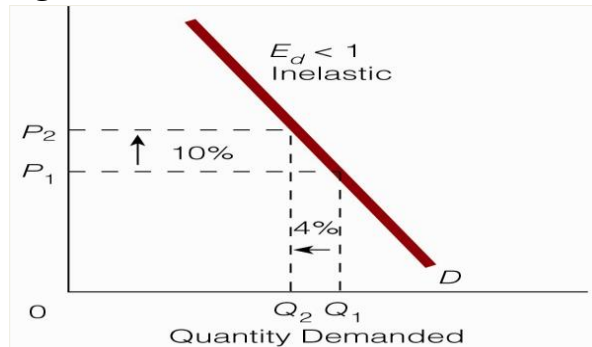
Figure 2: Elastic Demand



2. Inelastic Demand ($E_d < 1$)—If the percentage change in price is greater than the percentage change in quantity demanded, demand is said to be inelastic. That is if the numerator is less than the denominator, the elasticity coefficient is less than 1, and demand is inelastic (see Figure 3).

Percentage change in quantity demanded < Percentage change in price $\rightarrow E_d < 1 \rightarrow$ Demand is inelastic

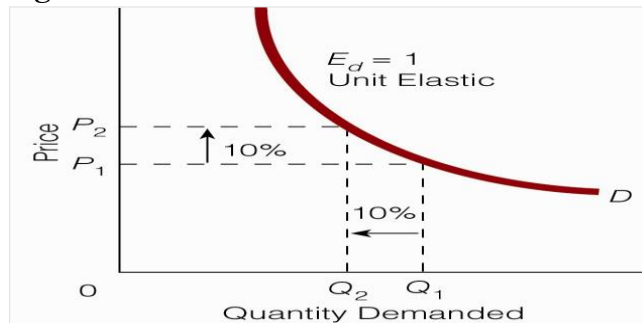
Figure 3: Inelastic Demand



3. Unit Elastic Demand ($E_d = 1$)—If the percentage change in quantity demanded equals the percentage change in price, demand is said to be unit elastic. That is the numerator equals the denominator, the elasticity coefficient is 1, and demand is unit elastic (see Figure 4).

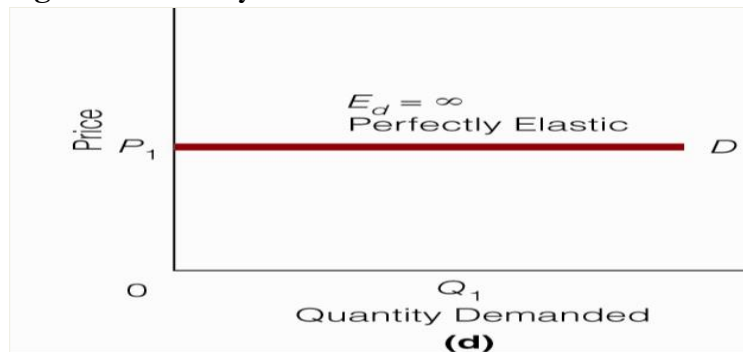
Percentage change in quantity demanded = Percentage change in price $\rightarrow E_d = 1 \rightarrow$ Demand is unit elastic

Figure 4: Unit Elastic Demand



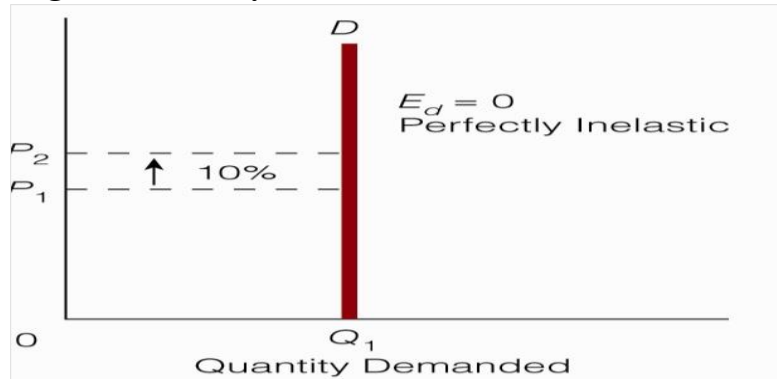
4. Perfectly Elastic Demand ($E_d = \infty$)—If quantity demanded changes dramatically in response to a change in price—e.g., if quantity demanded drops to zero following a price change—demand is said to be perfectly elastic. That is if quantity demanded is extremely responsive to changes in price, the result is **perfectly elastic demand** (see Figure 5).

Figure 5: Perfectly Elastic Demand



5. Perfectly Inelastic Demand ($E_d = 0$)—If quantity demanded is completely unresponsive to a change in price, demand is said to be perfectly inelastic. This happens when a change in price causes no change in quantity demanded (see Figure 6).

Figure 6: Perfectly Inelastic Demand



D. Price Elasticity of Demand and Total Revenue (Total Expenditure)

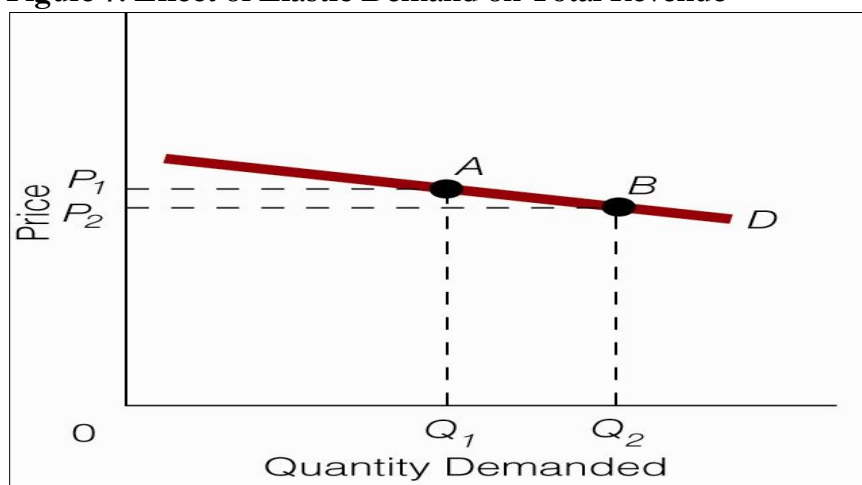
Total revenue (TR) of a seller equals the price of a good times the quantity of the good sold. Whether total revenue rises, falls, or remains constant after a price change depends on whether the percentage change in the quantity demanded is less than, greater than, or equal to the percentage change in price. Thus, price elasticity of demand influences total revenue.

E. Elastic Demand and Total Revenue

The effect that a change in price has on total revenue depends upon the price elasticity of demand. If demand is elastic, there is an inverse relationship between price and total revenue (total expenditure). If demand is inelastic, there is a direct or positive relationship between price and total revenue. If demand is unit elastic, a change in price will have no effect on total revenue.

If Demand is elastic: $P \uparrow \rightarrow TR \downarrow$ and $P \downarrow \rightarrow TR \uparrow$

Figure 7: Effect of Elastic Demand on Total Revenue



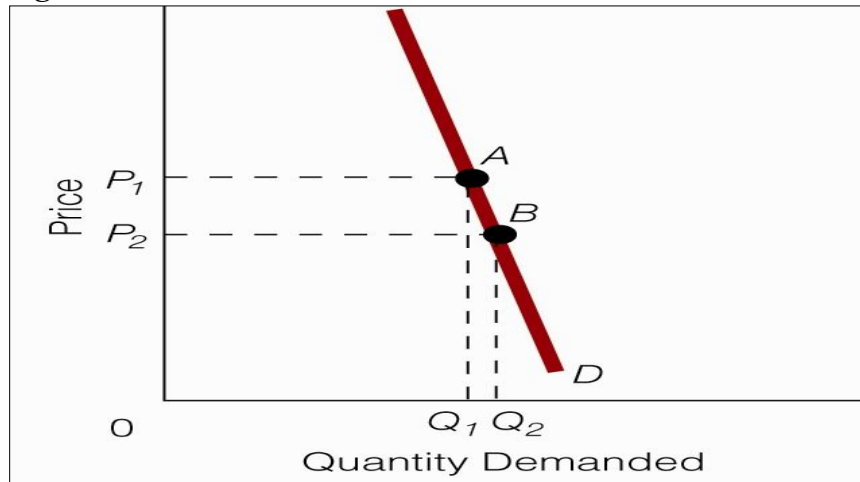
The demand curve in Figure 7 is elastic between points A and B . A fall in price, from P_1 to P_2 , will increase the size of the total revenue rectangle from OP_1AQ_1 to OP_2BQ_2 . A rise in price, from P_2

to P_1 , will decrease the size of the total revenue rectangle from $OP_2 BQ_2$ to $OP_1 AQ_1$. In other words, when demand is elastic, price and total revenue are inversely related.

► If demand is inelastic, the percentage change in quantity demanded is less than the percentage change in price. If price rises, quantity demanded falls but by a smaller percentage than the percentage rise in price. As a result, total revenue increases. So if demand is inelastic, a price rise increases total revenue. However, if price falls, the quantity demanded rises by a smaller percentage than the percentage fall in price, and total revenue decreases.

If Demand is inelastic: $P \uparrow \rightarrow TR \uparrow$ and $P \downarrow \rightarrow TR \downarrow$

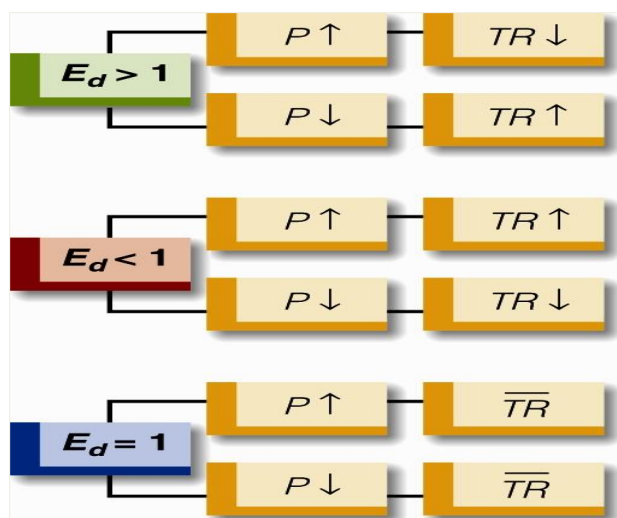
Figure 8: Effect of Inelastic Demand on Total Revenue



The Demand curve in Figure 8 is inelastic between points A and B . A fall in price, from P_1 to P_2 , will decrease the size of the total revenue rectangle from $OP_1 AQ_1$ to $OP_2 BQ_2$. A rise in price, from P_2 to P_1 , will increase the size of the total revenue rectangle from $OP_2 BQ_2$ to $OP_1 AQ_1$. In other words, when demand is inelastic, price and total revenue are directly related.

► If demand is unit elastic, the percentage change in quantity demanded equals the percentage change in price. If price rises, the quantity demanded falls by the same percentage as the percentage rise in price. Total revenue does not change. If price falls, the quantity demanded rises by the same percentage as the percentage fall in price. Again, total revenue does not change. If demand is unit elastic, a rise or fall in price leaves total revenue unchanged.

Figure 9: Elasticity, Price Changes and Total Revenue



Elasticity and the Issue of How Much?

Elasticity is a measurement of how much one thing changes given how much something else changes. Price elasticity of demand looks at the percentage change in quantity demanded given some percentage change in price. Income elasticity of demand looks at the percentage change in the quantity demanded of a good given some percentage change in income. Price elasticity of supply deals with the percentage change in the quantity supplied of a good given some percentage change in price. Elasticity—whether it be demand, income, supply, or some other type of elasticity—is often the right concept to consider when discussing various topics concerning change, especially where the magnitude of change is important.

The concept of elasticity is relevant to the issue of how much (what percentage) something will change as a result of something else changing. And sometimes knowing the answer to a how-much question is extremely important to the issue at hand. For example, if higher taxes on cigarettes really don't reduce cigarette consumption very much, then perhaps there is a better way than taxes to reduce the consumption of cigarettes among the young, should that be the objective.

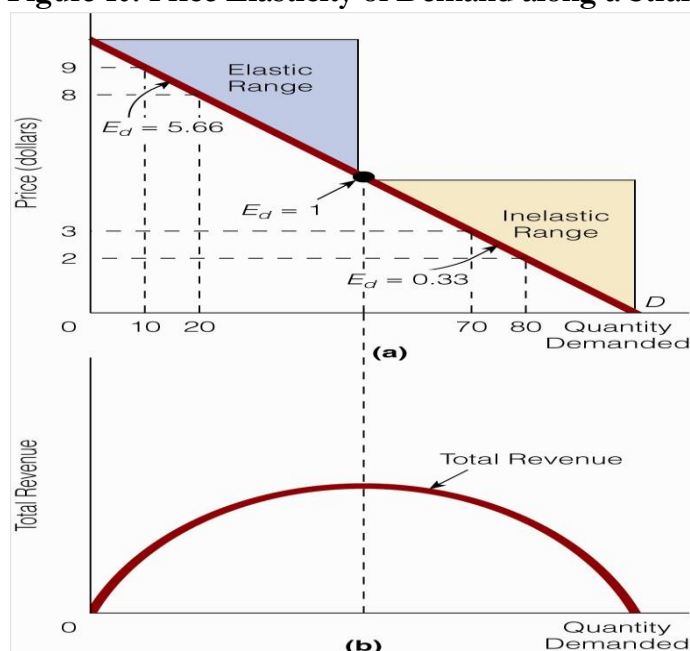
Self Test

1. On Tuesday, the price and quantity demanded are \$7 and 120 units, respectively. Ten days later, the price and quantity demanded are \$6 and 150 units, respectively. What is the price elasticity of demand between the \$7 and \$6 prices?
2. What does a price elasticity of demand of 0.39 mean?
3. Identify what happens to total revenue as a result of each of the following:
4. Alexi says, "When a seller raises his price, his total revenue rises." *What is Alexi implicitly assuming?*

F. Price Elasticity of Demand Along a Straight-Line Demand Curve

The price elasticity of demand for a straight-line downward-sloping demand curve varies from highly elastic to highly inelastic. Consider the price elasticity of demand at the upper range of the demand curve in Figure 10.

Figure 10: Price Elasticity of Demand along a Straight-line Demand Curve



Whether the price falls from \$9 to \$8 or rises from \$8 to \$9, using the price elasticity of demand formula, gives 5.66 as the price elasticity of demand. Now consider the price elasticity of demand at the lower range of the demand curve. Whether the price falls from \$3 to \$2 or rises from \$2 to \$3, we calculate the price elasticity of demand as 0.33. In other words, along the range of the demand curve identified, price elasticity goes from being greater than 1 (5.66) to being less than 1 (0.33); and on its way from being greater than 1 to being less than 1, price elasticity of demand must be equal to 1. In Figure 10, the price elasticity of demand is equal to 1 at the *midpoint* of the demand curve. (*For any straight-line downward-sloping demand curve, price elasticity of demand equals 1 at the midpoint of the curve.*)

The elastic and inelastic ranges along the straight-line downward-sloping demand curve can be related to a total revenue curve (see Figure 10). If we start in the elastic range of the demand curve in Figure 10(a) and lower price, total revenue rises, as shown in Figure 10 (b). That is, as price is coming down within the elastic range of the demand curve in part (a), total revenue is rising in part (b). When price has fallen enough that we move into the inelastic range of the demand curve in part (a), further price declines simply lower total revenue, as shown in part (b). Therefore, total revenue is at its highest—its peak—when price elasticity of demand equals 1.

G. Determinants of Price Elasticity of Demand

There are four major determinants of the price elasticity of demand: (1) the number of substitute goods available; (2) whether the good is determined to be a necessity or a luxury; (3) the percentage of one's budget spent on the good in question; and (4) the amount of time that has passed since the price change.

1.Number of substitutes—Suppose good A has 2 substitutes and good B has 15 substitutes. Assume that each of the 2 substitutes for good A is as good a substitute (or a good enough substitute) for that good as each of the 15 substitutes is for good B. Let the price of each good rise by 10 percent. The quantity demanded of each good decreases. Will the percentage change in the quantity demanded of good A be greater or less than the percentage change in quantity demanded of

good B? The answer is the good with 15 substitutes, good B. The reason is that the greater the opportunities are for substitution (good B has more substitutes than good A), the greater the cutback in the quantity of the good purchased will be as its price rises. The relationship between the availability of substitutes and price elasticity is clear:

- The more substitutes a good has, the higher the price elasticity of demand will be.
- The fewer substitutes a good has, the lower the price elasticity of demand.

Also:

- The more broadly defined the good is, the fewer the substitutes it will have.
- The more narrowly defined the good, the more the substitutes.

2.Necessities versus luxuries— Generally, the more that a good is considered a luxury (*a good that we can do without*) rather than a necessity (a good that we cannot do without), the higher the price elasticity of demand will be.

3.Percentage of one's budget spent on the good— The greater the percentage of one's budget that goes to purchase a good, the higher the price elasticity of demand; the smaller the percentage of one's budget that goes to purchase a good, the lower the price elasticity of demand.

4.Time— The more time that passes (after a price change), the higher the price elasticity of demand for the good; the shorter the time span, the lower the price elasticity of demand. That is, price elasticity is higher in the long run than in the short run.

Self Test

1.If good X has 7 substitutes and demand is inelastic, then if there are 9 substitutes for good X, will demand be elastic? Explain your answer.

2. Price elasticity of demand is predicted to be higher for which good of the following combinations of goods? Explain your answers.

- Dell computers or computers
- Heinz ketchup or ketchup
- Wavah water or water

Advertising and Demand Elasticity:

A marketing or advertising slogan is the link that holds the customer and the product or service together. The creative talent of the advertising company makes the consumer feel some connection to the product being advertised. In the end, the advert is intended to make consumers feel a special connection to the product or brand by making it look unique. What is the economic logic behind designing an advert campaign that makes the consumer feel some connection to the product being advertised? If the campaign is successful, it can change the price elasticity of demand of the product.

Suppose 10 products (A–J) are close substitutes for one another. A top advertising company is hired to think up an advert campaign for product A. If they can come up with a campaign that gets consumers feeling some special connection to product A, they can differentiate product A from its substitutes. In other words, consumers may come to think that product B or C are not really good substitutes for product A because they don't have the same connection to B and C as they do to A.

We know that the fewer substitutes a product has (*even if only in the minds of buyers*), the lower its price elasticity of demand will be. If the advert can effectively eliminate the substitutes for product A, it effectively lowers the price elasticity of demand for product A. If it can lower the elasticity enough to bring it below 1, then the demand for the good is *inelastic*. And if demand is inelastic, you can raise the price of the product and have greater total revenue too. But will profit rise? At a higher price for the product, fewer units will be sold, and if fewer units are sold, then fewer need to be produced; so total costs will decline.

OTHER ELASTICITY CONCEPTS: Three other elasticities are cross elasticity of demand, income elasticity of demand, and price elasticity of supply.

H. Cross Elasticity of Demand

Cross elasticity of demand measures the responsiveness in the quantity demanded of one good to changes in the price of another good. It is calculated by dividing the percentage change in the quantity demanded of one good by the percentage change in the price of another.

$E_c = (\% \text{ Change in Quantity Demanded of One Good} / \% \text{ Change in Price of Another Good})$
 where E_c stands for the coefficient of cross elasticity of demand

This concept is often used to determine whether two goods are substitutes or complements and the degree to which one good is a substitute for or a complement to the other. Consider Blue Band Margarine and Prestige Margarine. Suppose that when the price of Prestige increases by 10%, the quantity demanded of Blue Band increases by 45%. The cross elasticity of demand for Blue Band with respect to the price of Prestige is:

$$E_c = (\% \text{ Change in Quantity Demanded of Blue Band} / \% \text{ Change in Price of Prestige}) = 45/10 = 4.5$$

In this case, the cross elasticity of demand is a positive 4.5. When the cross elasticity of demand is positive, the percentage change in the quantity demanded of one good (in the numerator) moves in the same direction as the percentage change in the price of the other good (in the denominator). This is a characteristic of goods that are substitutes. So if $E_c > 0$, the two goods are substitutes.

If the elasticity coefficient is negative, $E_c < 0$, then the two goods are complements.

A negative cross elasticity of demand occurs when the percentage change in the quantity demanded of one good (numerator) and the percentage change in the price of another good (denominator) move in opposite directions. For example, suppose the price of cars increases by 5%, and the quantity demanded of car tires decreases by 10%. Calculating the cross elasticity of demand, we have $-10\%/5\% = -2$. Therefore, cars and car tires are complements.

I. Income Elasticity of Demand

Income elasticity of demand measures the responsiveness of quantity demanded to changes in income. It is calculated by dividing the percentage change in quantity demanded of a good by the percentage change in income.

$E_Y = (\% \text{ Change in Quantity Demanded of a good} / \% \text{ Change in Income})$
 where E_Y = coefficient of income elasticity of demand, or elasticity coefficient.

Income elasticity of demand is positive, $E_Y > 0$, for a *normal good*. A normal good is one whose demand and thus whose quantity demanded increase, given an increase in income.

In contrast to a normal good, the demand for an *inferior good* decreases as income increases. That is, Income elasticity of demand is negative, $E_Y < 0$, for an *inferior good*.

We calculate the income elasticity of demand for a good using the same approach we used to calculate price elasticity of demand.

$$E_d = \frac{\frac{\Delta Q_d}{Q_{d \text{ average}}}}{\frac{\Delta Y}{Y_{\text{average}}}}$$

where Q_d average is the average quantity demanded, and Y_{average} is the average income.

Suppose income increases from \$500 to \$600 per month, and as a result quantity demanded of good X increases from 20 units to 30 units per month. We have

$$E_Y = \frac{\frac{10}{25}}{\frac{100}{550}} = 2.2$$

$E_Y > 0$; so good X is a normal good. Also:

- Because $E_Y > 1$, demand for good X is said to be **income elastic**. In other words, the percentage change in quantity demanded of the good is greater than the percentage change in income.
- If $E_Y < 1$, the demand for the good is said to be **income inelastic**.
- If $E_Y = 1$, then the demand for the good is **income unit elastic**.

J. Price Elasticity of Supply

Price elasticity of supply measures the responsiveness of quantity supplied to changes in price. It is calculated by dividing the percentage change in quantity supplied of a good by the percentage change in the price of the good.

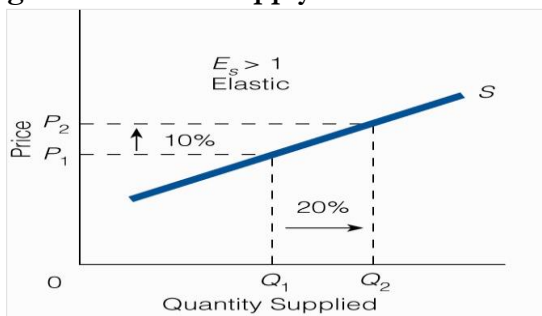
$$E_s = (\% \text{Change in Quantity Supplied of a good} / \% \text{Change in Price})$$

where E_s = coefficient of price elasticity of supply, or elasticity coefficient.

We use the same approach to calculate the price elasticity of supply that we used to calculate the price elasticity of demand. In addition, supply can be classified as elastic, inelastic, unit elastic, perfectly elastic, or perfectly inelastic.

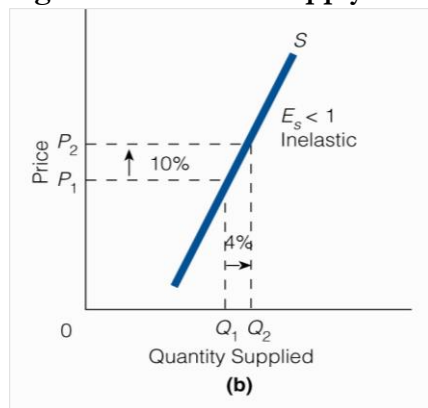
Elastic supply ($E_s > 1$) refers to a percentage change in quantity supplied that is greater than the percentage change in price.

Figure 11: Elastic Supply



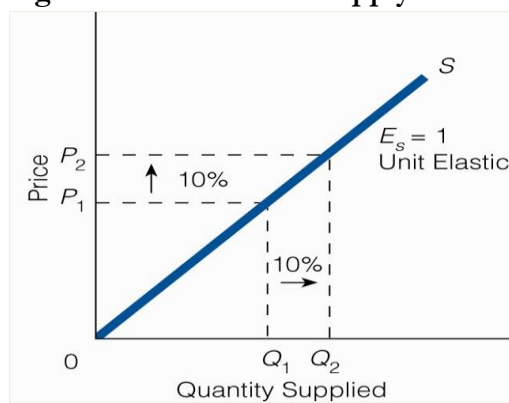
- Inelastic supply ($E_s < 1$) refers to a percentage change in quantity supplied that is less than the percentage change in price.

Figure 12: Inelastic Supply



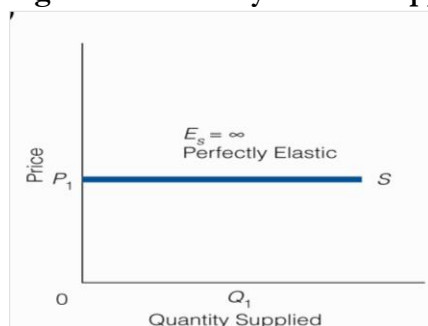
●● Unit elastic supply ($E_s = 1$) refers to a percentage change in quantity supplied that is equal to the percentage change in price.

Figure 13: Unit Elastic Supply



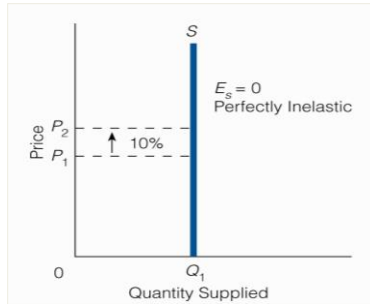
●● In the case of perfectly elastic supply ($E_s = \infty$), a small change in price changes the quantity supplied by an infinitely large amount (and thus the supply curve, or a portion of the overall supply curve, is horizontal).

Figure 14: Perfectly Elastic Supply



●● In the case of perfectly inelastic supply ($E_s = 0$), a change in price brings no change in quantity supplied (and thus the supply curve, or a portion of the overall supply curve, is vertical).

Figure 15: Perfectly Inelastic Supply



K. Price Elasticity of Supply and Time

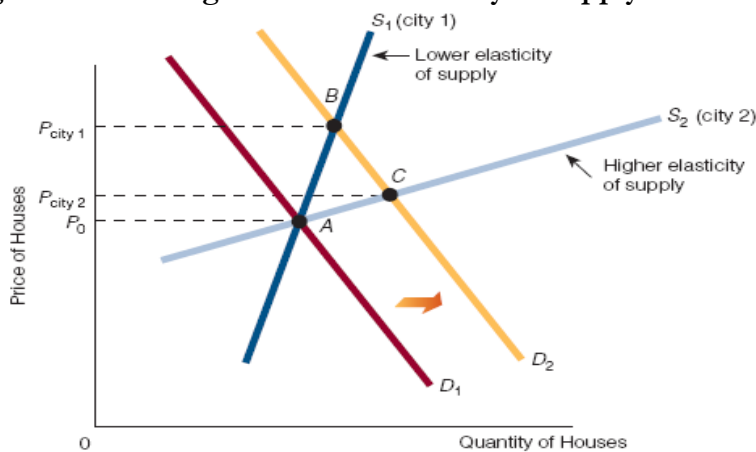
The longer the period needed for adjustment is to a change in price, the higher the price elasticity of supply will be. The obvious reason is that additional production takes time. For example, suppose that the demand for new housing increases in your city and that the increase occurs all at once on Tuesday, placing upward pressure on the price of housing. The number of houses supplied will not be much different on Saturday than it was on Tuesday. It will take time for suppliers to determine whether the increase in demand is permanent. If they decide it is temporary, not much will change. If contractors decide it is permanent, they need time to move resources from the production of other things into the production of new housing.

House Prices and the Elasticity of Supply

House prices increased in the United States during the years 1998 through mid-2006. House prices did not rise by the same percentage in all cities and states, however. For example, house prices increased more in Los Angeles than in Houston, Texas. House prices increased more in Florida than in Idaho. Why didn't house prices rise by the same percentage in every location? Why did they rise more in some places than in others?

One reason could be that demand didn't increase by the same amount in all locations. The demand for houses in, say, San Francisco, California could have risen by more than the demand for houses in Topeka, Kansas. No doubt this is part of the explanation. But another part of the explanation has to do with supply.

Figure 16. Housing Prices and Elasticity of Supply



As the price of a good rises, we expect the quantity supplied (of the good) to rise too. In other words, the supply curve of the good is upward sloping. But, although the supply curve of housing is upward sloping, not all supply curves have the same elasticity of supply. For example, Figure 16

shows two supply curves, S_1 and S_2 . S_1 has lower elasticity of supply than S_2 . Now suppose that S_1 represents the supply curve of housing in city 1 and that S_2 represents the supply curve of housing in city 2. Suppose the demand for housing in each city rises from D_1 to D_2 , as in Figure 16. As a result, the price of houses rises in both cities, but it rises by more in city 1 than in city 2. In other words, the lower the elasticity of supply is, the greater the increase in price will be.

But why would the elasticity of supply be lower for housing in city 1 than in city 2? The answer could have to do with land use regulations. Suppose that each city has 1,000 vacant areas and that house developers are able to put houses up on only 10% of vacant land in city 1, whereas in city 2 house developers are able to put houses up on 70% of it. For a given rise in price, the developers in city 2 can put up more houses than developers in city 1 can put up. As a result, if the demand for houses rises by the same amount in city 1 and city 2, more houses will be built in city 2 than in 1, and so the price of houses will rise by less in city 2 than in city 1.

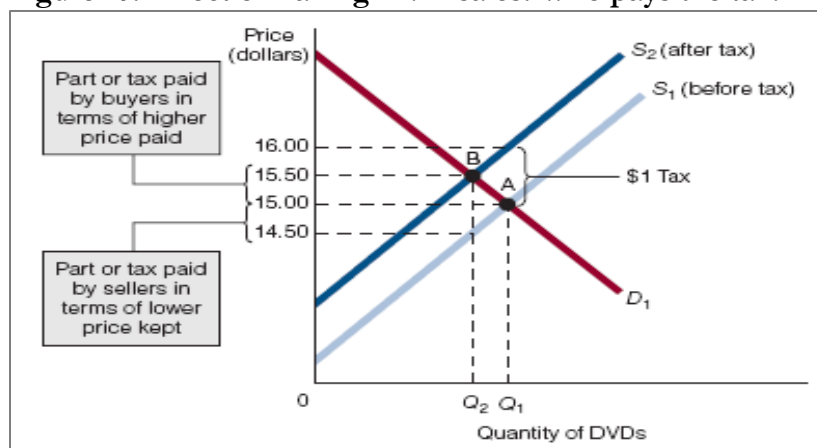
THE RELATIONSHIP BETWEEN TAXES AND ELASTICITY

L. Who Pays the Tax?

Most people think that if government places a tax on the seller of a good, the seller actually pays the tax. However, the *placement* of a tax is not the same as its *payment*, and placement does not guarantee payment.

Suppose the government imposes a tax on sellers of music DVDs. Sellers are taxed \$1 for every DVD they sell: sell a DVD, send \$1 to the government. The government action changes the equilibrium in the DVD market. In Figure 17, before the tax is imposed, the equilibrium price and the quantity of DVDs are \$15 and Q_1 , respectively.

Figure 17. Effect of Taxing DVD sales: Who pays the tax?



The tax per DVD shifts the supply curve leftward from S_1 to S_2 . The vertical distance between the two supply curves represents the \$1-per-DVD tax, because what matters to sellers is how much they keep for each DVD sold, not how much buyers pay. For example, if sellers are keeping \$15 per DVD for Q_1 DVDs before the tax is imposed, then they want to keep as much after the tax is

imposed. But if the tax is \$1, the only way they can keep \$15 per DVD for 1 DVDs is to receive \$16 per DVD. They receive \$16 per DVD from buyers, turn over \$1 to the government, and keep \$15. In other words, each quantity on the new supply curve, S_2 , corresponds to a \$1 higher price than it did on the old supply curve, S_1 .

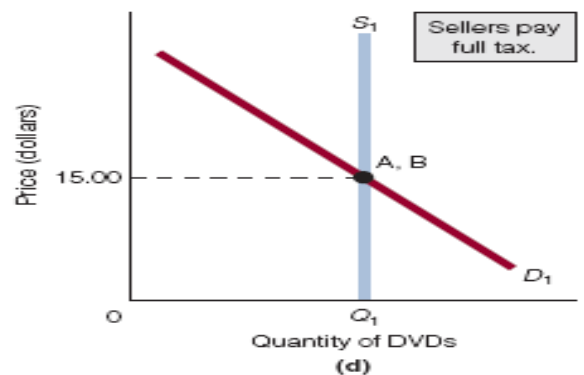
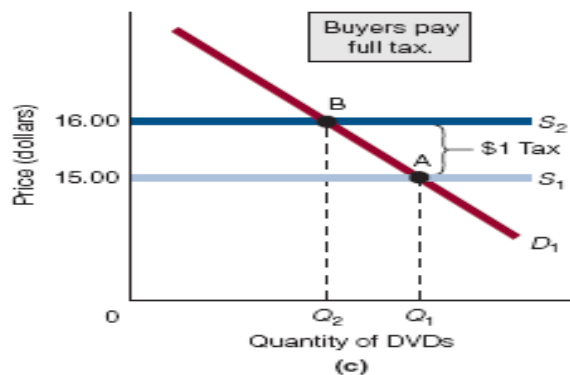
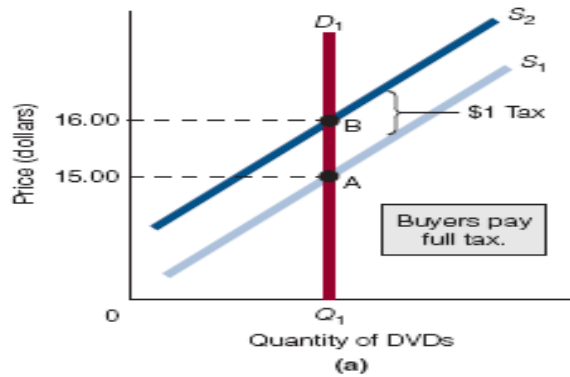
However, the new equilibrium price will not necessarily be \$1 higher than the old equilibrium price. In this case, the new equilibrium happens to be at a price of \$15.50 and a quantity of $Q = 2$. Buyers pay \$15.50 per DVD after the tax is imposed, as opposed to \$15.00 before the tax was imposed. The difference between the new and old prices is the amount of the \$1.00 tax that buyers pay per DVD. In this example, buyers pay 50 cents, or one-half of the \$1.00 tax per DVD. Before the tax, buyers pay \$15.00. After the tax, buyers pay \$15.50. The sellers receive \$15.50 per DVD from buyers after the tax is imposed, as opposed to \$15.00 per DVD before the tax was imposed, but they do not get to keep \$15.50 per DVD. One dollar has to be turned over to the government, leaving the sellers with \$14.50. Before the tax was imposed, however, sellers received and kept \$15.00 per DVD. In this example, the difference between \$15.00 and \$14.50—50 cents—is the amount of the tax per DVD that sellers pay. Before the tax, sellers receive \$15.00 and keep \$15.00. After the tax, sellers receive \$15.50 and keep \$14.50. So, although the full tax was *placed* on the sellers, they *paid* only one-half of it; although none of the tax was placed on buyers, they paid one-half of it too.

M. Elasticity and the Tax

In our tax example, buyers paid half of the \$1 tax and sellers paid half, but this is not the outcome in every situation. The buyer can pay more than half the tax. In fact, the buyer can pay the full tax if demand for the good is perfectly inelastic, as in Figure 18(a). The tax shifts the supply curve from S_1 to S_2 , and the equilibrium price rises from \$15.00 to \$16.00. In other words, if demand is perfectly inelastic and a tax is placed on the sellers of a good, buyers pay the full tax as part of a higher price.

Parts (b)–(d) of Figure 18 show other cases. In part (b), demand is perfectly elastic. The tax shifts the supply curve from S_1 to S_2 , but the equilibrium price does not change. Sellers must therefore pay the full tax if demand is perfectly elastic. In part (c), supply is **perfectly elastic**, and buyers pay the full tax. In part (d), supply is **perfectly inelastic** and a change in price causes no change in quantity supplied. If sellers try to charge a higher price than \$15 for their good (*and thus try to get buyers to pay some of the tax*), a surplus will result, driving the price back down to \$15. In this case, sellers pay the full tax. Although Figure 18 does not show this possibility, sellers would receive \$15, turn over \$1 to the government, and keep \$14 for each unit sold.

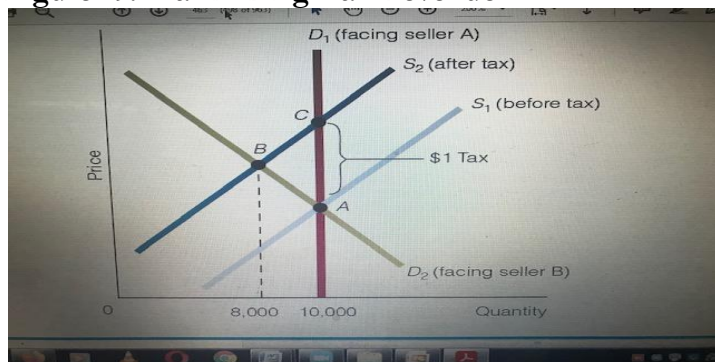
Figure 18. Different Elasticities and Who pays the tax?



N. Degree of Elasticity and Tax Revenue

Consider two sellers, A and B. Seller A faces a perfectly inelastic demand for her product and is currently selling 10,000 units a month. Seller B faces an elastic demand for his product and is currently selling 10,000 units a month. Government is thinking about placing a \$1 tax per unit of product sold on one of the two sellers. If government's objective is to maximize tax revenues, which seller should it tax?

Figure 19. Maximizing Tax Revenue



In Figure 19, the demand curve facing seller A is D_1 ; the demand curve facing seller B is D_2 . S_1 represents the supply curve for both firms. Currently, both firms are at equilibrium at point A, selling 10,000 units. If government places a \$1 tax per unit sold on seller A, the supply curve shifts to S_2 , and the equilibrium is now at point C. Because demand is perfectly inelastic, A still sells 10,000 units. Tax revenue equals the tax (\$1) times 10,000 units, or \$10,000. If government places the \$1 tax per unit sold on seller B, tax revenue will be only \$8,000. When the tax shifts the supply

curve to D_2 , the equilibrium moves to point B , where only 8,000 units are sold. The lesson is that given the \$1 tax per unit sold, tax revenues are maximized by placing the tax on the seller who faces the more inelastic (less elastic) demand curve.

Self Test

1. What does an income elasticity of demand of 1.33 mean?
2. What does perfectly inelastic supply signify?
3. Why will government raise more tax revenue if it applies a tax to a good with inelastic demand than if it applies the tax to a good with elastic demand?
4. Under what condition would a per-unit tax placed on the sellers of computers be fully paid by the buyers of computers?

Coursework Assignment #8: Due Date Friday June 3, 2021 5pm

1. Explain how a seller can determine whether the demand for his or her good is inelastic, elastic, or unit elastic between two prices.
2. For each of the following, identify where demand is elastic, inelastic, perfectly elastic, perfectly inelastic, or unit elastic: (a) Price rises by 10 percent and the quantity demanded falls by 2 percent; (b) Price falls by 5 percent and the quantity demanded rises by 4 percent; (c) Price falls by 6 percent and the quantity demanded does not change; (d) Price rises by 2 percent and the quantity demanded falls by 1 percent.
3. Prove that price elasticity of demand is not the same as the slope of a demand curve.
4. Suppose the current price of fuel at the pump is Ush4,000 per liter and that 1 million liters are sold per month. A politician proposes to add a Ush 100 tax to the price of a liter. She says the tax will generate Ush100,000,00 tax revenues per month ($1 \text{ million liters} \times \text{Ush}100 = \text{Ush}100,000,000$). What assumption is she making?
5. Identify whether total revenue rises, falls, or remains constant for each of the following: (a) Demand is inelastic and price falls; (b) Demand is elastic and price rises; (c) Demand is unit elastic and price rises; (d) Demand is inelastic and price rises; (e) Demand is elastic and price falls.
6. Suppose a straight-line, downward-sloping demand curve shifts rightward. Is the price elasticity of demand higher, lower, or the same between any two prices on the new (higher) demand curve than on the old (lower) demand curve?
7. The City of Goma was hit by a volcano eruption that destroyed 25 percent of the housing in the area. Do you expect the total expenditure on housing after the volcano eruption to be greater than, less than, or equal to what it was before the volcano eruption? Explain your answer.
8. In each of the following pairs of goods, which has the higher price elasticity of demand: (a) Airline travel in the short run or airline travel in the long run; (b) Television sets or Sony television sets; (c) Cars or Toyota; (d) Computers or Lenovo Computers (e) Shoes or Clarks Shoes?
9. How might you determine whether toothpaste and mouthwash manufacturers are competitors?

10. Assume the demand for product A is perfectly inelastic. Further, assume that the buyers of product A get the funds to pay for it by stealing. (a) If the supply of A decreases, what happens to its price? (b) What happens to the amount of crime committed by buyers of A?

11. Suppose you learned that the price elasticity of demand for wheat is 0.7 between the current price for wheat and a price \$2 higher per kg. Do you think farmers collectively would try to reduce the supply of wheat and drive the price up \$2 higher per kg? Explain your answer. Assuming that they would try to reduce supply, what problems might they have in actually doing so?

12. In 1947, the U.S. Justice Department brought a suit against the DuPont Company (which at the time sold 75 percent of all the cellophane in the United States) for monopolizing the production and sale of cellophane. In court, the DuPont Company tried to show that cellophane was only one of several goods in the market in which it was sold. It argued that its market was not the cellophane market but the flexible packaging materials market, which included (besides cellophane) waxed paper, aluminum foil, and other such products. DuPont pointed out that it had only 20 percent of all sales in this more broadly defined market. Using this information, discuss how the concept of cross elasticity of demand would help establish whether DuPont should have been viewed as a firm in the cellophane market or as a firm in the flexible packaging materials market.

13. "If government wishes to tax certain goods, it should tax goods that have inelastic rather than elastic demand." What is the rationale for this statement?

14. A tax is placed on the sellers of a good. What happens to the percentage of this tax that buyers pay as the price elasticity of demand for the good decreases? Explain your answer.

LECTURE NOTES XI-XVII

11.0 OVERVIEW OF MACROECONOMICS

11.1.0 Introduction

In the first lectures of this course, we introduced the four broad categories of Economics: positive economics, normative economics, microeconomics and macroeconomics. Microeconomics is the study of human behavior and choices as they relate to relatively small units, such as an individual, a firm, an industry, or a single market. Macroeconomics is the study of human behavior and choices as they relate to an entire economy. All the previous lectures have been looking at human behavior at a microeconomic level. In the remaining lectures of this course, shall dwell on interactions at a level of the whole economy (macroeconomic level).

Macroeconomics primarily focuses on aggregating or adding together the individual microeconomic components in the economy to the study the whole economy, using aggregate measures such as Gross Domestic Product (GDP), unemployment rate, government surplus, government deficits and many other measures.

Definition: What is macroeconomics?

Macroeconomics is a category of economics that analyses operations of the whole economy by looking at decisions of individual actors aggregated together. Recall that microeconomics is the study of how individual households and firms make decisions and how these decisions interact in the market.

Microeconomics and macroeconomics are considered linked because economy-wide events arise from the interaction of households and firms. One could actually say that moving from microeconomics to macroeconomics involves reasoning from a specific level to an aggregate level. For example, consider what happens when the wage rate declines. In such a situation, microeconomics is interested in finding out how firms will respond to this fall in wage rate—will they hire more workers and increase production? On the other hand, for an economy as a whole, a wide spread reduction in wages may cause consumers to spend less (buy less of most commodities) and save more of their income, which would lead to a reduction of production in some firms. Another example is that if single individuals wish to increase their savings, they need to exercise self-control but if all individuals make such effort, there will be a decrease in consumption and a consequent decline of production in some firms.

In macroeconomics, the assumption of “other things equal” is relaxed or dropped. It looks at the whole economy as one functioning unit.

11.1.1 IMPORTANT MACROECONOMIC VARIABLES

When one talks about macroeconomics, three important economic variables or measures should always come to mind. These include:

1. Real gross domestic product (real GDP)

Real GDP measures the total income of everyone in the economy (adjusted for the level of prices). Concerning this measure, macroeconomics tries to answer questions like, *“why do some economies grow while others don’t?”*

2. Inflation rate

Inflation rate measures how fast prices are rising. Here, macroeconomics considers answering questions like, *“Why did countries like Uganda have high inflation rates during President Idi Amin’s regime or the during the year of 2011?”* The same question applies to Zimbabwe during the rule of president Mugabe.

3. Unemployment

The unemployment rate measures the fraction of the labour force that is out of work. Macroeconomics tries to find out why people can’t find jobs.

Although the task of fighting poverty, creating jobs and controlling inflation falls with the policy makers, the work of explaining how these economic events come about and making policies to improve economic performance falls on macroeconomists.

11.2.0 ROLE OF MACROECONOMICS IN NATIONAL DEVELOPMENT

Macroeconomics aims at achieving the following goals in the economy;

- Ensuring high employment and low involuntary unemployment rates
- Encouraging full production
- Stabilising prices (ensure low inflation), through prices and wages set in free markets
- Promoting rapid growth of output and consumption to high levels
- Ensuring balanced balance of payments (BOP), where exports roughly balance imports and the nation has a stable exchange rate against foreign currencies

Studying the 3 key economic variables in macroeconomics (GDP, Inflation and unemployment), involves answering the following questions;

- Why do they change over time? and;
- How do they interact with one another?

In answering the two questions above, macroeconomics analyses causes of problems like unemployment, inflation, lagging economic growth and mounting international deficits. These macroeconomic problems create psychological as well as material damage and they are a serious source of social tension and potential disruption in a free society. For example *inflation*: the abrupt increase in prices in Uganda led to protests led by opposition politicians which became violent and resulted in the loss of lives and property. Increasing prices can also cause workers to demand for higher wages and this stresses the employers, retired persons try to live on limited incomes as homemakers try to put food on the table etc.

You will find macroeconomics interesting and challenging since policies that help to solve one major problem often intensify others. For example, inflation can be reduced by raising interest rates so that individuals borrow less. Unfortunately, this policy will reduce investment in production and consequently slow down the economy.

11.2.1 The Classical and Keynesian view of development in a national economy

A number of economists have come up with different views to try to explain what national economic development entails. Before the 1930’s, classical economists followed the **say’s law** in directing economic development. Say’s law states *“supply creates its own demand, sufficient to purchase all goods and services produced”*. This law means that increases in supply will stimulate demand. This is based on the belief that every commodity is brought to the market to enable its producers to buy other commodities. Based on this thinking, policies were directed towards increasing the supply side of the economy. The classical view was to increase production and demand would follow.

Classical Economists and Say's Law

You know from the study of supply and demand that markets can experience temporary shortages and surpluses. But can the economy have a general surplus or glut of goods and services? The classical economists thought not, largely because they believed in Say's law (named after J. B. Say). In its simplest version, **Say's law** states that supply creates its own demand.

This law is most easily understood in terms of a barter economy. Consider a person baking bread in a barter economy (*where goods are exchanged for other goods, not money*); the baker is a supplier of bread. According to Say, as the baker is baking bread, he is thinking of the goods and services he will obtain in exchange for it. Thus, his act of supplying bread is linked to his demand for other goods. Supply creates its own demand. If supplying some goods leads to a simultaneous demand for other goods, then Say's law implies that there cannot be either (1) a general overproduction of goods (where supply in the economy is greater than demand) or (2) a general underproduction of goods (*where demand in the economy is greater than supply*).

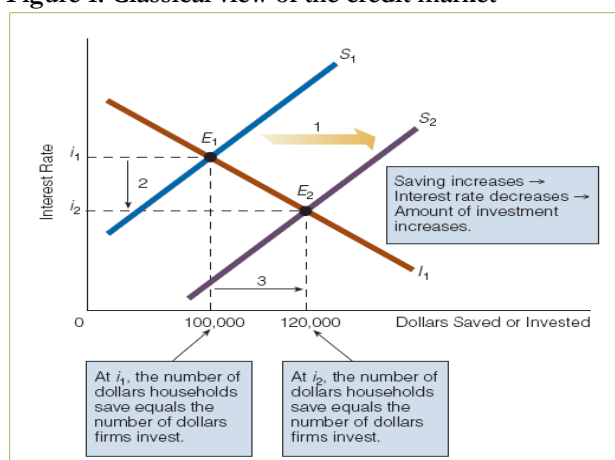
On the other hand, if the baker is baking bread in a money economy, does Say's law hold? Over a period of time, the baker earns an income as a result of supplying bread, but what does he do with the income? One use of the money is to buy goods and services. However, his demand for goods and services may not necessarily match the income that he generates by supplying bread. The baker may spend less than his full income because he saves. So we might think that Say's law does not hold in a money economy because the act of supplying goods and services—thus earning income—need not create an equal amount of demand. But the classical economists disagreed. They argued that even in a money economy, where individuals sometimes spend less than their full incomes, Say's law still holds. Their argument was partly based on the assumption of interest rate flexibility.

9-2 Classical Economists and Interest Rate Flexibility

For Say's law to hold in a money economy, the funds saved must give rise to an equal amount of funds invested. If not, then some of the income earned from supplying goods may not be used to demand goods (*which is a contradiction of Say's law*). As a result, goods will be overproduced.

The classical economists argued that saving is matched by an equal amount of investment because of interest rate flexibility in the credit market.

Figure 1: Classical view of the credit market



In Figure 1, I represents investment and S represents saving. I_1 is downward sloping, indicating an inverse relationship between the amount of funds firms invest and the interest rate (i). This is

because the interest rate is the cost of borrowing funds. The higher the interest rate is, the fewer funds firms borrow and invest; the lower the interest rate, the more funds firms borrow and invest. S_1 is upward sloping, indicating a direct relationship between the amount of funds that households save and the interest rate. The reason is that the higher the interest rate is, the higher the reward is for saving (*or the higher the opportunity cost of consuming*). So fewer funds are consumed and more funds are saved. Market-equilibrating forces move the credit market to interest rate i_1 and the equilibrium point E_1 . At E_1 , the number of dollars households save (\$100,000) equals the number of dollars firms invest (\$100,000).

Suppose now that saving increases (*fewer funds consumed and more funds saved*) at each interest rate level. In Figure 1, the saving increase is represented by a rightward shift in the saving curve from S_1 to S_2 . The classical economists believed that an increase in saving puts downward pressure on the interest rate, moving it to i_2 , thereby increasing the number of dollars firms invest. Ultimately, the number of dollars households save (\$120,000) once again equals the number of dollars firms invest (\$120,000). Interest rate flexibility ensures that saving equals investment. In short, changes in the interest rate uphold Say's law in a money economy where there is saving.

Let's use a few numbers to illustrate what classical economists were saying. Consider a tiny economy in which at a given price level, total expenditure (TE) is \$5,000. Total expenditures (*total spending on domestic goods & services*) equal the sum of consumption (C), investment (I), government purchases (G), and net exports ($EX - IM$).

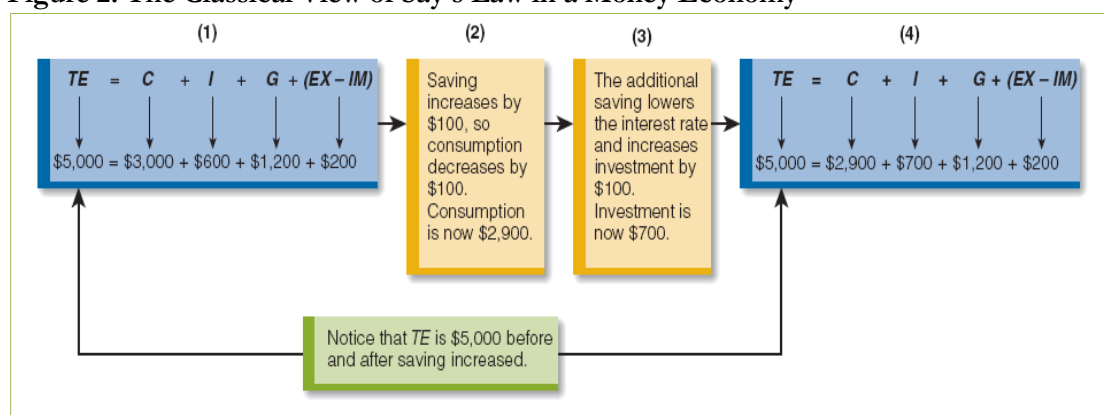
If $C = \$3,000$, $I = \$600$, $G = \$1,200$, and $EX - IM = \$200$, then

$$TE = C + I + G + (EX - IM) \rightarrow \$5,000 = \$3,000 + \$600 + \$1,200 + \$200$$

The \$5,000 worth of goods and services that the four sectors of the economy want to purchase also happens to be the exact dollar amount of goods and services that suppliers want to sell. But what happens when saving is increased in the economy? Saving (S) is equal to the amount of a person's disposable income (Y_d) minus consumption (C).

For saving to increase, consumption must decrease (*See Figure 2*).

Figure 2. The Classical View of Say's Law in a Money Economy



If saving increases by \$100, then consumption must fall from \$3,000 to \$2,900. At first glance, this seems to imply that total expenditures will fall to \$4,900. But classical economists disagreed. They said that investment will increase by \$100, going from \$600 to \$700. Total expenditures will remain constant at \$5,000 and will be equal to the dollar amount of the goods and services that suppliers want to sell.

$$TE = C + I + G + (EX - IM) \rightarrow \$5,000 = \$2,900 + \$700 + \$1,200 + \$200$$

If this were true then, according to the classical view of the economy, Say's law holds both in a barter economy and in a money economy. In a money economy, according to classical economists, interest rates will adjust to equate saving and investment. Therefore, any fall in consumption (*and consequent rise in saving*) will be matched by an equal rise in investment. In essence, at a given price level, total expenditures will not decrease as a result of an increase in saving.

What does an increase in saving imply for aggregate demand (*AD*)? We know that aggregate demand changes only if total spending in the economy changes at a given price level. Therefore, because total spending does not change as a result of an increase in saving, aggregate demand does not change.

Is Saving the Same as “Not Spending”?

Here is what you sometimes hear people say: *The economy is badly off right now (production is down, unemployment is up), and it requires a big dose of spending to pick things up. If people would simply start spending more money—if they would simply buy more goods and services—then firms would sell more goods and services. And to sell more goods and services, the firms would need to produce them. And to produce them, they would need to hire more people. That would end up lowering the unemployment rate. Plus, the newly hired people will have income to spend, which will add even more spending power to the economy and make things even better.*

Now if this is all correct (*spending is good for the economy*), then saving (*not spending*) must be bad for the economy. If spending gets production up and unemployment down, then not spending—or saving—must cause production to move down and unemployment to move up. **But what does our classical macroeconomic model say about saving being not spending?** Well, it says that saving may be the same as not spending on consumer goods but that saving is not the same as not spending at all. Figure 1 above shows that an increase in saving shifts the savings curve to the right, lowering the interest rate; a lower interest rate then turns the extra savings into more investment. And remember, investment is spending undertaken by the business sector of the economy. To the classical macroeconomist, money that leaves the spending stream at one point (*in the form of less consumption spending*) can very easily and likely enter the spending stream at another point (*as more investment spending*). What goes out of one door comes back in through another door. **To the person who argues that saving is not spending, the classical macroeconomist says, “False.”**

However, John Maynard Keynes, an English economist, changed how many economists viewed the economy. His major work, *The General Theory of Employment, Interest and Money*, was published in 1936. Just prior to its publication, the Great Depression had plagued many countries of the world during the Second World. Looking around at the world during that time, one had to wonder whether the classical view of the economy could be right. Unemployment was sky-high in many countries, and many economies had been contracting. Where was Say's law, with its promise that there would be no general gluts or surplus? Where was full employment?, etc.

Keynes's Criticism of Say's Law in a Money Economy

According to classical economists and Say's law, if consumption spending falls because saving increases, then total spending will not fall, because the added saving will simply bring about more investment spending. Keynes disagreed. He didn't think that added saving would necessarily stimulate an equal amount of added investment spending. Figure 1 above illustrates Keynes's point of view. Let consumption equal \$3,000, investment equal \$600, government purchases equal \$1,200, and net exports equal \$200. Then saving increases by \$100, lowering consumption to \$2,900.

According to the classical economists, investment will rise by \$100 at the same time, going from \$600 to \$700. Keynes asked, what is the guarantee that an increase in investment will equally match an increase in saving? What if saving rises by \$100 (and consumption goes down by \$100), but investment rises by, say, only \$40 (instead of \$100)? Then the original equation $TE = C + I + G + (EX - IM)$ changes from

$$TE = \$3,000 + \$600 + \$1,200 + \$200 = \$5,000 \text{ to}$$

$$TE = \$2,900 + \$660 + \$1,200 + \$200 = \$4,900 \text{ not to}$$

$$TE = \$2,900 + \$700 + \$1,200 + \$200 = \$5,000$$

Thus, total expenditures decrease from \$5,000 to \$4,940. And if, at a given price level, total spending falls, so will aggregate demand. In other words, according to Keynes, aggregate demand could fall if saving increases. Of course, a classical economist would retort that as a result of a \$100 increase in saving, interest rates will fall enough to guarantee that investment will increase by \$100.

Keynes countered by saying that individuals save and invest for a host of reasons and that no single factor, such as the interest rate, links these activities. Furthermore, whereas the classical economists believed that saving and investment depend on the interest rate, Keynes believed that both saving and investment depend on a number of factors that may be far more influential than the interest rate. Keynes held that saving is more responsive to changes in income than to changes in the interest rate and that investment is more responsive to technological changes, business expectations, and innovations than to changes in the interest rate.

Consider the difference between Keynes and the classical economists on saving.

- The classical economists held that saving is directly related to the interest rate: As the interest rate goes up, saving rises; as the interest rate goes down, saving falls, *ceteris paribus*.
- Keynes thought this assumption might not always be true. Suppose individuals are saving for a certain goal—say, a retirement fund of \$100,000. They might save less per period at an interest rate of 10% than at an interest rate of 5% because a higher interest rate means that they can save less per period and still meet their goal by retirement. For example, if the interest rate is 5%, they need \$50,000 in savings to earn \$2,500 in interest income per year. If the interest rate is 10%, they need only \$25,000 in savings to earn \$2,500 in interest.

As for investment, Keynes believed that the interest rate is important in determining the level of investment, but not as important as other variables, such as the expected rate of profit on investment. Keynes argued that if business expectations are pessimistic, then much investment is unlikely, regardless of how low the interest rate is.

11.3.0 MEASUREMENT OF THE NATIONAL ECONOMY

A national economy is defined as the entire network of producers, distributors and consumers of goods and services in a nation. When we talk of the national economy, major interest is placed on the nation's level of productivity. A nation's productivity is also referred to as the Gross domestic product (GDP).

11.3.1 Definition of GDP

GDP is the total value of the current production of final goods and services within the country during a given period of time, normally a quarter or a year. An economy produces millions of different goods and services. For example, when you think about the different types of goods being produced in Uganda's economy, the list is endless. In order for us to know the size of our economy, we use GDP which sums up over all production of goods and services in a single numerical measure.

However, a problem arises when we try to sum up these goods and services because they are different. For example, if our economy was only producing cows, it would be easy for us to add up all the cows in the country and come up with a final number of cows as our GDP. However, since we produce many different types of goods and services, adding all the items requires us to express them in a common unit of measure, typically a monetary unit. In Uganda for example, GDP can be expressed as shillings value of production. The final goods and service are hence valued at market prices.

11.3.2 Measurement of GDP

GDP can be measured in three different ways;

1. Product approach (*also called value added method*),
2. income approach and
3. expenditure method

1. Product approach (Value added)

In this approach, we add up "value added" on output by all sectors per year. The value added by any producer is the value of his/her output minus the value of the inputs he/she used in producing a good. With this approach, GDP is computed by summing up the value added in each of the sectors of the economy. Examples of the sectors of the economy include: agriculture, manufacturing, services, mining etc. Let's use a simple agricultural example to explain the value-added approach. Think of a farmer producing beans on one acre of land, his value added will be the monetary value of the beans he/she harvests from the one acre minus the value/cost of inputs he used in growing the beans (e.g. land, fertilizer, manure, labour, pesticides etc). If this value added is summed for all farmers in Uganda, we obtain the GDP from agriculture; and if the same is done for each sector, the sum for all sectors gives Uganda's GDP.

2. Income approach

The income approach measures economic activity (GDP) by adding all income received by producers of output, including wages received by workers and profits received by owners of firms. This is the same as saying that the GDP is measured by adding up the incomes of all factors of production (labour + capital) that contribute to the production process. Labour is paid by wages while capital is paid by profits. When we account for the capital depreciation and indirect taxes, we get domestic income. Capital depreciation and indirect taxes are accounted for by subtracting them from GDP.

From the GDP obtained using this approach, we first subtract depreciation, which gives us the national domestic product (NDP) as shown in the equation below;

$$\text{GDP} - \text{Depreciation} = \text{NDP (Net domestic product)}$$

From the NDP, we then subtract indirect tax revenue to obtain the Domestic income as seen below; i.e., $\text{NDP} - \text{indirect tax revenue} = \text{Domestic Income}$

3. Expenditure method

In this method, GDP is measured as the sum of the expenditure (on final goods and services) in usually four sectors of the economy: (1) household, (2) business, (3) government, and (4) foreign. In each of these four sectors, economic actors buy goods and services; in other words, they spend. By sector, the expenditures are called, respectively, (1) consumption (C) by households; (2) gross private domestic investment, or simply investment (I) in the economy; (3) government consumption expenditures and gross investment, or simply government purchases (G); and (4) net exports or net sales for foreigners (NX). Going by the expenditure approach:

GDP = Household consumption + Investment + Government expenditure + Net exports Also written as: $GDP = P_C C + P_I I + P_G G + (P_X X - P_M M) \dots (1)$

This equation is called the **National Income accounts identity**. Because of the way the variables are defined, the above equation (1) must hold.

The terms in the equation above are explained below in detail.

Household consumption ($P_C C$): The market value of goods and services bought by the households, which include durable (e.g. cars, furniture) and non-durable goods (such as food, clothing etc).

Investment ($P_I I$): The market value of goods bought for future use. These can be business fixed investment (e.g. new plant or equipment), residential investment and/or inventory investment. The term investment is only used to refer to the new capital created and excludes transactions that are merely reallocation of assets. For example, if you bought a house from property masters, at individual level, you would have invested but the economy has not added on any new capital. On the other hand, if you build a house, the economy has created a new capital and this is included in the Investment expenditure.

Government expenditure ($P_G G$): The government's expenditure on the various goods and services it purchases. This category of expenditure includes expenditure on military equipment, road infrastructure and services that government workers provide. It excludes expenditure on transfer payments to individuals such as social security, pension and welfare.

Net exports ($(P_X X - P_M M)$): This is the value of net exports. It is equal to the market value of exports minus the market value of imports. It reflects trade with other countries.

Important things to note:

1. Expenditure that is not made in exchange of goods or services should not be included in the measurement of GDP when using expenditure approach. Examples include: money given to relatives, government funds spent on flood victims, assistance given to the needy by companies, etc.
2. We have looked at the three approaches that can be used to measure GDP. Whatever approach is used to measure GDP (*income, expenditure and value added*) the resulting GDP should be the same.

11.4.0 CALCULATING GDP

11.4.1 Adding goods and services

An economy produces many different goods and services e.g. bread, haircuts computers etc. which have different value. The national income accounts use market prices because the market prices reflect how much people are willing to pay for goods and services. For example if an economy produces three mangoes and two apples, we cannot add mangoes and apples and say GDP = 5 fruits. To capture the fact that these fruits have different values, we use the market prices. Thus, if the price of apples is Ush500/= @ and mangoes are Ush300/= @, the GDP = $(300 \times 3) + (500 \times 2)$ =Ush1900, instead of 5 fruits.

GDP measures the currently produced goods and services and does not include resale of used goods. For example, if Mukwano industries makes soap and sells it to a dry cleaner, the value of soap is included in GDP. However, if a vendor buys the soap from Mukwano and then sells it to a consumer, the resale reflects the transfer of an asset but not an addition to the economy's income. Therefore, in the GDP, we shall only include the sell of soap between Mukwano and the vendor. The resale of soap to the consumer is not included in the computation.

11.4.2 The treatment of inventories

It is obvious that not all goods produced in a particular year are bought up by the end of that year. As a result, the value of these goods has to be treated in a special way when calculating GDP. If goods produced in the current period are stored to be sold in the next period (*different accounting periods*), the stored goods are counted as inventories and included in GDP at the end of the current accounting period (*period when they were produced*). Since these goods are going to be sold in the next accounting period, the inventories will not be included in calculation of GDP for that period. This is because they are treated as used goods in the next period.

11.4.3 Intermediate goods and value added

Firms buy goods for use in their production process. For example, Mukwano buys sunflower for use in his manufacture of cooking oil. The question here is, “should both the value of sunflower and cooking oil be included in GDP calculation?” When computing GDP, the value of goods used in the production of the final good are not included in GDP measurement. This tells us that sunflower used by mukwano to produce cooking oil is not included but only the final goods (i.e. cooking oil) is included.

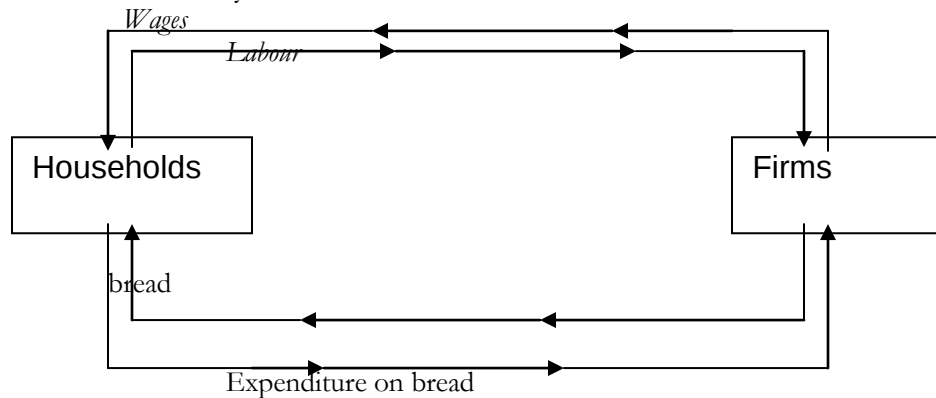
11.4.4. Housing services and imputations

Some goods and services do not have market prices because they are not sold in the market. For example, if a family hires a person through an advert placed in the Monitor newspaper to cook and clean for them, the service is counted in GDP. If family members perform the same tasks, however, their services are not counted in GDP. In the first case, a service is bought and sold for a price in a market setting. In the second case, it is not; no transaction takes place, and if it is to be included in the computation of GDP, we must use an estimate of their value. Such an estimate is called an imputed value, and in this case, we could use the value of what the family member would have earned if they worked outside the family. Imputations are also used to value services like security.

11.4.5 Concept of national accounting

To better understand the concept of GDP, we turn to the national income accounting system. This system is used to measure GDP and many related statistics. Imagine an economy that produces bread-using labour as the only input. Bread is produced by firms and labour supplied by households. Using the simple flow-chart below, we shall see how a real economy functions. Any economy has

economic actors (*i.e. household, Government and firms*) and the markets for goods and services, market for the factors of production and financial markets. Following the arrows in the flow chart above, you can see that firms sell bread to households while households sell their labour to firms. Households use income from their labour paid as wages to buy bread from firms. Firms use the revenue from the sell of bread to pay the households' wages and the remainder is profits, which they can also use to buy bread for themselves.



11.4.6 Limitations of GDP

Although GDP is used in measuring a country's economy, it has some limitations which include;

1. *Presence of an underground economy*: An underground economy is the part of the economy which people hide from the government because they want to avoid taxes or because the activity is illegal. Take an example of "*marijuana business*" or prostitution etc. Sellers of such goods and services can never declare their businesses and because of that, income from these activities will always be left out of GDP calculations. The value of many goods and services are also not captured although income is flowing in the economy. Also, in many developing countries like Uganda, many goods and services are produced and consumed at home; and these are never included in GDP. Because of these limitations, GDP is an imperfect measure of economic activity.
2. *GDP computations exclude leisure*: Leisure is considered to be an important good although it is not included in GDP calculation. Look at it this way, if people work for more hours in week (less leisure), the GDP value may be higher although their lives will be worse off because generally, leisure is a good and work is a "bad". Leisure is a good in much the same way that cars, houses, and shoes are goods. But leisure is not counted in GDP because it is too difficult to quantify.

11.5.0 GNP AS A MEASURE OF THE NATIONAL ECONOMY

For a country like Uganda with many foreign investors, our GDP includes income earned by both national and non nationals. We should not forget that there are many Ugandans abroad who earn income through professional jobs and non professional jobs ('kyeyo') and bring the money back to Uganda. This income is not included in GDP measurement. To overcome this shortcoming in measurement for the national economy, a more precise alternative measure is used. This measure is known as the gross national product (GNP).

11.5.1 Gross National product (GNP)

GNP measures the total income earned by nationals in a given period of time. In a closed economy, $GDP = GNP$. A closed economy is one that is not involved in trade or flow of capital to and from the rest of the world while an open economy is one that is involved in trade or capital flow. Uganda is an open economy. In an open economy like Uganda:

$GNP = GDP + \text{factors payment from abroad} - \text{factor payments to abroad}$. In all economies, some factors of production (labour and capital) are owned by foreigners (factor payments to abroad). At the same time, domestic residents who earn income from abroad contribute to the factor payments from abroad. While GDP measures the income of factors of production within the nation's boundaries, irrespective of who earns it, GNP measures the income of residents of the economy no matter whether the income is earned in domestic production or foreign production.

$GNP = GDP + NFP \dots\dots\dots(2)$

This equation breaks down GNP into GDP and Net Foreign Product (NFP= factors payment from abroad - factor payments to abroad). Remember that factors of production are paid with profits in the case of capital and wages in the case of labour. For example, profits that investors like Sudhir and Madhvani get make up factor payments to abroad while the wages that Ugandans working in United Arab Emirates get make up factor payments from abroad.

A country's level of GNP per capita (*GNP divided by the number of citizens residing in country at a given point in time*) is the most commonly used yard stick of economic development. The question is "does GNP perfectly measure economic well-being?" GNP per capita conveys a lot of information about the economic well-being. For example, countries with a high GNP also have high levels of personal consumption, education, less mortality rates etc; and thus well-being.

11.5.2 Limitations of using GNP as a measure for the national economy

Like GDP, GNP has limitation as a measure of economic well being. Its three fundamental weaknesses:

1. Measuring output at market prices can lead to underestimation or over estimation of GNP. GNP measures output at market prices but excludes output measured by social value. Consequently, there are goods and services that are not counted in the official GNP value. For example, work that is done at home, barter exchange, etc., is not considered in the computation of GNP. For this reason, the official GNP statistics underestimate the actual income of the economy. There are also goods whose market value overstates their true social value hence overestimating the GNP. For example, think of a new power plant that produces electricity. This power plant also produces pollution which has a social cost. The true social value of this plant would be the market value of the electricity minus the social cost of pollution.
2. Using GNP to measure well being ignores the issue of price levels in the country. For example, assume that there are two countries with the same GNP but in one country, the prices are lower. The GNP values tells us that the economic well being is the same, but in reality, the economic well being will be higher in the country where prices are low compared to the country where prices are high. This is because one unit of dollar will buy more goods/services in a country with lower prices.
3. Another source of inaccuracy of GNP as a measure for the economy is its inability to account for income inequality in an economy. The GNP value doesn't consider the fact that

in a country like Uganda, most of the income is in the hands of a small fraction of the population.

11.5.3. Rationale for measuring the National Economy

1. National policy analysis: For example, policies on employment can be made based on the computed level of output, investment, etc
2. Periodic measurements of the national economy provides a data set on important variables such as national income, savings, consumption patterns that are used in economic and social research
3. It gives an insight into the standard of living of the people in that economy. Per capita income for different periods is a good indicator of improvements or decline in the standard of living over time
4. National income statistics also show the distribution of income among various sectors of the economy. Namely: the households, business and the government sectors. Such information is important for planning taxation and government expenditure
5. Figures of imports and exports give useful information on the level of international transactions and thus the extent to which the country depends on other economies
6. National income statistics show expenditure patterns which is important in the making of the national budget
7. The statistics are useful in comparisons of the country's performance over time or between the country's regions. With information on regional performance, leaders are able to plan for the development of the backward regions
8. The statistics show the rate of resource utilization. The increase in national income may be the result of increased utilization of national resource.

11.6.0 THE NATIONAL BUDGET

All people in one way or another and at some point in their lives go through the process of making a budget. This could be for household needs, school requirements, graduation party, wedding, funeral etc. Nations also have budgets and these are very important in national development.

11.6.1 What is a national budget?

A budget is a statement (an account) outlining anticipated government receipts and payments as well as measures proposed to be taken in the forthcoming year. In Uganda, it is presented annually by the Minister of Finance and Economic Planning.

11.6.2 Components of the national budget

Every budget is made up of two important sections: the revenue and expenditure. The budget that government prepares every year shows its revenue and expenditure in that year. Expenditure specifies what the government intends to do or how income will be spent while revenue specifies the sources of income to be spent. If the revenue is less than expenditure, the government borrows to finance the budget. In such a case, we say that government is running a budget deficit. On the other hand, if the revenue is greater than the expenditure, then the government is running a budget surplus. In case of revenue being greater than expenditure, the government will lend extra income to those who need it. A government runs a balanced budget when the revenue is equal to the expenditure. The budget can also be classified as a development budget when the measures

proposed are for long-term developments or recurrent budget if proposed measures are for short-term revenue and expenditure.

Sources of revenue

The two most important sources of revenue to the government include taxes and profits:

1. Taxes

The most important source of public revenue is the taxes levied on the economy. These taxes can be divided into three broad categories:

- i. Income taxes charged on individuals and corporations, such as pay as you earn (PAYE) for individuals and income for corporations
- ii. Expenditure taxes include sales taxes, excise taxes and import tariff. When you import a car for example, you are charged an import tariff when the car crosses into Ugandan
- iii. Property taxes (i.e. taxes levied on houses, buildings, agricultural and residential land and inheritances).
- iv. Value Added Tax (VAT) which is a *tax* applied to the *value added at each stage of production or the value chain*. The value added is the difference between what a producer sells a (final) good for and what it pays for an (intermediate) good.

VAT Illustration: Suppose a farmer finds a wheat seed by the roadside, picks it and plants it. After some time, wheat appears. The farmer harvests the wheat and sells it to a baker for \$1. The value added is \$1.00.

- The farmer sells the wheat to the baker for \$1.00.
- The farmer doesn't buy any intermediate goods (so intermediate goods "purchased" = \$0.00).
- Value added = \$1.00 - \$0.00 = \$1.00.
- Dollar amount kept by farmer = \$1.00.

The baker, who has purchased wheat, turns it into a loaf of bread, which he sells to a (final) consumer for \$1.40. The value added is \$0.40.

- The baker sells the loaf of bread to a consumer for \$1.40.
- The baker bought the wheat (the intermediate good) from the farmer for \$1.00.
- Value added = \$1.40 - \$1.00 = \$0.40.
- Dollar amount kept by baker = \$0.40.

Notice two things:

1. The sum of the values added (\$1.00 + \$0.40) is equal to the price paid by the final consumer for the loaf of bread (\$1.40).

2. The value added at each stage of production is equal to the dollar amount kept by the farmer and baker. For instance, the value added by the farmer was \$1.00, and this is the amount he kept.

VAT is a *tax* applied to the *value added at each stage of production*. Suppose the VAT rate is 10 percent. A VAT rate of 10 percent applied to the \$1.00 value added by the farmer is \$0.10. A VAT tax rate of 10 percent applied to the \$0.40 value added by the baker is \$0.04. The total VAT ends up being \$0.14.

Taxes levied on individuals' income and business firms are called direct taxes. Examples are income and property taxes. On the other hand, sales taxes and trade tariff that are charged on commodities are called indirect taxes. In developing countries like Uganda, most taxes are indirect. This is because it is easier to collect indirect taxes than it is to collect those charged on individuals. The problem with this tax structure is that those paid by the poor represent a higher proportion of their own income compared to those paid by the rich. This happens because a large part of the poor people's income is spent on consumption commodities.

2. *Profits from the sell of goods and services in the state owned companies*

In the previous years, companies like Uganda electricity board (UEB), Coffee Marketing Board (CMB), Uganda Commercial Bank (UCB) and many others used to be a source of revenue to the government. However, over the past years, Uganda has sold most of them and this source of revenue is currently less important to the government. Revenue from government companies is still important in countries like Ethiopia where we find that the Ethiopian Airlines is one of the largest revenue earners for the country. In Kenya, government businesses like Kenya Airways are still important.

Expenditure

Various items are included in the budget's expenditure section. These include:

- 1) *Consumption (G)*: This includes wages to the public workers and goods for the government current consumption (such as car maintenance, paying rent etc). The government also buys guns and services for its employees. In most countries, weapons accounts for the biggest share of the government expenditure.
- 2) *Investment (I)*: This includes expenditure on capital goods. These are goods used in the production of other goods and services. An example of such goods are roads.
- 3) *Transfers to the private sector (Tr)*: These expenditures include pension, unemployment insurance (in some countries), etc. A few years ago, the Ugandan government introduced a transfer of 25,000/= per month to the elderly people (above 60 years of age)
- 4) *Interest to the public debtor (rD)*: As mentioned earlier, governments resort to borrowing when their expenditure is higher than revenue. The loans a government gets are paid back with interest at the end of the loan period. This interest is also considered a part of government expenditure.

11.6.3 The role of a national budget in national economy

- The budget specifies in details the different types of taxes and therefore serves as a guide in taxation
- The budget is also a national plan on how, where and how much government spends on goods and services. It guides officials who direct government expenditure and serves as a reference for accountability
- The budget acts as a fiscal tool since it defines the taxation policies which are important fiscal policies.
- The budget is an incentive to work and an encouragement to foreign donors. For example, if public workers learn that wages are going to be raised, they will be more enthusiastic in their work which increases productivity
- The budget explains the revenue and expenditure of the previous year and hence gives an accountability of the previous budget

11.7.0. INTRODUCTION TO MONETARY ECONOMICS

11.7.1 Definition of money

To a layperson, the words *income*, *credit*, and *wealth* are used synonymously with *money*. In each of the three sentences below, the word *money* is used incorrectly; the word in parentheses is the word an economist would use.

1. How much money (income) did you earn last year?
2. Most of her money (wealth) is tied up in real estate.
3. It sure is difficult to get money (credit) in today's tight mortgage market.

In economics, the words *money*, *income*, *credit*, and *wealth* are not synonyms. The most general definition of **money** is any good that is widely accepted for purposes of exchange (payment for goods and services) and the repayment of debt. To an economist, money is that kind of good that you can use immediately to buy things because others will accept it as payment.

11.7.2 Functions of money

We can summarise the functions of money in 3 ways, namely:

1. Medium of exchange,
2. Store of value and
3. As a unit of account

1) *A medium of exchange*: The most important function of money is to serve as a medium of exchange because it speeds up transactions by removing the problem associated with barter exchange: **coincidence of wants** (*i.e. the necessity of I wanting what you offer and you wanting what I offer, before we can exchange our products*). If socially accepted, every person is willing to accept money in payment, rather than goods and services. In short, money increases trade and makes it more efficient by providing a much more convenient method of exchange or sharing of goods and services than the cumbersome barter trade system.

To understand this function, try to imagine an economy without the social convention of money. In our world all you need to carry out a market transaction (*whether you want to buy or sell some good or service*) is to either have money (*if you want to buy*) or for the purchaser to have money (*if you want to sell*). In a barter (exchange) economy, market exchange would require the so-called *coincidence of wants*. By coincidence of wants, we mean that you would have to physically possess the goods or services that the other person wants and he/she would also have to physically possess the goods or services that you want for the exchange to take place.

The example below illustrates how remarkably complicated finding consumption goods to quickly satisfy the coincidence of wants would get. Without money, an extraordinary amount of time and energy would be spent simply arranging the goods one needed to trade.

Coincidence of wants Illustration:

Imagine a farmer who has a cow and wants to exchange it for goats. For this to happen, he has to find someone that is interested in a cow and willing to exchange it for 3 goats which this farmer finds acceptable. After a long search however, the cow owner finds no one ready to do such a switch and only gets a deal from another trader who is only prepared to give 2 goats and 3 chickens in exchange. The cow owner is left with two options; he/she will either broaden his/her search for a satisfactory exchange, or settle for the lesser deal which is 2 goats and 3 chickens. You can see that a lot of time is wasted in barter trade and if the exchange actually occurs, one of the traders is left discontented sometimes. This justifies the need for a universally accepted medium of exchange like money.

2) *Money is a unit of account:* Money provides a common measurement of the relative value of goods and services. Just as we measure weight in kilograms or height in feet, the values of goods and services are expressed in terms of money. In Uganda, prices and wages are expressed in shillings, the unit of account.

3) *Money as a store of value:* Store of value is the ability of money to hold value over time, depending on what is socially agreed upon as money (there are different types of money). “*Money acts as a store of wealth, i.e. it is a useful mechanism for transforming income in the present into future purchases*”. This function is most important when there is no inflation (*high price increase*). If there is inflation, the value stored will be affected by the rate of inflation.

11.8.0 TYPES OF MONEY, DEMAND AND SUPPLY OF MONEY

11.8.1 Types of money

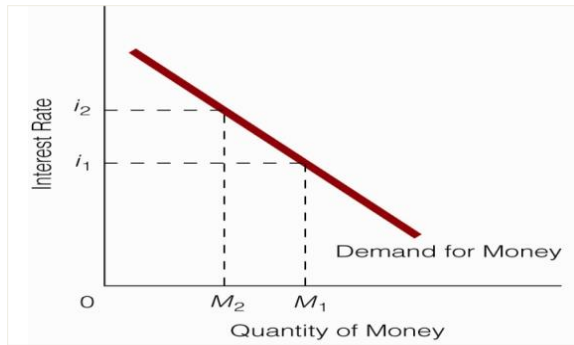
In Uganda, we have three major types of money;

1. Coin and currency, which is the most commonly used type of money for payment for goods and services in Uganda, transferred by handing the cash over to the seller.
2. Cheque account balances, transferred by writing a cheque which some people will accept as payment for goods and services.
3. Other assets like savings account balances held in banks can be turned into cash or demand deposits nearly instantaneously, risklessly, and costlessly.

11.8.2 Money demand and supply

Like all markets, the money market has two sides: a demand side and a supply side. Figure 1 below illustrates the **demand for money (balances)**, where the price of holding money balances is on the vertical axis, and the quantity of money is on the horizontal axis. The price of holding money balances—specifically, the opportunity cost of holding money—is the interest rate. By holding money, individuals forfeit the opportunity to hold that portion of their wealth in other forms. For example, the person who holds \$1,000 in cash gives up the opportunity to purchase a \$1,000 asset that yields interest (e.g., a bond). Thus the interest rate is the opportunity cost of holding money. A person can be described as “paying the price” of forfeited interest by holding money. Figure 3 shows that as the interest rate increases, the opportunity cost of holding money increases, and individuals choose to hold less money. As the interest rate decreases, the opportunity cost of holding money decreases, and individuals choose to hold more money.

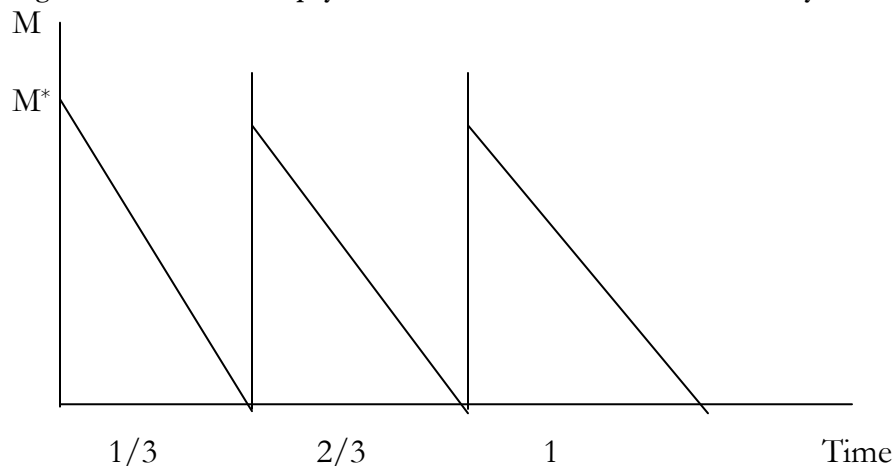
Figure 3: Demand for Money



People have *demand* for money just as they have demand for any other good. They want to hold a certain amount of wealth in the form of readily-spendable purchasing power because money is useful. The more money you have at hand, the easier it is to buy things. Too little money makes living one's life pointlessly difficult. You have to waste time running to the bank for extra cash or waste energy and time converting your assets into cash before you can carry out your normal daily transactions. On the other hand, you don't want to have too much of your wealth in the form of readily spendable purchasing power. Cash sitting in your pocket is not earning interest at the bank. Wealth you will not want to spend for a given period could earn a high return by being deposited in a bank or invested in the stock market than sitting in your house. Therefore, while it is costly to go to the bank to withdrawal money, it is also costly to hold much of your wealth in form of cash (opportunity cost). Therefore the individual must balance the opportunity cost (*what they would have gained if the money earned interest in the bank*) of holding money against the transaction cost of frequently going to the bank to withdrawal money every time they desire to buy something.

To understand this idea, suppose that a household earns income whose nominal value is PQ per month and these earnings are deposited automatically at the beginning of each period in an interest bearing savings account. If the household's expenditure sums up to PQ in a month and it can only use non-interest bearing money to make purchases. Let the fixed cost of withdrawing each time be P_b . This cost represents the time and expenses of actually going to the bank. Suppose that M^* is the amount of money withdrawn every time the household goes to the bank; and suppose the household visits the bank 3 times a month, each time withdrawing enough money for 10 days. Figure 4 below illustrates this household's demand for money in a month.

Figure 4: Stream of Cash payments and transactions demand for money



The total demand for money in a month is the total area of the three triangles. Each triangle has a base of $1/3$ and height of M^*

$$\text{Total area} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \left[\frac{1}{3} + \frac{1}{3} + \frac{1}{3} \right] M^* = \frac{M^*}{2}$$

Average money holding (demand for money) during a month is $\frac{M^*}{2}$. The number of trips to the bank is $\frac{PQ}{M^*}$. Where by PQ is the total amount of money earned per month and as indicated earlier, M^* is the amount of money picked on each trip. With a fixed cost of withdrawal of P_b , the total cost of withdrawing in a month from the bank is the number of trips made to withdraw money multiplied by the cost of withdrawing on each trip. This is equal to $P_b \frac{PQ}{M^*}$. The opportunity cost of holding money instead of banking it is the interest the household would earn for the money they hold per month in the bank. This is equal to $i(\frac{M^*}{2})$. If $i(\frac{M^*}{2}) > P_b \frac{PQ}{M^*}$, it makes economic sense to leave half of the money in the bank and withdraw it when you need it; and the converse is true.

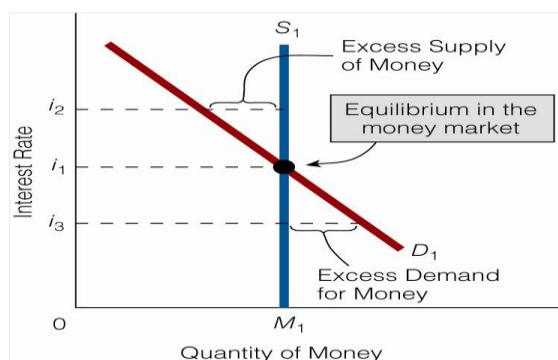
Figure 5 below shows the supply of money as a vertical line at the quantity of money that is largely (but not exclusively) determined by the Central Bank. However, the money supply is largely but not exclusively determined by the Central Bank because both commercial banks and the public are important players in the money supply process. For example, when banks do not lend their entire excess reserves, the money supply is not as large as it is when they do. Or when people keep “their stolen money” in their houses as is common in Uganda for fear of being investigated, the money supply in the economy will not be as large as it would otherwise be if they kept the money in banks.

Figure 5: Supply for Money



The money market is in equilibrium when the quantity demanded of money equals the quantity supplied. In Figure 6 below, equilibrium exists at the interest rate i_1 .

Figure 6: Equilibrium in the Money Market



At a higher interest rate, i_2 , the quantity supplied of money is greater than the quantity demanded, and there is an excess supply of money ("too much" money). At a lower interest rate, i_3 , the quantity demanded of money is greater than the quantity supplied, and there is an excess demand for money ("too little" money). Only at i_1 are the quantity demanded and the quantity supplied of money equal. At i_1 , there are no shortages or surpluses of money and no excess demands or excess supplies. Individuals are holding the amounts of money they want to hold.

11.8.3 More about Money Supply

Money supply is the quantity of money available in an economy. There are two official measures of money supply in the economy, namely; $M1$ and $M2$. The narrowest, sometimes called "transactions money," is $M1$.

1) $M1$: $M1$ sometimes called "transactions money". It consists of currency held outside banks (by members of the public for use in everyday transactions), checkable deposits, and traveler's checks. $M1 = \text{currency} + \text{cheque account deposits} + \text{travellers' checks}$

- Currency - This is the sum of paper money and coins.
- Cheque account deposits – These are deposits on which checks can be written. If a person has cheque deposits with a bank, they can always write cheques to make payments for goods and services they want to purchase.
- Travellers' cheques - These are offered by financial institutions and they act as cash but are protected against loss or theft. Traveller's cheques can be used to make payments even outside one's home country, since the financial institution that issued the cheque guarantees payments to the individual or business that receives them (*as long as they are correctly signed*).

All the three components of $M1$ are money in our usual understanding of the term since they can be directly used to pay for goods and services. We can therefore say that $M1$ measures purchasing power immediately available to the public without borrowing or having to give notice. In summary, $M1$ is the aggregate of currency plus any method to convert money deposits to currency when needed. Such money deposits include bank accounts.

Where Do Credit Cards Fit In?

A credit card is commonly referred to as plastic money, **but it is not money**. A credit card is an instrument or a document that makes it easier for the holder to obtain a loan. When Tina hands the Games Store Cashier her MasterCard or Visa, she is, in effect, spending someone else's money. The Game submits the claim to the bank which gave Tina the Credit Card, the bank pays Game, and then the bank bills Tina. By using her credit card, Tina spends someone else's money, and she ultimately must repay her credit card debt with money.

2) *M2*: M2 is much larger and broader than M1. It is made of all M1 components plus savings deposits, time deposits (small certificate of deposits), money-market mutual funds (MMF's) and money-market deposit accounts (MMDA's).

$M2 = \text{currency} + \text{cheque account deposits} + \text{travellers' checks} + \text{Savings deposits} + \text{Small CD's (time deposits)} + \text{money-market mutual funds (MMF's)} + \text{money-market deposit accounts (MMDA's)}$

The unknown terms in M2 above are defined as;

- Savings deposits - Accounts that pay interest and can be withdrawn on as a customer demands. They liked for the ease with which you can obtain the cash (liquidity) and superior interest rates compared to cheque account deposits. For money to be invested over long periods however, time deposits which give higher interest rates are preferred.
- Small certificates of deposit (time deposits) - This is money deposited at a financial institution and can not be withdrawn for a certain period of time. At the end of the period, the customer is given an interest. The longer the period, the better the interest.
- Money-market deposit accounts (MMDA's) - Money market deposit accounts are accounts which offer interest to account holders but the interest depends on the prevailing interest rate in the money market. Large sums of money are needed for one to participate in the money market, meaning few individual investors are able to participate in the money market. As compared to the cheque account deposits, cheque writing transactions in this type of accounts are limited.
- Money-market mutual funds (MMF's) - Since individuals find it difficult to directly participate in the money market for the reason mentioned above, buying shares of a money market mutual fund is one way of going around this. MMF act by pooling the resources of individual investors and investing them in money market instruments. Gains from the investment are redistributed to the shareholders in the MMF after costs incurred have been subtracted. Like the MMDA's, MMF's have limited cheque writing transactions.

11.9.0 HOW MONEY SUPPLY IS CREATED

11.9.1 How is money supply created by the Central Bank?

The amount of money flowing into the economy can be controlled by Central banks, such as the Bank of Uganda. Central banks create money supply by either buying or selling securities like treasury bills and bonds. A security is a document indicating ownership. It shows the amount of money owed to you, the period of time for which it will be held and the interest rate payment offered.

- *Treasury bill*- It is a security with maturity period ranging from one to six months. Central banks sell treasury bills when they want to reduce money supply in the economy. The buyers give the central bank money in exchange for the document for a stated time period. At the end of the period, the central bank buys back the treasury bill at its face value with interest to the party involved. By buying back the treasury bill, it increases money supply in the economy.
- *Treasury bond*- A treasury bond works in the same way as a treasury bill and the only difference is that it is more long term and you receive the interest payments regularly. **Treasury bonds** are always issued in 30-year terms and pay interest every six months. However, **you don't have to hold the bond** for the full 30 years; **you can** sell it anytime after the first 45 days. If the central bank sells it, money supply decreases and if it buys it back money supply increases in the economy.

11.9.2 How is money supply created by the Private Commercial Banks

Activities of private banks such as commercial banks can also control money supply through their activities to lend and accept deposits. To understand how the private banks create money supply, first imagine a world without banks. In such a world money only takes the form of currency, such that $M1 = \text{Currency}$ since there is nothing like depositing. Now introduce banks. First suppose that banks accept deposits but do not give loans. Deposits received by banks but have not been lent out are called reserves. This is called **100% reserve banking**. If all households deposit all their money in banks, money supply remains unchanged. Now consider that banks can lend out part of their deposits to other users and keep 20% of the deposits as reserve. This is called **fractional banking**. The bank's balance sheet looks like this in summary:

Assets	Liabilities
Reserve (20%)	Deposits (100%)
Loan (80%)	

The reserve and loans are considered assets because they are of economic value and are owned by the bank. Remember that reserve refers to the money that banks have received from depositors but have not used it to make loans. Deposits by customers are liabilities to banks since they are supposed to give the money back to customers whenever they need it. Suppose that the initial deposit in the bank was Ush100,000/= by all the customers, The money supply = Currency (given as loans) + deposit (*available for withdrawal by account holders depending on account type*)

Currency = $\text{Ush}100,000 \times 80\% = \text{shs}80,000$ (*the 80% given as loans is already in supply within the economy, so it is currency*)

Deposit = Ush100,000. Therefore, money supply = $(100,000 + 80,000) = \text{Ush}180,000$.

You can see that if the commercial banks adjust the fraction of the deposits given as loans, money supply in the economy will change. An increase in the loan fraction will increase money supply while a decrease in the loan fraction will decrease money supply. For example, increasing the fraction to be given as loans from 80% to 90% will increase money supply from Ush180,000/= to Ush190,000/= while decreasing the loan fraction from 80% to 60% will decrease money supply from Ush180,000/= to Ush160,000/=. If banks were not giving loans, money supply would remain constant.

11.10.0 HOW MONEY SUPPLY IS RELATED TO INFLATION AND INTEREST RATE

Inflation rate measures how fast prices are rising in the economy. There is a strong relationship between inflation rate and money supply; and between money supply and interest rate—the proportion of a loan that is charged as a fee to the borrower, typically expressed as an annual percentage of the loan outstanding. The concept of interest rate is pretty easy to understand. If you had borrowed money from a bank, you would return the borrowed amount plus an extra fee which is called the interest. Interest rate therefore measures the cost of borrowing per year as a percentage of the amount that has been loaned.

11.10.1 Relationship between money supply and inflation

You recall from the lecture on markets that demand for goods must balance with the supply of goods for equilibrium to exist. If supply is greater than demand (surplus), prices would decrease and if demand is greater than supply (shortage), prices would increase to restore equilibrium. Just like the goods market, money demand must balance with money supply in the money market.

To understand the relationship between money supply and inflation, assume that there is an increase in the money supply. In a country like Uganda, when money supply increases, households will find themselves with the excess money available to them to carry out more purchases that they demand. Since there is an increase in demand for goods due to the increase in money supply, prices will increase and a unit of a good will cost more than it cost before. This will increase people's demand for money until the demand is equal to the supply of money.

Figure 7: Money supply and inflation

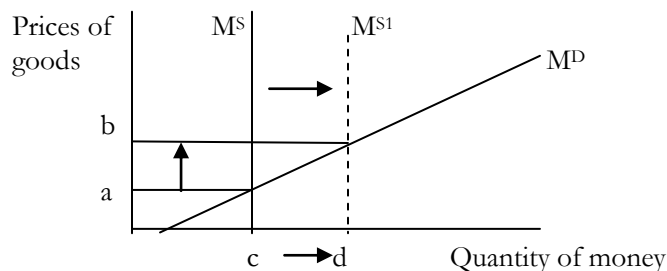


Figure 7 looks at changes in prices in relation to money supply and demand. Since money supply is determined by Central Bank and Commercial Banks and not related to price of goods, it is perfectly inelastic—a change in prices of goods has no effect on money supply. However, money demand is related to price of goods and services from theory of money demand (*increase in prices increases demand for money*).

Initially, equilibrium between money demand and supply curve occurred at price a . An increase in money supply from M^S to M^{S1} is equivalent to a shift in the money supply curve (M^S) to the right as indicated by the arrow. Therefore, a shift of the money supply curve to the right brings about an increase in prices from point a to point b and consequently, a rise in quantity if money demanded from point c to point d . Equilibrium in the money market is now occurring at a higher price level b . This means that increase in money supply results in increase in price levels and hence inflation. Here it is assumed that interest rate is fixed.

11.10.2 Relationship between money supply and interest rates

Money supply also affects interest rates. Suppose that the central bank increases money supply probably by buying back treasury bonds, if the prices remain fixed, households will find themselves with excess money than they need for their purchases. These households may tend to deposit excess money in the banks and this will lower interest rates given. On the contrary, if money supply decreases through the central bank selling bonds, households will withdraw more money from the bank and this will raise interest rates. Remember that money given as loans comes from the deposits made in the banks. Therefore, if deposits are more, banks will encourage people to borrow more money by lowering the interest rate, but if deposits are less, banks offer less loans so they will control the number of borrowers by raising the interest rate. This shows that a loan is like any other good on the market i.e. when less money is available for loans (less goods), banks (producers)

raise the interest rate (price of the good). The opposite is true when more money is available for loans.

11.11.0 TOOLS FOR REGULATING THE NATIONAL ECONOMY

You recall three critical economic variables in every economy that need to be stabilized to avoid social tension and a disruption in society. These include inflation, unemployment and economic growth (measured by GDP). The government is responsible for maintaining the stability of these three variables by regulating the behaviour of firms and households in the private sector, using various tools. Regulating the economy improves the efficiency with which society's resources are assigned and it helps in altering the distribution of income in the economy.

11.11.1 Tools for regulating a national economy

There are three major instruments that the government uses;

- Fiscal policy- It concerns the patterns of government spending, taxation and borrowing decisions of the public sector.
- Monetary policy- These are policies for managing the interest rates and credit conditions through regulating the money supply. Monetary policy also manages the exchange rate and affects trade and flow of capital.
- Incomes policies- These are programs that directly/indirectly affect wages and prices. The goal is to control inflation without incurring the high costs of recessions (decline in economic productivity) and unemployment.

11.11.2 Fiscal policy as a tool for regulating national economy

A major way government can regulate the economy is through its *fiscal policy*. **Fiscal policy** consists of changes in government expenditures and/or taxes to achieve economic goals, such as low unemployment, price stability (inflation), and economic growth. You recall that the biggest proportion of the government revenue is taxes paid by households or business firms. When households pay part of their income to the government in form of taxes, what they are left with for their consumption is called *disposable income*. This implies that the government can increase national income by decreasing its expenditure or reducing taxes. If the government wants to decrease national income, it will do the opposite i.e. increase its expenditure or increase taxes.

Some Relevant Fiscal Policy Terms

Expansionary fiscal policy consists of increases in government expenditures and/or decreases in taxes to achieve macroeconomic goals. **Contractionary fiscal policy** is implemented through decreases in government expenditures and/or increases in taxes to achieve these goals.

- *Expansionary Fiscal Policy*. Government expenditures are up and/or taxes are down.
- *Contractionary Fiscal Policy*. Government expenditures are down and/or taxes are up.

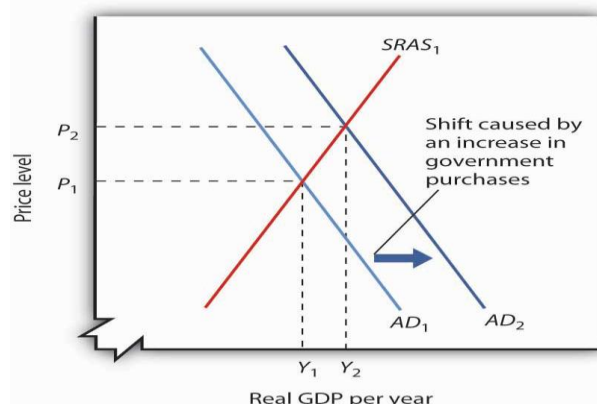
When deliberate government actions bring about changes in its expenditures and taxes, fiscal policy is said to be *discretionary*. For example, a decision by Parliament to increase government spending by, say, Ush10 trillion in an attempt to lower the unemployment rate is an act of **discretionary fiscal policy**. In contrast, a change in either government expenditures or in taxes that occurs automatically in response to economic events is referred to as **automatic fiscal policy**. To illustrate, suppose Real

GDP in the economy turns down, causing more people to become unemployed and, as a result, automatically receive unemployment benefits. These added unemployment benefits automatically boost government spending.

Demand-Side Fiscal Policy

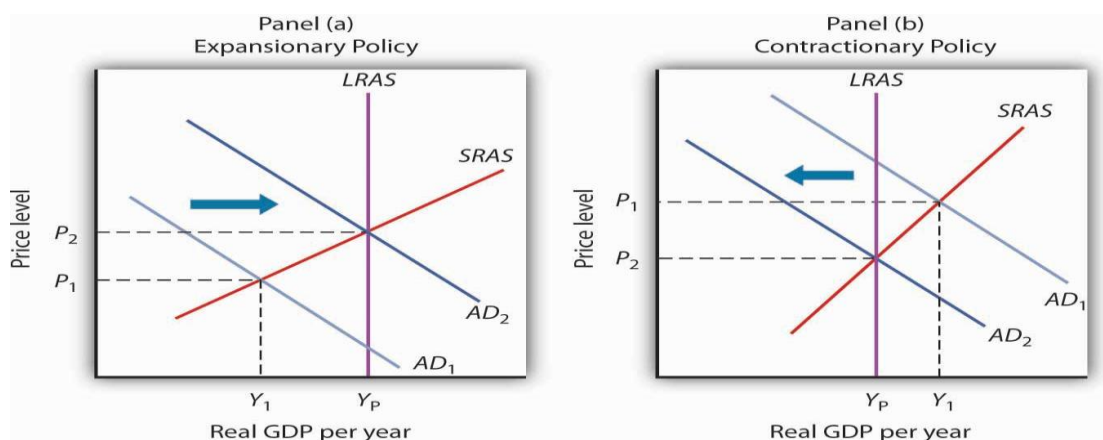
How do changes in government purchases (G) and taxes (T) affect aggregate demand? Recall that a change in consumption, investment, government purchases, or net exports can change aggregate demand and therefore shift the AD curve. For example, an increase in government purchases (G) increases aggregate demand and shifts the AD curve to the right. (see Figure 8 below)

Figure 8: Effect of increase in government purchases on Aggregate Demand



A decrease in G decreases aggregate demand and shifts the AD curve to the left. A change in taxes (T) can affect consumption, investment, or both, and they therefore can affect aggregate demand. For example, a decrease in income taxes increases disposable (after-tax) income, permitting individuals to increase their consumption. As consumption rises, the AD curve shifts to the right. An increase in taxes decreases disposable income, lowers consumption, and shifts the AD curve to the left.

Figure 9: Effect of Expansionary and Contractionary Fiscal Policies



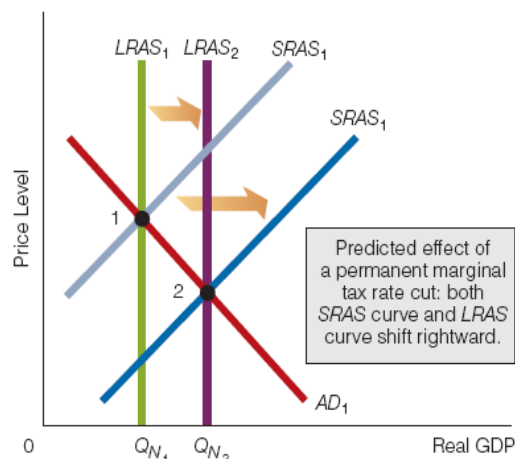
Supply-Side Fiscal Policy

Fiscal policy effects may be felt on the supply side as well as on the demand side of the economy. For example, a reduction in tax rates may alter an individual's incentive to work and produce, thus altering aggregate supply. When fiscal policy measures affect tax rates, they may affect both aggregate supply and aggregate demand. Consider a reduction in an individual's marginal tax rate.

The **marginal (income) tax rate** is equal to the change in a person's tax payment divided by the change in the person's taxable income.

$$\text{Marginal Tax Rate} = \frac{\Delta \text{Tax Payment}}{\Delta \text{Taxable Income}}$$

Figure 10: Effect of Marginal Tax Rate on Aggregate Supply



For example, if Serena's taxable income increases by USh 100,000 and her tax payment increases by Ush28,000, her marginal tax rate is 28%. If her taxable income increases by USh 100,000 and her tax payment increases by Ush35,000 then her marginal tax rate is 35%. All other things held constant, lower marginal tax rates increase the incentive to engage in productive activities (work) relative to leisure and tax-avoidance activities. As resources shift from leisure to work, short-run aggregate supply increases. When the lower marginal tax rates are permanent (not a one-shot phenomenon), most economists predict that not only the short-run aggregate supply curve but also the long-run aggregate supply curve will shift rightward. Figure 10 illustrates the predicted effect of a permanent marginal tax rate cut on aggregate supply.

Fiscal Policy and Expectations

Even if, when tax rates are lowered, people do not work more and produce more, it cannot necessarily be said that lower tax rates do not stimulate work and production. Consider two different settings. In setting 1, income tax rates are lowered in year 1 with no further cuts expected in future years. In setting 2, income tax rates are lowered in year 1 with further cuts expected in future years. In setting 1, suppose tax cuts are implemented, and individuals don't respond by working more and producing more. Then we could confidently say, all other things being equal, that lower tax rates do not seem to stimulate work and production. But in setting 2, suppose tax cuts are implemented, and individuals don't respond immediately by working more and producing more. We should not conclude that lower tax rates don't stimulate work and production because the tax rates in year 1 are relatively higher than the tax rates expected in future years (such as years 2, 3, and so on). In other words, although the tax cut in year 1 reduced tax rates, the tax rate is still higher in year 1 than it will be in years 2, 3, and 4. People may simply be waiting for tax rates to go down more before they start working more and producing more (and thus earning more income on which to pay taxes).

Now look at the opposite condition: raising tax rates. Raising tax rates should lead to individuals' cutting back on work and production, but this effect isn't necessarily predicted if tax rates are expected to rise more in future years. In fact, raising the tax rate in year 1, with an expected tax rate

hike to follow in year 2, could actually get people to work and produce more in year 1. In relative terms, the tax rate is lower in year 1 than it will be in year 2.

Macroeconomic analysis makes the following predictions regarding the use of the fiscal policy:

(1) A policy to increase government expenditure or reduce taxation could act by reducing unemployment but also increasing the inflation rate. Reduction in taxes or increase in government expenditure means more income available for household consumption (disposable income), which translates into higher demand for final consumption goods. The production sector responds to the increase in demand by expanding the production, which increases the demand for inputs including labour. Prices also tend to increase when demand for goods increases. However, the extent of rise in prices (inflation) depends on the existing level of unemployment. If the level of unemployment is low, firms may not be able to meet the increased demand for labour, so supply of output would increase by a small proportion. Since the demand for output is still higher than the output that firms can produce, inflation rate will be higher. On the contrary, if the initial level of unemployment was high, the increased demand for labour would be met and output supply would increase by a satisfactory level. The fiscal policy would create a lower increase in price levels (inflation) in such a case since supply for goods balances the increased demand for the goods.

(2) Fiscal policy can be used to control inflation by reducing government expenditure or increasing taxation. This reduces disposable income and consequently lowers demand for goods and services leading to a fall in price levels. However, for inflation to fall to desired levels it is required that a fiscal policy change causes a very large reduction in national income and an increase in unemployment which act to reduce bargaining power of workers and ability of firms to increase prices. If the policy has a small effect on national income and unemployment, inflation rate will reduce by a small value.

In an economy like ours, the government can implement a number of fiscal policies to increase national income and reduce unemployment. These include:

- To increase production and create employment, government can give farmers subsidies and attract foreign investors by taxing them less and protecting their industries
- The government can also increase spending in employment generating sectors such as public works, agriculture and industry
- The government can also reduce unemployment by increasing expenditure on education and training to increase skills of labour. With these skills, people are able to employ themselves
- The government can reduce taxes on industries, which use labour-intensive technology and increase taxes on industries which use capital-intensive technology. Labour-intensive technologies use more of human labour in their production while capital intensive technologies use more of machines in production. By implementing such a policy, industries are encouraged to use labour-intensive technologies which employ many people
- The government can encourage exports by reducing export duties. This encourages the production of such exports which decreases unemployment and increases income
- Using fiscal policies, the government can also increase income distribution and reduce income inequalities. For example, progressive taxation increases the number of people participating in investment, production and job creation. By progressive taxation, means that the tax rate increases as an individual's income increases i.e. people with more income pay a higher percentage of that income as taxes.

However, reducing unemployment may cause inflation to rise and a fall in inflation might only be achievable by allowing unemployment to rise. For example, if government wanted to reduce unemployment rate, it could reduce taxes which leads to an increase in disposable income, increase in demand for goods and labour. Although unemployment rate will decrease, the increase in total aggregate demand **could** lead to an increase in inflation in the labour and goods markets. Therefore, we can also say that there is always a trade off between reduced inflation and unemployment rate. This tells us that fiscal policy alone cannot achieve both.

11.12.0 MONETARY POLICY AS A TOOL FOR REGULATING THE ECONOMY

Monetary policy is the management of demand and supply of money together with the interest rate in order to influence the level of economic activity. Policy makers that believe in the monetary policy see the fluctuations of national income and its effects on employment and prices from the point of view that changes in national income are brought about when, and only when, the supply of money changes. They argue that national income increases if the additional government deficit is financed by increases in cash creation or borrowing from banks. This monetary policy increases the supply of money, which in turn increases the national income but this is accompanied by an increase in prices. Hence, monetary policies that increase money supply also increase inflation. Since increase in prices will stimulate more supply of goods and services, the production sector will respond to higher prices by expanding production through increase in demand for inputs such labour. The result will be reduced unemployment.

The monetary policy is aimed at achieving the following objectives;

- Stimulate the growth of the economy (increase in GDP)
- Control inflation
- Maintain full employment
- Stabilize balance of payment
- Ensure equitable distribution of income
- Ensure that government deficits are financed at a low interest rate i.e. when government expenditure exceeds the revenue, the deficit is financed by borrowing from the cheapest source
- Create a broad and continuous market for government securities

The central bank in collaboration with the treasury formulates and implements the monetary policy. Tools of monetary policy include;

1) Open market operations

As explained earlier, the central bank creates money supply through the buying and selling of securities (treasury bonds and bills). When the central bank sells securities to the public this reduces money supply. When the private banks buy securities from the central bank, the central bank receives cash in exchange for the securities; this is equivalent to government borrowing from the banks. The excess reserves in the banking systems reduce and private banks will increase the borrowing interest rate. This consequently discourages public from borrowing and money supply in the economy decreases. This situation translates into a reduction in private investment, with

reduction in employment and output as **inflation reduces**. On the other hand, the central bank can increase money supply by buying the securities from the public.

2) *Discount rate*

This refers to the interest rate the central bank charges commercial banks for the loans it gives to them. If bank A wants a \$1 million loan, it can go to the Central Bank or to another bank (say, bank B) for it. The loan the bank gets from the Central Bank is called a **discount loan**, and the interest rate a bank pays for a discount loan is called the **discount rate**. The discount rate is set by the Central Bank. Commercial banks usually borrow from the central bank as a last resort. When the discount rate is increased, commercial banks are not willing to borrow from the central bank since the cost of borrowing has increased. This potentially lowers the level of excess reserves in the banking system and commercial banks will have to increase the interest rate at which households borrow. This discourages households from borrowing and in turn reduces money supply in the economy. On the other hand, reduction of discount rate encourages commercial banks to borrow from the central and this potentially increases the level of excess reserves in the banking system. With excess reserves, commercial banks will encourage borrowing by lowering the interest rate and consequently, there will be an increase in money supply in the economy.

3) *Reserve deposit requirement.*

The reserve deposit requirement also called the legal reserve ratio is a regulation imposed on commercial banks by the central bank and it specifies the minimum reserve deposit that these banks should hold. Reserve means the fraction of deposits that is not used for loans. The Central bank can adjust money supply by raising or lowering the reserve deposit requirement. If it increases the reserve requirement ratio, it automatically decreases the amount of excess reserves in commercial banks. Suppose that Stanbic bank has Ush100 million as deposits from clients and its reserve is currently Ush18 million. Let us also assume that the central bank dictates a reserve deposit requirement of 10% of the deposits for every commercial bank. This information tells us that Stanbic bank is required to keep not less than Ush10 million as reserve deposit requirement. Since this bank is holding Ush18 million as reserve but is only required to hold Ush10 million it has an excess of Ush8 million as reserve, which it can decide to loan it out to its clients and by so doing increase money supply. On the other hand, a decrease in excess reserves decreases the commercial bank's ability to give out loans, which leads to a decrease in money supply in the economy.