

Principles of Microeconomics

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Introduction

What's in This Chapter?

In this unit, we define economics and study important economic concepts.

We study economics to explain important economic relationships and to determine how to best increase a nation's wealth. In this definition, wealth includes tangible (cars, houses, food), as well as intangible goods and services (protection from violence, clean air, entertainment, leisure time).

The production possibilities curve in this unit shows us the production choices we face given a certain amount of resources. No matter how abundant our resources are, they are limited, and we have to make choices regarding what and how much we want to produce.

Later on, in section 4, we look at the circular flow model. This model paints a picture of the main economic activities in a country.

In free-market economies, the decision as to what and how much to produce is made by the buyers and sellers of the products and a government exerts relatively little control over prices of products. Section 5 discusses the three main economic systems, which reflect the various degrees of government involvement: capitalism, socialism, and communism.

Section 6 defines and explains important fundamental economic concepts, such as the fallacy of composition, the fallacy of cause and effect, economic growth, opportunity cost, positive and normative economics, and real and nominal prices.

Section 7 discusses the increasingly important role of critical thinking in economics, and suggests ways that you can increase your critical thinking skills.



Section 1: Economics

The Definition of Economics

What is economics all about? Is it the study of money? Is it about trade-offs and scarce resources? Is it about inflation, unemployment, and deficits? Is it about eliminating poverty?



All of the above are important topics in the study of economics. However, the overall objective of economic research is its ability to explain how we can most optimally achieve the highest standard of living for as many people as possible. Thus:

Economics is the study of how we can best increase a nation's wealth with the resources that we have available to us.

Wealth in this definition includes tangible products, such as cars and houses, as well as intangible products, such as more leisure time and cleaner air.

How Can We Best Increase Our Nation's Wealth?

There is substantial disagreement over how a country can best achieve optimum wealth. Some economists support considerable government involvement, price controls, and government rules and regulations. Others believe that government involvement should be minimal and limited to tasks including the provision of a legal system, military, police and fire protection, and providing certain public goods. Many believe that a combination of moderate government involvement and private initiative works best.

Among other issues, there is controversy about the role of profits, consumer spending, savings, capital formation, income distribution, and unions. Should we more heavily tax profits to more equally distribute the wealth in our country? Should we encourage spending and discourage saving to stimulate economic growth, or should we do just the opposite? Do unions raise real wages or are they harmful to our economic growth? These are important economic issues, which we will elaborate on throughout the text. Let's define some important concepts first.

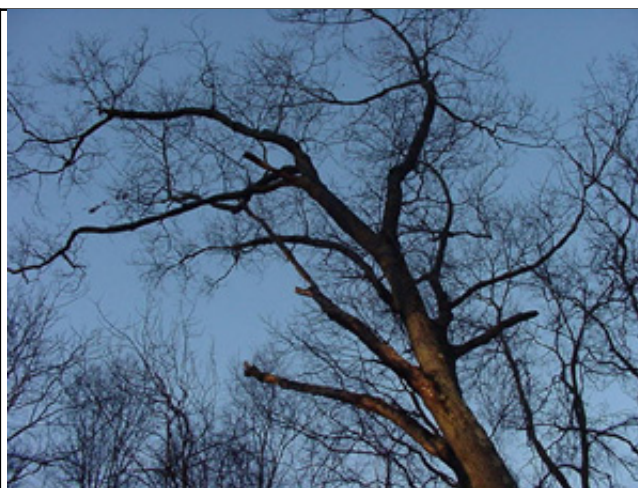
Marginal Benefit and Marginal Cost

When you make choices as a citizen, a business person, a student, or a government official, you make them, assuming you are rational and you make decisions voluntarily, by comparing marginal benefits and marginal costs. You will choose an activity (for example, going to school, accepting a job, or buying or selling a product), as long as your marginal benefit is equal to or greater than your marginal cost. When you choose to enroll in a college, you expect that your marginal benefit (a diploma, better job, or higher earnings) will be at least as great as your marginal costs (the value of your time, your expenses on books, tuition, and other costs). When you buy a car, you make that decision because your expected marginal benefits (freedom to travel without having to rely on others to provide rides, status, and ability to accept jobs further away) are at least as great as your marginal costs (price of the car, gas, insurance, and maintenance). A firm will make a specific number of products based on its marginal benefits and marginal costs. It will choose to increase production as long as its marginal benefit (marginal revenue) is at least as great as its marginal cost.

The Difference Between Macroeconomics and Microeconomics

Macroeconomics includes those concepts that deal with the entire economy or large components of the economy or the world. The nation's unemployment rate, inflation rates, interest rates, federal government budgets and government fiscal policies, economic growth, the Federal Reserve System and monetary policy, foreign exchange rates and the balance of payments are typical topics discussed in macroeconomics.

Microeconomics includes those concepts that deal with smaller components of the economy. Individual demand and supply of goods and services, the price elasticity (sensitivity) of demand for goods and services, production, cost functions, and profit maximization in various industries, income inequality and income distribution, and the effect of protectionism (tariffs, quotas, and other trade restrictions) on international trade are topics generally included in microeconomics.



Macroeconomics looks at the bigger picture of the economy. Microeconomics looks at the individual components of the economy.

If macroeconomics is like studying a forest, microeconomics is like studying the individual trees.

Section 2: The Production Possibilities Curve

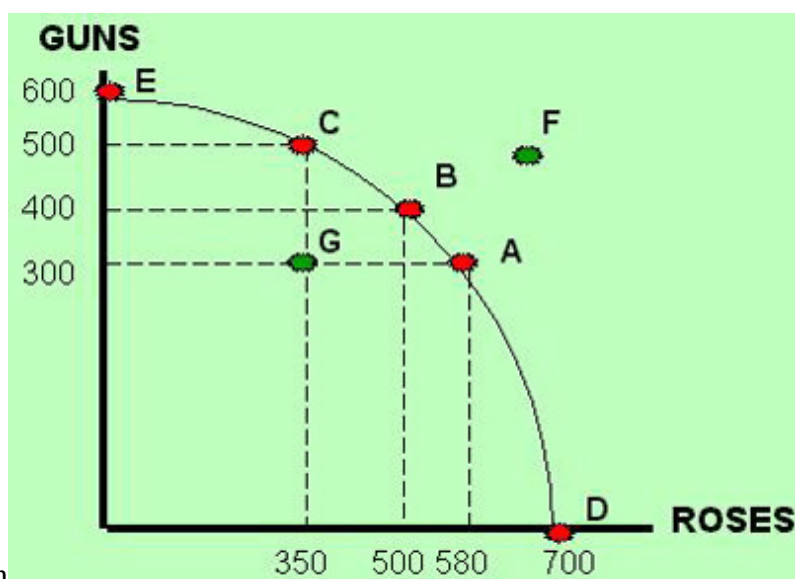
Production Choices

When we study how a country can best increase its wealth, we must look at its production behavior. In



order to produce, a country must use its resources, including land, labor, capital, and raw materials. A production possibilities curve represents production combinations that can be produced with a given amount of resources. For instance, let's say that a very small hypothetical country currently uses 100 acres of land, 20 machines, and 50 workers, and is able to produce two products: guns and roses.

You can think of "guns" as representing the category of products including weapons, fighter airplanes, tanks, and other military products. "Roses" represents all consumer products. This country has some choices (possibilities) regarding how it uses its resources. It can produce 500 units of guns and 350 units of roses (point C on the graph below). However, it can also, with the same resources, produce 400 units of guns and 500 units of roses (point B). Or it can produce 300 units of guns and 580 units of roses (point A). Numerous other combinations (for example, points D, E, G), are possible. A diagram representing all possible combinations is graphed in the figure below.



A production possibilities curve represents outcome or production combinations that can be produced with a given amount of resources.

Points on the Curve and Trade-offs

If an economy is operating at **a point on the production possibilities curve**, all resources are used, and they are utilized as efficiently as possible (points E, C, B, A, and D). If a country does not use its resources efficiently (unemployment), then it is operating **inside the production possibilities curve** (point G).

Any point on the curve illustrates an output combination, which is the maximum that can be produced with the existing resources and technology. It follows that output cannot increase if resources and technology remain constant. When economists discuss the concept of scarcity, they mean that resources are limited and that at any given point in time, production is limited. If an economy is producing **on** the curve, increasing the production of one good or a category of goods always occurs at the expense (opportunity cost or trade-off) of the production of another good or category of goods.

A point inside the curve, for example 300 guns and 350 roses (point G), represents an output combination that is produced using fewer than the available resources (unemployment), or with all the resources, but with the resources used inefficiently (underemployment).

Point F is a production combination that cannot be achieved with the existing resources. Over time, the economy may grow and realize greater production capacities to produce, and we may get to point F in the future. This will be discussed in the next section.

Increasing Costs and the Concave Shape of the Production Possibilities Curve

The production possibilities curve graphed above bows outward (it is concave). This is because the production of the last 100 units of output (for example, the production change from 500 units of guns to 600 units of guns) requires more of a trade-off of roses than the production of the first 100 units of output. In any economy, the production of the first few units is usually easier and cheaper, because the resources to produce these products are more readily available. For example, a country that has no orange production and then chooses to produce 100 bushels of oranges per year will find it relatively easy to plant trees in areas that are conducive to growing oranges. However, if total production of bushels of oranges is at one million per year, and we want to produce another 100 bushels, it is more difficult and more costly, because not as much land is available to grow oranges.

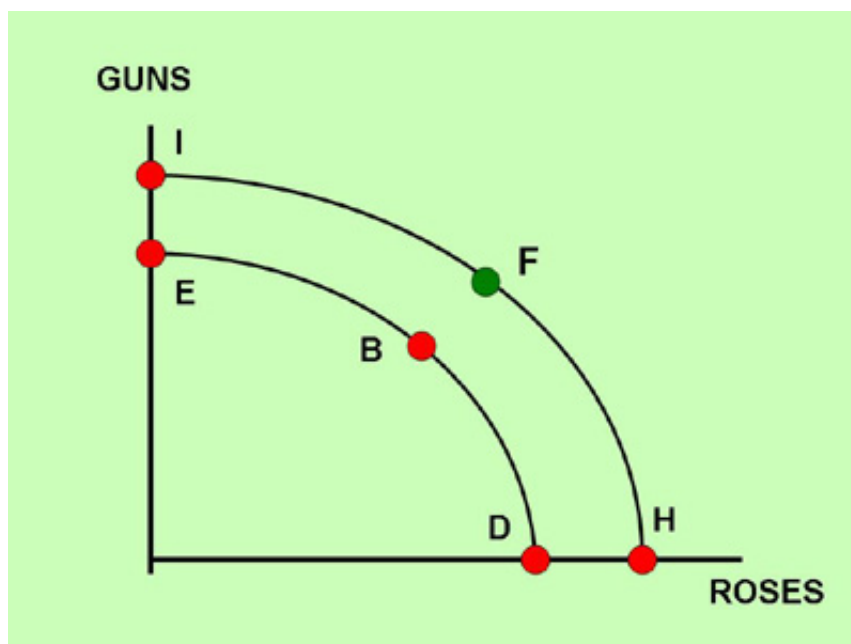
For a video explanation of the Production Possibilities Curve, please watch the following:

[YouTube Video](#)

Section 3: Economic Growth

Causes of Economic Growth

Economic growth occurs when the economy realizes greater production levels. In the graph below, the curve shifts outward to the right (for instance, through point F from the graph in the previous section), so that the country's production capacity level rises. For the curve to shift outward, resources (land, labor, capital, and raw materials) must increase, or we must improve the way we use these resources (technology). Therefore, economic growth is made possible by advances in technology and/or increases in resources, including increases in the labor force and capital goods, such as machinery, equipment, assembly lines, office buildings, factories, roads, highways, and airports.



How does a country increase its capital goods, and how does it achieve these advances in technology? Let's take a look at increases in capital goods first.

Increases in Capital Goods

Capital goods are produced just like other goods, such as cars, televisions, or food. If a country is producing at full employment (operating on the curve), more capital goods can be produced only if the country produces fewer consumption goods. Looking at the diagram in the previous section, this is reflected by a move from a point on the curve from the lower right to the upper left (for example, from point D to point A, or from point B to point C).



A government can encourage more production of capital goods by, for example, providing tax breaks for the production of capital goods, or by increasing taxes on the production or sale of non-capital (consumption) goods.

Advances in Technology

Advances in technology occur because of inventions and improvements in producing goods and services. Inventions and improvements take place when entrepreneurs have incentives to produce more efficiently



and lower their costs. When lower costs lead to higher profits and greater rewards, entrepreneurs are motivated to continue to improve their production process. Countries that allow entrepreneurs to keep all or most of these rewards (by limiting taxation and government involvement) have been shown to experience greater rates of technological growth.

Advances in human technology also stimulate economic growth. When people become more productive (for example, by gaining skills and becoming more educated), the production possibilities curve shifts outward.

Economic Growth and Economic Systems

As evidenced by the 2008/2009 recession and the current pandemic related downturn, we don't have economic growth all the time. However, during most years, industrialized countries experience economic growth (an increase in overall production). Among others, Western Economies, Hong Kong, Taiwan, Singapore, China, Vietnam, Chile, the United Arab Emirates, South Africa, Russia and several other East bloc countries have increased their production capacities significantly during the past several decades (Russia has stagnated recently due to the conflict with Ukraine and subsequent sanctions). China adopted

significant free market elements primarily starting in the late 1980s, and as a result has experienced record growth. India has also become more capitalist and opened its borders to increased free international trade in the 1990s. These countries' production possibilities curves have shifted out considerably because of freer markets, increases in capital stock and advances in technology. Brazil, Russia, India, China, and South Africa are five economies with a relatively high average rate of economic growth over the past several decades (even though some have struggled in the past several years). They are known as the BRICS countries.

Communist (or command economy) countries, such as North Korea, Venezuela, and Cuba, have experienced far less economic growth than their capitalist counterparts.

In addition, many third-world countries that have struggled with civil strife and governmental corruption have been unable to shift their production possibility curves outward, because the political instability has made it difficult for capitalism and free markets to properly function. For capitalism to succeed, a country needs a stable economic and political climate in which its government provides essential conditions, such as a just legal system, a just reward system (taxes and regulations that reward work and entrepreneurship), a proper infrastructure, strong national security, and protection of individual and property rights. Even the United States has felt the effects of uncertainty regarding the security of the country. When a country, its citizens, and its property are not protected properly, it can have a devastating effect on productivity and the motivation of its people to work hard. As security and stability improve, the conditions for a positive economic climate improve.

Conditions for Economic Growth

With the economic demise of many non-capitalist and often dictatorial statist countries, it has become clear during the past several decades that certain economic conditions must exist for healthy economic growth to occur. The free or mostly free countries and areas in our world, such as Japan, Taiwan, the United States, the United Kingdom, Canada, Hong Kong, Poland, Sweden, South Korea, and Singapore, have per capita (per person) earnings, that are much higher than the per capita earnings in statist countries, such as Cuba, Venezuela, Iran, and North Korea. The life expectancy in freer countries is higher than in statist countries, and even the large majority of the poor in the freer, capitalist countries lives at a level well beyond that of the average citizen in a statist country. Countries with the highest per capita earnings are characterized by all or most of the following:

1. Strong private property rights.

Societies experience the most economic growth when their citizens have optimal incentives to work. Hard and smart work then translates into greater wealth (a house, a car, a computer, a smart phone, stocks, bonds, etc.). These properties must be protected though, otherwise the incentive to work hard and smart disappears. Countries that protect their citizens' properties experience greater economic growth and have less absolute poverty than countries that have weak protection.

Andrew Bernstein in his "Capitalist Manifesto" states that: "Men often understand that an individual's life belongs to him and cannot be disposed of by society, but fail to grasp that his property must similarly belong to him and be protected against confiscation by society. In fact, men cannot live without an inalienable right to own property. The right to life is the source of all rights - and the right to property is their only implementation. Without property rights, no other rights are possible" (page 34).

2. Free markets, free international trade, and a stable price level.

Free markets are markets in which prices of products, as well as wages, rents, interest rates, and foreign exchange rates, are determined by the interaction of private sector demand and supply.



	Free international trade requires a free exchange of goods and services and resources between countries. Governments accomplish this by avoiding protectionism (trade obstacles, such as tariffs and quotas). A stable price level is achieved when there is little or no fluctuation in the country's average price level. The country's central monetary agency can accomplish this by keeping its money supply restricted or constant.
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3. Essential government regulations and reasonable levels of taxation. Some regulations are useful and necessary as the financial difficulties of the recent past have clearly demonstrated. The government must enforce clear and effective rules in order to safeguard economic and financial stability, product safety, and consumer and worker protection. Taxes must be collected in order for the government to provide its essential functions. Reasonable and cost-effective regulations and taxation encourage businesses to start or continue production, with rewards that provide incentives for hard work, innovation, and creativity. High levels of taxation mean that most of a company's or an individual's earnings are given to the government and there is little incentive for hard work, productivity and efficiency. Excessive regulations lead to time consuming and expensive business operations. They discourage business start-ups and can cause businesses to fail or move abroad. An economy can only be productive if the economic environment is conducive to the development of new ideas and innovations. This also requires a strong educational system, and the promotion of research and development.

4. Minimal corruption. A stable and secure environment is a required condition for a free market and a productive society. If the government of a country is corrupt or allows corruption by private groups, and initiates force by taking away citizens' and businesses' private property, then there is no incentive for potentially hard-working and innovative workers to produce and accumulate wealth.

Why Do Statist Countries Continue to Exist?

If economic growth and wealth accumulation are so much higher in capitalist countries than in statist countries, why, then, don't statist countries change to capitalism? The answer is that capitalism requires freedom (economic and political), and statist rulers and dictators are fearful that with freedom among their citizens, they would lose their position of power.

The Money Supply and the Production Possibilities Curve

The production possibilities curve does not shift outward with an increase in the nation's money supply. If this were the case, all we would have to do would be to print more money all the time. The only causes of an outward shift in the production possibilities curve are increases in resources and advances in technology.

Potential Versus Actual Production

A country that experiences an outward shift of its production possibilities curve will increase its **potential** to produce. This does not mean that the country will increase its **actual** production. A country could be at a point inside of the curve and experience unemployment and inefficiency. North Korea, Iran, Venezuela, and several other heavily government controlled states have large amounts of resources. However, due to limited economic and political freedom, these resources are not used at their maximum efficiency. Consequently, the real Gross Domestic Products of these countries (a measure of a country's overall productivity) are far less than that of industrialized and mostly free market countries. As they allow more capitalist elements and freedom into their economy, they will be able to shift their production possibilities curves outward, as well as to produce closer to their maximum efficiency level.

Natural Disasters and Military Conflicts

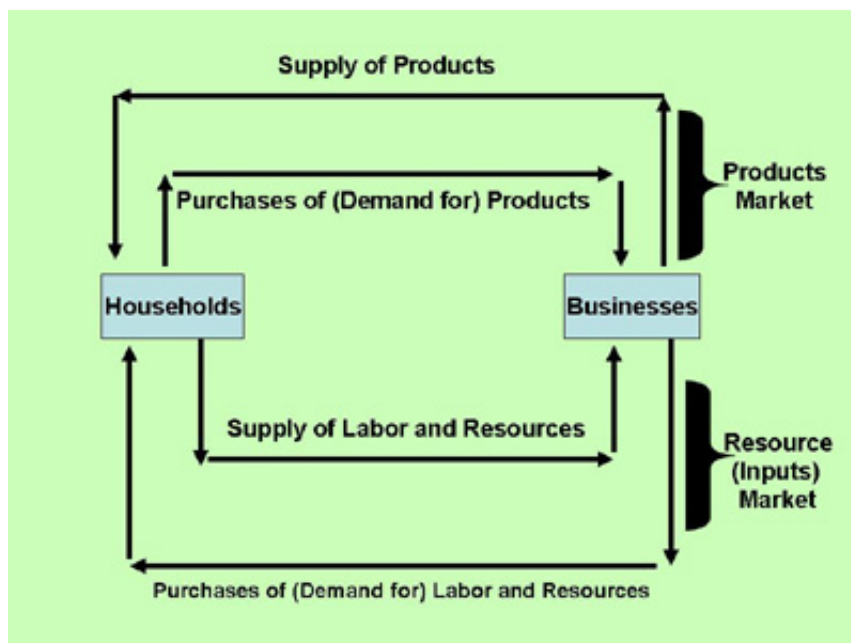
When natural disasters (hurricanes, floods, pandemics, etc.) occur, it takes away production resources. This shifts the production possibilities curve to the left and decreases an economy's capacity to produce. Wars and terrorist activities that destroy production capacities also shift the curve to the left.

Section 4: The Circular Flow

The Simple Circular Flow Model

An economy consists of many persons and groups who participate in various economic activities. In its simplest form, an economy consists of buyers and sellers. Sellers are mostly businesses that produce goods and services. Businesses also buy resources, including land, labor, capital goods, and raw materials. Households buy consumer goods and services that are produced by the businesses. Households also provide labor necessary to make these products. Those households that own land, capital (money), capital goods, and raw materials provide these resources for production.

In the graph below, a simple circular flow diagram shows the economic interactions between households and businesses. This represents a simplified picture of how our economy works.



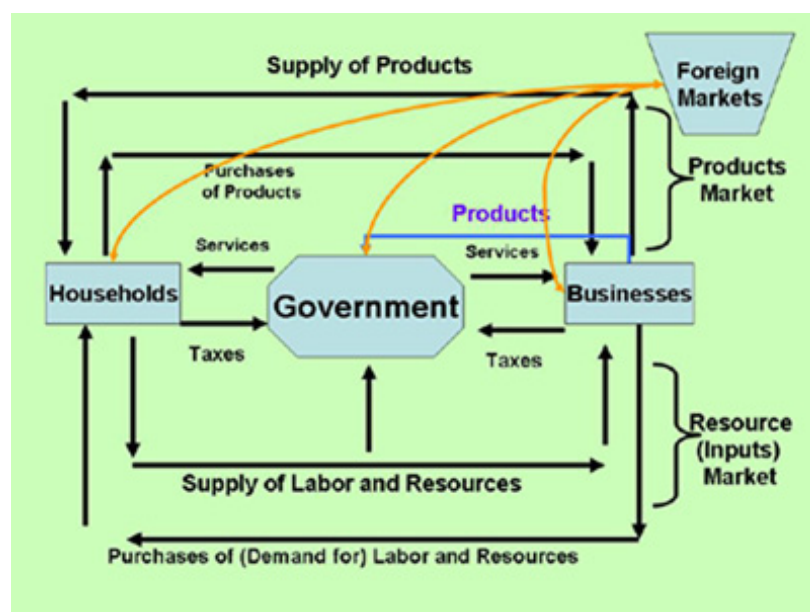
A simple circular flow diagram

The Circular Flow with Government and Foreign Markets

A more realistic picture of our economy includes the households and business activities described above, and also incorporates the economic interactions of two other main participants in our economy: government and foreign markets. This is illustrated in the diagram below.

Governments provide services to businesses, households, and foreign markets, and collect taxes to pay for these. Foreign markets buy and sell goods and services to and from our households, businesses, and governments.

So a typical economy consists of four main groups: households, businesses, governments, and foreign markets. The circular flow model illustrates the interactions between these four groups.



A circular flow diagram with government and foreign markets

For a video explanation of the circular flow, please watch the following:

[YouTube Video](#)

Section 5: Economic Systems

The Three Economic Systems

1. A laissez-faire economy.

Laissez-faire is French for "let do." It means "hands-off" and represents a pure capitalist system, or a so-called price system, in which the supply and demand behavior of businesses and households determine



prices of goods and services and factors of production.

The government plays an important role in a pure capitalist economy, but its role is limited to only the most essential functions such as providing a legal system, protecting private property, providing infrastructure and providing certain public goods.

2. A command economy.

A command economy is a communist system in which a country's government determines prices of goods and services and factors of production. The government is in control of all of the country's economic decisions.

3. A mixed economy.

A mixed economy is a combination of the two systems. Most industrialized countries around the world have mixed economies. The exact mix differs depending on the amount of government involvement.

Economic Systems around the World

The United States, Canada, Mexico, South Africa, China, Sweden, England, Norway, Japan, South Korea, Holland, Germany, and most other industrialized countries are examples of mixed economies. The private sector (businesses and households) plays a significant role, but so does the government in the form of various types of government spending, taxation, regulations, price controls, and monetary policies.

During a significant part of the nineteenth century, the United States had close to a free market, or laissez-faire economy. In this system, households and businesses had significant economic freedom. There was very little government involvement, minimal regulations, and free banking. The government was only in charge of the most essential economic and political functions, such as providing defense and national security, providing a legal system, and providing public goods, such as roads, highways and other infrastructure. The government collected taxes merely to pay for these essential functions. Prices, wages,

interest rates, and other economic variables were determined by the economic decisions of private businesses and households. The United States experienced significant industrial growth during this time period. Prices fell during most years, average wages of all income groups grew during most years, and private charity giving was common.

The Heritage Foundation publishes an index that ranks countries and economic areas around the world based on their economic freedom (visit <https://www.heritage.org/index/ranking>). In 2021, it ranks Singapore as the most economically free area in the world. The United States is ranked 21st. The 2021 ranking is based on criteria including the amount of government involvement (taxation, regulation), private property rights, and people's freedom and encouragement to produce, innovate and advance. The top ten freest countries in 2021 are:

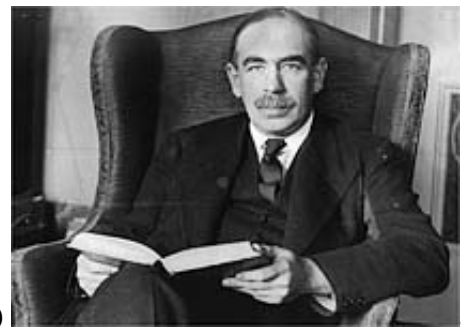
1. Singapore
2. New Zealand
3. Australia
4. Switzerland
5. Ireland
6. Taiwan
7. United Kingdom
8. Estonia
9. Canada
10. Denmark

At the bottom and least free are:

178. Cuba
179. Venezuela
180. North Korea.

The increasing role of governments

In the years leading up to and including the 1920s and 1930s, due to influences of economists such as



Karl Marx, Friedrich Engels, and John Maynard Keynes (pictured) and the events of the Great Depression, industrialized countries experienced a dramatic change in economic beliefs about the role of the private sector and a country's government. Since this time the role of most governments around the world has increased considerably.

In 1913, the United States Federal Reserve System was created. Central banks took control of the country's monetary system. Also in 1913, the United States adopted the income tax. Throughout the 1920s and 1930s, labor unions, supported by government legislation, gained in influence. Regulations about worker safety, anti-discrimination and anti-trust laws grew significantly. In 1934, the Federal Deposit Insurance Corporation was formed. Social programs, such as Social Security, Unemployment

Compensation, various welfare programs, minimum wage laws, and farmer support programs became indispensable. New Deal types of government spending to create jobs, such as the Tennessee Valley Authority project, became commonplace. To fund these expenses and to pay for the growing number of government employees, taxes on individuals and businesses increased considerably. Government deficits also grew.

During the 1960s, the war on poverty added many new government programs. During the 1970s, environmental concerns increased government regulations to fight pollution. The Reagan administration supported limited growth and favored a smaller role for the government (except in the area of national security), but government spending continued to grow and government budget deficits took off. The George W. Bush administration supported a strong build-up of the military and homeland security in the aftermath of 9/11. Bush also supported corporate bailouts and government stimulus packages (increased government spending) during the 2007/2008 recession. This increased our already high national debt level. The Obama administration further increased the government presence in our economy, especially in the areas of national health care, energy, education and even in traditionally private sector industries such as banking, housing, and auto manufacturing. The Obama administration and a divided Congress struggled to find ways to reduce large deficits and a potentially disastrous growing national debt. The Trump administration has scaled back regulations and has attempted to reduce the role of the government by passing tax reform with lower rates for most households and businesses, but government spending continues to increase and there is more government intervention in the areas of international trade, immigration, and homeland security. Recently, due to the pandemic, government spending has increased significantly and this will affect future tax rates. It is expected that the Biden administration will continue to increase spending (even post Covid), especially in the social welfare area and climate change. This will further either increase the national debt, or raise future taxes or both.

Significantly increased government involvement during the past century has shifted the United States economy away from its mostly free market philosophy during significant parts of the 19th century. The degree of government involvement beyond its essential functions (protector of private and personal property, provider of a legal system, provider of essential public goods) will remain an important and controversial debate.

Section 6: Important Concepts and Definitions

In this section we will clarify several concepts that we will come across throughout our text.

Nominal and Real Values

Nominal values, such as nominal prices, nominal earnings, nominal wages, nominal interest rates, and nominal Gross Domestic Product, refer to the actual dollar value of these variables.



A person who earns \$10 per hour in today's dollars earns a nominal wage of \$10.

Real values are values in comparison, or relative, to price changes over time. You may earn \$10 this year and you may earn \$10 five years from now. Your nominal income remains the same, but \$10 five years from now is not worth as much as \$10 now. The real value of \$10 five years from now is less than \$10 in today's dollars.



We also distinguish between real and nominal when we discuss interest rates. Real interest rates are nominal interest rates adjusted for inflation. In other words, $\text{real interest rates} = \text{nominal interest rates} - \text{inflation}$. For example, if you pay your bank 6% in nominal interest, you are only paying 2% in real interest, if prices are rising by 4%.

Positive and Normative Economic Statements

Positive economic statements are facts, or statements, which can be proven. Normative economic statements cannot be proven. They are opinions or value judgments.

A positive statement does not have to be a true statement. The statement could be proven false, in which

case, it is a false positive statement.

Predictions are neither positive nor normative statements. Predictions, such as "The New York Mets will win the World Series next year," or "Unemployment will fall below 3% next month," are neither normative nor positive statements. They are predictions unrelated to facts or value judgments.

Examples of positive economic statements are

1. The federal government experienced a budget surplus this past year.
2. When the value of the dollar falls, Japanese products imported into the United States become more expensive.
3. Legalizing drugs will lower the price of drugs and reduce the crime rate among drug users.
4. The United States does not have a federally mandated minimum wage (this is a false positive statement).

Examples of normative economic statements are

1. The government should raise taxes and lower government spending to reduce the budget deficit.
2. We need to try to lower the value of the dollar in order to discourage the importation of foreign goods into this country.
3. Our federal government should legalize the use of drugs in this country.
4. The minimum wage should increase to \$14.50.

Ceteris Paribus

This Latin term means "if no other things in the economy change." For example, when college tuition increases, our chapter on supply and demand predicts that student enrollment (the number of course sign-ups) will decrease. Economists, indeed, predict this with the condition of "*ceteris paribus*," or if no other things in the economy change. But if students' (or their parents' or guardians') real incomes increase, then college enrollment may increase, despite the tuition increase. Tuition increases are still predicted to decrease college enrollment, but in this case, other things in the economy (incomes) did change, and the "*ceteris paribus*" condition was violated.

The Fallacy of Composition

You are subject to the fallacy of composition if you state that what is good for one is necessarily good for the entire group. If a college has a shortage of parking spaces for its students, it may be beneficial for a number of students to arrive very early and secure a parking space. However, if everyone arrives very early, the parking problem remains an issue.

The Broken Window Fallacy

The economist Henry Hazlitt, in his book *Economics in One Lesson*, provides another good example of the fallacy of composition. In Chapter 2, the "Broken Window Fallacy," he describes that when a person throws a brick through a baker's window, it may seem that this stimulates the economy, because it provides a job for a glazier (window repair person).

According to Hazlitt, the fallacy occurs when we do not take into account the additional expenditures due to the replacement of the window. This expense lowers the baker's spending on other goods and services. If the baker would have bought a suit from the tailor without the expense of repairing his window, then the tailor loses a job compared to if the window had not been broken. So if the window is broken, the glazier gains a job, but the tailor loses one. Overall, there is no gain in employment if someone throws a brick through a window. Additionally, the baker loses, because he is without a suit compared to if the window had not been broken. Analogously, hurricanes, floods, and wartime activities do not provide a net gain in employment. They create jobs in one area of the economy, but take away jobs in another. Overall, they destroy wealth and are harmful to the economy.

The following section was researched and written by the late Howard Community College professor,



journalist and writer, Bob Russell (pictured).

"It is difficult to predict the impact of serious hurricanes on the U.S. economy, but there are a few things we can conclude. A lot of money and activity that might ordinarily travel to the hurricane affected areas will go to other areas of the country or the world. For instance, just consider the impact that these storms have had on the conference and meeting industry, vacations, sporting events, etc. Many of these expenses are being diverted to other locations. On the other hand, lots of government spending, insurance claim payments, and private construction money go to the hurricane-affected areas, mostly to cover reconstruction and rebuilding expenses.

In 2005 all of our pocketbooks were affected by Katrina and Rita — especially at the gas pumps. These increased costs slowed the economy a bit. Fuel, heating, and transportation costs all rose, causing a reduction in output. Of course, reconstruction of the devastated areas provided a bit of an uplift to the construction industry and supply lines of repair items, wood and other building supplies, furniture, etc. Dollars spent on the reconstruction effort is money that will have to be diverted from money which would have been spent in other areas and with other goals.

This line of thinking provides us with an opportunity to talk a bit about the “Broken Window Fallacy,” a fascinating economic theory. It goes like this: If someone throws a stone through a shop window, the owner needs to fix it.

The cost to do so is, hypothetically, \$250, selected to fit with Hazlitt’s example below. The repair puts people to work and increases total output. Since this creates jobs, might we do well to break lots of windows and repair them? Most folks think this is nonsense since, although it would employ labor, there would be no benefit to the society at large. Yet there are many similar schemes, promoted by politicians and supported by the general public in the name of JOBS. Long ago, this fallacy was exposed by the French economist Frederic Bastiat in an essay entitled “What is seen and what is not seen.” Bastiat teaches us to understand the economic reality beneath the superficial appearance of everyday economic life. What is seen is the broken window repaired, the workers working and the money they spend. What is not seen is that these workers and resources would have been employed in something else if not for the broken window. What ultimately benefits society is not jobs,

but goods. In this instance, the glass store gains, but the broken window store owner loses (she probably would have spent the money on something else) – and the person that owns the shop that sells what she would have bought has a loss.

According to the late Henry Hazlitt in *Economics in One Lesson*, “Instead of [the shopkeeper] having a window and \$250, he now has merely a window. Or, as he was planning to buy [a] suit that very afternoon, instead of having both a window and a suit he must be content with the window or the suit. If we think of him as a part of the community, the community has lost a new suit that might otherwise have come into being, and is just that much poorer.”

The Broken Window Fallacy endures because of the difficulty of seeing what the shopkeeper would have done. We can see the gain that goes to the glass shop. We can see the new pane of glass in the front of the store. However, we cannot see what the shopkeeper would have done with the money if he had been allowed to keep it, precisely because he wasn't allowed to keep it. We cannot see the new suit foregone. Since the winners are easily identifiable and the losers are not, it's easy to conclude that there are only winners and the economy as a whole is better off. Overall, the economy will suffer due to the hurricanes, not benefit as some media pundits have suggested, although the intensity and duration of the suffering is up for grabs."

From one of Bob Russell's newsletters (reprinted with permission).

For a video explanation of the Broken Window Fallacy, please watch the following:

[YouTube Video](#)

What is Good for One Industry is not Necessarily Good for the Country

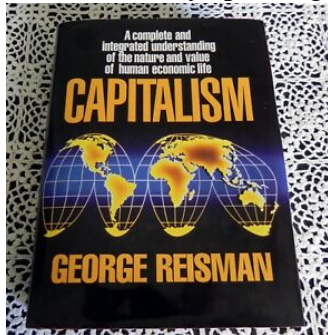
Let's look at the farming industry as an example of the fallacy of composition. Currently, the United States government (and governments of many other industrialized countries) supports farmers in the form



of direct subsidies and other programs. These subsidies benefit most farmers and seem to be beneficial for the farming industry. Many people believe that what is good for the farming industry must automatically also be good for the entire country. It is certainly possible that this is the case. However, to automatically conclude this is to suffer from the fallacy of composition. Farm subsidies and other farm support programs costs the government money. This increases taxes and hurts citizens. Furthermore, some farm programs (price supports) increase the price of certain agricultural products to consumers. Some economists also claim that the subsidies to farmers do not even benefit farmers themselves because it makes them weaker and less competitive in the long run. The subsidies may help the farmers in the short run, but not in the long run. For more information about farm programs and their economic effects, see our Microeconomics text, Unit 6.

Does a Demand Increase Stimulate the Economy?

George Reisman, in his book *Capitalism*, discusses another example of the fallacy of composition. He states that an increase in the demand for one product causes a price increase for that product. Assuming the cost of making the product does not increase, the product's profitability increases. Does this mean that if aggregate demand (demand for all products) increases, profitability of all products increases? Well, it depends. If a nation's total nominal income is constant, it is actually not possible for demand of all products to increase. Demand for one product may increase, but then the demand for other products must, mathematically speaking, decrease. So prices of some products increase, but prices of others decrease.



The only way for demand of all products to increase is if total nominal income increases. This is only possible if the nation's total money in circulation increases. This is possible if the nation increases its money supply. But in this case, prices increase, and if profits increase, it means merely that nominal profits increase and not real profits. An important implication of this realization is that if the government decides to "stimulate" the economy by encouraging people to spend more on consumer goods (by printing more money, or by distributing money through social programs, creating public works jobs), it does not really increase total aggregate demand. The demand for one particular good or category of goods (those bought by the elderly, for example, in the case of higher Social Security paychecks for the elderly) may rise, but the demand for other goods will have to fall. Nominal (the monetary amount of) spending may increase, but real spending will not. The only way to increase real profits is to increase productivity. This lowers costs and decreases prices, which allows increases in real profits and real demand.

The Fallacy of Cause and Effect

Cause and Effect Fallacy

Because A happens before B, A must necessarily be the cause of B.

It is tempting to conclude that if one event occurs right before another, the first event must have caused the second event. Let's say your basketball team wins its first three games while you are out with an injury. The fourth game, you are back, and your team loses. You conclude that it must be your fault. Of course, your presence could have something to do with it, but you cannot automatically conclude this. Other variables may have played a role: the game conditions, the referees, the opponent, your other teammates' performance that day, the coach's performance, or bad luck.

Similarly, in economics, people sometimes conclude that if one event follows another, the other must have caused the one. The period following World War II has seen a rising standard of living in

industrialized countries around the world. This period has also been accompanied by much greater government involvement in these countries. Can we conclude that greater government involvement has caused higher standards of living? Some would say it has contributed, but others may say that despite increasing government involvement, standards of living have risen. It would be a fallacy to *automatically* conclude that more government involvement leads to higher standards of living because we must look at other variables, such as technology changes and political and socio-economic changes that contribute to economic growth.

Section 7: Economics and Critical Thinking

Question Everything

Critical thinking is particularly important in today's Internet society and world of information overload. Authors, journalists, economists, politicians, talk-show hosts and even Hollywood celebrities and famous athletes make controversial and sometimes contradictory statements and express their opinions about social, political, and economic issues. It is useful to read their statements and to listen to their opinions. However, as educated citizens and critical thinkers, we must question everything. If we don't, we could end up with laws, regulations, and economic policies that harm our economy and our country.

When we evaluate a normative statement (for example, we should lower taxes) or question a positive statement (for example, if we lower taxes, then the government's deficit will increase), what do we look for? Below are some guidelines.

Critical Thinking Guidelines

When evaluating a statement we must

1. Question the source.

Study the background of the person making the statement. If a union leader provides arguments and statistics to support her/his claim that trade restrictions are beneficial to the American economy and that free trade leads to increased unemployment, we need to consider the source. The union leader's objective is to represent her/his constituency (union workers). Therefore, (s)he is biased and will make arguments to support her/his union agenda. This doesn't necessarily mean that the union leader is incorrect.

However, when a person is biased, we must be prepared to question the validity of the arguments. This also doesn't mean that we should not question statements from people who are not biased. We should, of course, evaluate all statements, but in particular from people who have an apparent bias.

2. Question the assumptions. An assumption is information you presume to be true. When several decades ago Washington, D.C. wanted to raise more revenue for the city, the city council decided that imposing a higher tax on gasoline would do the trick. They made the assumption that gasoline is a necessary good and, therefore, "inelastic." In microeconomics we learn that buyers of an inelastic product will not change their purchases of this product much when the price changes. Let's say that, for example, the tax was 30 cents before the tax increase, and people were buying 1 million gallons per month. Then the tax revenue to the city was 1 million times 30 cents, or \$300,000.



The mayor and his council raised the tax by 10 cents, and they expected buyers to purchase approximately the same amount of gasoline after the tax increase. If so, this would mean that the city's total tax revenue would now be 1 million times 40 cents, or \$400,000. However, after the tax increase, the city discovered that total tax revenue actually decreased (to less than \$300,000). It turned out that their assumption about the inelastic nature of gasoline was wrong. After the tax increase, many buyers decided to purchase gasoline in neighboring Virginia and Maryland.

Far fewer buyers bought gasoline in Washington, D.C. In other words, whereas gasoline in the entire United States market may be inelastic, gasoline in the Washington, D.C., area alone is elastic. Several months after the tax increase, Mayor Barry and his council rescinded the 10 cent tax increase.

3. Question how the variables are defined. Economists Card and Krueger conducted what is now a well-known study about the effects of a minimum wage increase in New Jersey. New Jersey, several decades ago, had increased its minimum wage by \$1. Card and Krueger had noticed that within a brief period of time following the increase, employment in New Jersey had gone up, despite the higher wage. Card and Krueger concluded that an increase in minimum wage increases employment and decreases unemployment. But when other economists questioned this study, they found that Card and Krueger had used a definition for "employment" that was questionable. Card and Krueger defined "employment" as the number of people, full-time as well as part-time, employed. After the minimum wage increased, many businesses, in order to cut costs and compensate for the higher wage, decided to increase their hiring of part-time workers at the expense of hiring full-time workers. The following example illustrates the flaw in the definition Card and Krueger used. When 500 full-time workers are employed, they work a combined 20,000 hours (500 times 40 hours). When 300 full-time and 300 part-time workers are employed, they work a combined 12,000 (300 times 40) plus 6,000 (300 times 20), or a total of 18,000 hours. Even though Card and Krueger's "employment" increased (from 500 to 600 workers), the total number of hours worked decreased (from 20,000 hours to 18,000 hours). If Card and Krueger had defined employment as the total number of hours worked, they would have concluded that an increase in the minimum wage decreases employment.

For a video explanation of the importance of properly defining economic variables, please watch:

[YouTube Video](#)

Another example of how defining a variable can lead to incorrect conclusions involves the definition of Gross Domestic Product. Gross Domestic Product is defined as the sum total of a country's production of

final goods and services. Because of the inclusion of only final goods and services, most products included in GDP are consumption goods. Intermediate goods are excluded. These are typically goods exchanged between businesses and include the flour sold by the miller to the baker, and the screws and machinery parts sold by the parts factory to the car manufacturer or furniture maker. The sale of intermediate goods, spare parts, and raw materials is an important component of our economy, and provides millions of people with jobs. However, this economic activity is ignored in the definition of GDP. To conclude that a country's total economic activity is made up of mostly consumption is, therefore, false. It is true that GDP is mostly consumption. However, a country's economic activity is more than the items included in GDP. Thus, when economists and politicians claim that in order to stimulate our economy, we should primarily focus on stimulating consumption, this is a dangerous conclusion.

A few more examples of varying definitions of important economic variables include the poverty rate and the infant mortality rate. Regarding the poverty rate, the United States considers a family of four poor when it earns less than approximately \$25,000. Other countries (especially less developed countries) consider a family of four poor when it earns less than \$2 per day (approximately \$4,000 per year). Some people claim that the health system in the United States is inferior to that of other countries. One variable they point at is the infant mortality rate. However, different countries use different definitions to measure this. The United States includes all babies regardless of the length of the pregnancy or regardless of whether it is born prematurely. Some Western European countries don't include babies if the pregnancy is short or if the baby is born prematurely (Wall Street Journal, "Single Payer's Misleading Statistics" by Scott W. Atlas, December 17, 2018). It becomes difficult to compare statistics between countries when definitions differ so much.

4. Question the validity of the statement. A statement's validity often breaks down because of two common fallacies. These fallacies are the fallacy of cause and effect, and the fallacy of composition. The latter is also called the "fallacy of what you cannot see", or the "broken window fallacy" (see Henry Hazlitt's *Economics In One Lesson*, Chapter 2).

People suffer from the fallacy of cause and effect when they conclude that just because event A occurs before event B, that A must have caused B. Event A could have caused B, but it is incorrect to automatically conclude that A causes B just because A precedes B. For example, European economists have observed growing technology during the past several decades. They have also observed growing average unemployment rates in most European countries during the past decades. Many economists have therefore concluded that growing technology causes greater unemployment. The fallacy is that they are omitting other variables, which may have caused the increase in unemployment. Perhaps increases in tax rates, or increases in protectionist measures, regulations, generous welfare programs, etc., contributed to the rise in unemployment.

People suffer from the fallacy of composition when they conclude that just because something is good for one group or industry, then it must be good for the entire country. Henry Hazlitt's Broken Window Fallacy illustrates that when a boy breaks a baker's window, it doesn't stimulate the economy. Hazlitt admits that the glazier (window repair person) gains a job, just like construction companies gain jobs from natural disasters, such as hurricanes and floods. However, the baker loses money, because he has to spend \$250 to repair the window. He subsequently cannot buy a \$250 suit from the tailor (this is foregone economic activity that you cannot see when the baker has to repair the window). Analogously, citizens

struck by a hurricane (or their insurance companies) now have less money to spend on goods and services they would have otherwise bought (for example, vacations, a new car, etc.) had they not needed to repair their houses. Hazlitt reminds us that one of the keys to economic thinking is to study the effects of economic action on all groups (the glazier, the baker, and the tailor), and not just one group (the glazier).

5. Question the statistics. Be careful when analyzing statistics. Let's look at the following example. A business earns a profit of \$100 in year 1, and a profit of \$120 in year 2. It reports to the media that its profits increased 20% (a \$20 increase as a percentage of the \$100 first year profit). In year 3, profit declines again to \$100, and the business reports a decrease in profit of 16.7% (a \$20 decrease as a percentage of the \$120 profit in year 2). Looking at the percentage changes, it appears that the business is better off in year 3 compared to year 1 (a 20% increase and a 16.7% decrease). However, in looking at the absolute dollar changes, we know that the profit is the same in year 3 compared to year 1. Statistics can be deceiving if incorrect formulas are used or the wrong calculations are made. For your information, in the above example, a better method of calculating the percentage change for this business is to apply the so-called arc formula. This formula takes the change in the profit divided by the average of the two years' profits. In the above example, using this formula, the percentage change is \$20 (the change) divided by \$110 (the average of \$100 and \$120), or 18.18%. Notice that the percentage change is the same whether the profit increased (year 1) or decreased (year 3).

Another example of deceiving statistics arises when looking at changes in income inequality. Let's say that in 1985 the richest 20% of the income earners in our country earned 49% of the total income, and that the poorest 20% earned 5%. Let's say that we noticed that the numbers for this year changed to 50% and 4%, respectively. Can we conclude that the rich have gotten richer and the poor have gotten poorer? Looking at the percentage earnings only, this is a correct conclusion. However, looking at real dollar earnings, or standard of living, the conclusion may be different. The reason for this is that in 2006, the total income of the country is bigger than in this year. For example if the country's total real income in 1985 is \$100 billion (hypothetically), and the total real income this year is \$200 billion, then the poor are making \$5 billion (5% times \$100 billion) in 1985, and \$8 billion (4% times \$200 billion) this year. In absolute real dollars, the poor have gotten richer, not poorer.

Some economists are concerned that average wages of middle class households have stagnated because they notice that statistically average wages have not increased much. Be careful with statistics though. It is possible that average wages declined because many high earning persons retired (baby boomers) and are being replaced by young, low earning workers. For example, if workers A, B, and C make \$80, \$70, and \$30 per hour respectively, then the average wage is \$60 ($\$180/3$). If worker A retires and is replaced with a young person earning \$20 per hour, then the average wage drops to \$40 ($\$120/3$). Even if workers B and C received significant raises, the average wage may have gone down. For example, if workers B and C now earn \$85 and \$45 respectively, and the incoming worker earns \$20, then the average wage is \$50 per hour ($\$150/3$). This illustrates a situation where significant economic growth has increased existing workers wages, but the average wage has dropped. Everyone should be happy with this progress even if average wages have decreased.

Statistical conclusions based on short-term outcomes may be correct, but long-term effects need to be considered as well. If the United States Federal Reserve restricts the money supply today, and within the next six months, the nation's unemployment rate increases, people may conclude that a tightening of the money supply causes a rise in unemployment. However, the unemployment rate may fall after one or two

years. When the Federal Reserve restricted the money supply in the early 1980s, interest rates rose in the beginning because of a shortage of bank reserves. However, in the long run, as a result of the tightening of the money supply, inflation decreased, and interest rates fell. Unemployment significantly fell thereafter. The converse can occur as well. If a country's central bank significantly increases the money supply, unemployment will fall in the short run, but rise in the long run (because of higher inflation).

6. Think like an economist. Thinking like an economist includes doing everything described in 1 through 5 above. Furthermore, economists use marginal benefit and marginal cost analysis. For example, does it make sense to eliminate all pollution in our society? It would be far too costly to eliminate every single instance of air, water, or noise pollution. However, the marginal benefit may equal the marginal cost (the optimum point) when we eliminate, say, 50% of the existing pollution.

When giving the solution to a problem, consider alternative solutions, pros and cons, pluses and minuses. It is not enough to support an economic program just because it adds benefit to our society. We also have to ask if the program is the best alternative. In other words, does it add the most benefit? The United States Social Security program has undoubtedly benefited many people, including the elderly, widows, disabled, and orphans. However, to ask whether we should support this program, we must also ask if this program is the best program. Can another program (for example, a privatized program or a reformed government-controlled program) deliver even more benefits? In another example, when the government bailed out Chrysler in the 1980s, it prevented Chrysler from laying off thousands of people, and it appeared to be a success. The real question, however, is not whether the government bailout was beneficial, but what would have happened if the government had not spent this money and how many alternate jobs this would have created. Could this have made the economy even better off?

Proper economic thinkers know to analyze the effects of a policy not just for one group, but for all groups (a technology improvement usually eliminates some jobs, but overall it creates jobs). And they know to consider not just the short run, but also the long run (restricting money supply growth may increase unemployment in the short run, but decrease unemployment in the long run).

Economic thinkers know to use common sense. Does the conclusion of a study violate the general principles of economics? If the minimum wage increases and employment increases, does this make sense? Applying the law of demand, it does not. If we do observe an increase in employment in the real world after a minimum wage increase, what is the reason? Were the definitions of the variables applied properly? Were the assumptions correct? Was the minimum wage below the market wage before and after the increase (in which case, an increase in the minimum wage does not change the actual wage – see Unit 2)? Furthermore, economic thinkers do well to be open-minded and non-judgmental. Look at all the numbers from an unbiased perspective and consider that anything is possible, regardless of any political agendas you may support, and regardless of what the majority of the population believes (the majority is not always correct).



Andrew Bernstein quotes Ayn Rand (pictured) in *The Capitalist Manifesto* (Bernstein A., 2005, P. 196): “The virtue of rationality means the recognition and acceptance of reason as one’s only source of knowledge, one’s only judge of values and one’s guide to action.” Bernstein continues: “This means that in every aspect of one’s life – in education, in career, in love, in finances and friendships – one must conduct oneself in accordance with as rigorous a process of logical thought as one can conscientiously muster.” (Bernstein A., 2005, P. 196). Think critically!

See: Bernstein, A. (2005). *The Capitalist Manifesto*. Lanham, Maryland: University Press of America, Inc.

See: Hazlitt, H. (1979). *Economics In One Lesson*. New York, New York: Crown Publishing.

Introduction

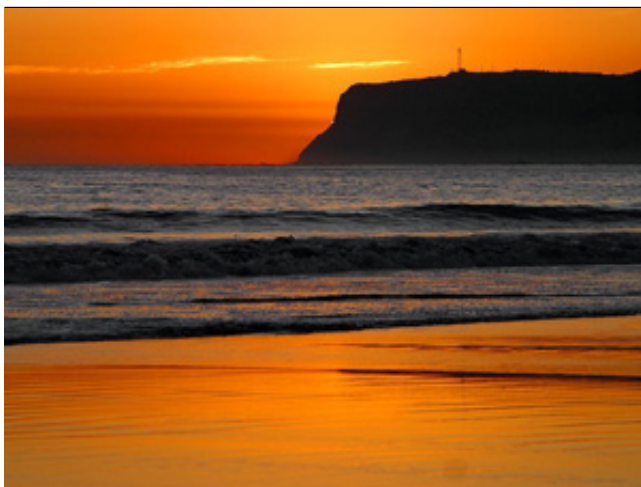
What's in This Chapter?

Why do prices of houses, cars, gasoline, and food fluctuate? Why do prices of stocks and bonds change all the time? Why do interest rates vary? Why do teachers and nurses make modest incomes and television celebrities make millions of dollars? What explains the increases and decreases in the foreign exchange value of the dollar?

In a free market economy, the answer to all these questions is this: "It is because of changes in supply and demand." When the demand for a product increases, then the price increases in the short term, and vice versa. When the supply increases, then the price decreases, and vice versa.

The mechanism of changing prices in a free market economy is powerful. When buyers want more of a product, and are willing to afford it, they communicate this by buying more of the product. This increases the product's price. The higher price gives producers an incentive (and the financial ability) to make more of the product. The subsequent greater supply satisfies the greater need. The greater supply eventually also brings the price back down. Overall satisfaction and the nation's wealth increase.

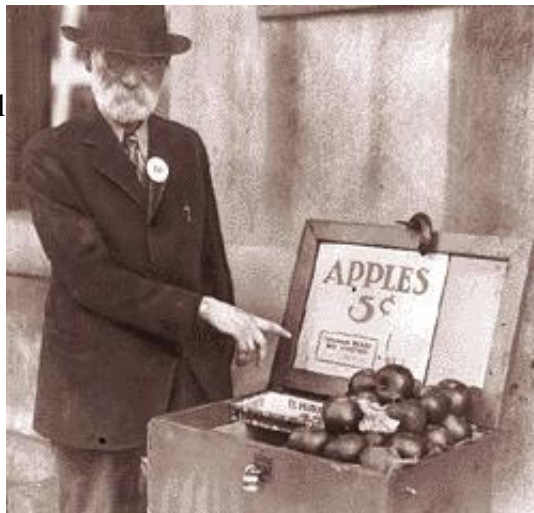
The free market system described above has many advantages and has led to high standards of living in many industrialized nations. It has some disadvantages, as well, as we will discuss in this unit.



Section 1: The Law of Demand

Price and Quantity Changes

The law of demand states that buyers of a good will purchase more of the good if its price is lower, and vice versa. This assumes that no other economic changes take place. If the price of apples decreases from \$1.79 per pound to \$1.59 per pound, consumers will buy more apples.



Ceteris Paribus

The law of demand assumes that no other changes take place. This assumption is called "*ceteris paribus*." If we don't make this assumption, then it is possible that the price of apples decreases from \$1.79 per pound to \$1.59 per pound, and that fewer, not more, pounds of apples are purchased.

One explanation for this may be that the price of oranges, a substitute product, has decreased more than the price of apples, so that consumers will substitute oranges for apples. Does this violate the law of demand? The answer is no. If we had not changed anything else (*ceteris paribus*), then we would have noticed an *increase* in the quantity purchased of apples as a result of a decrease in its price, and this conforms to the law of demand.

Substitution and Income Effects

There are two primary reasons why people purchase more of a product as its price decreases. One is the "substitution effect." The substitution effect states that as the price of a product decreases, it becomes cheaper than competing products (assuming the other products don't decrease in price). Consumers will substitute the cheaper product for the more expensive product, and vice versa. For example, if apple juice decreases in price, then "*ceteris paribus*," more people will purchase apple juice. Note also that fewer people will purchase orange juice, assuming that these products are substitutes.

The other effect is the "income effect." The income effect states that as the price of a product decreases, buyers will have more income available to purchase more products, and vice versa. For example, if

someone purchases 4 DVDs per week at \$15 per DVD, this buyer's total expenditure on DVDs is \$60. If the price of the DVD falls to \$10, the total expenditure for 4 DVDs now equals \$40. This means that this buyer now has \$20 more income compared to when the price of the DVD was \$15. In essence, this buyer's real income has increased. This allows the buyer to purchase more DVDs.

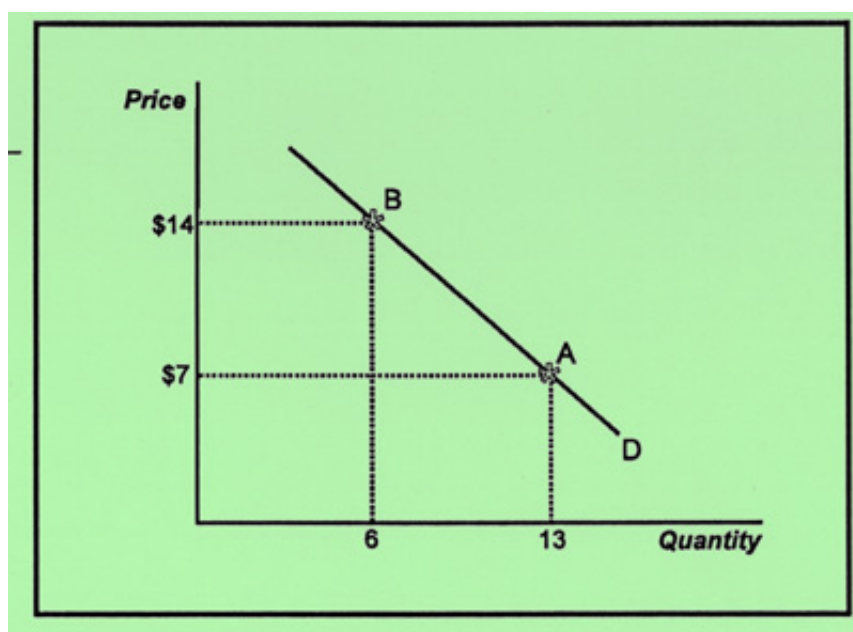
Section 2: The Demand Curve

Graphing the Demand Curve

We can graph demand data in a diagram. The two variables we consider are the price of the product (P) and the amount of the product purchased during a certain period of time (Q). Economists usually measure the price of the product on the vertical axis and the quantity on the horizontal one.

A demand schedule and a corresponding demand curve represent the buyer's **willingness** and **ability** to purchase the product. For demand to exist, the buyer cannot merely desire the product, but (s)he must also be able to afford it.

In the diagram below, two points are plotted for a hypothetical product. At a price of \$7 per product, 13 units are sold. At a price of \$14 per product, only 6 units are sold. Other points can be plotted and a line or curve can be connected through these points to arrive at the demand curve. A demand curve usually extends from the upper left to the lower right. It is "downward sloping."



The above diagram shows that on demand curve D, consumers buy 13 units at a price of \$7 (point A) and 6 units at a price of \$14 (point B).

For a video explanation of how to graph a demand curve, please watch:

[YouTube Video](#)

Demand, Utils, Total Utility, and Marginal Utility

The willingness of a buyer to purchase a product depends on the value the buyer expects to receive from purchasing the product relative to the price. Economists call the value or satisfaction a buyer receives

from a product **utility**. **Marginal utility** is the additional value a buyer receives from purchasing one additional product. Typically, a buyer's marginal utility decreases as the person consumes more of a product. For example, if you visit the grocery store to purchase oranges, the marginal utility of each orange decreases, as you purchase more oranges. Let's assume that you really like oranges, you don't have any oranges at home, and that you haven't had eaten one for a while. As you enter the store, the first orange looks very appealing (get it?) to you. Let's say for comparison purposes that this first orange is worth 100 utils to you. A util is an imaginary measure of satisfaction. Because satisfaction differs per person, no one really knows how much a util is. However, we use utils for comparison purposes. For example, we know that if you have already bought the first orange, then the second orange by itself does not provide as much utility (satisfaction) as the first orange. If you already have two oranges, then the third orange does not provide as much utility as the first or the second orange. Analogously, if you were to buy a car, owning a car provides you with considerably more utility if you don't already have one, compared to owning a second car if you already own a car. This illustrates the Law of Diminishing Marginal Utility.

The Law of Diminishing Marginal Utility

The Law of Diminishing Marginal Utility states that the more you have of a product, the less satisfaction you receive from buying additional products. Certain exceptions apply. Beer and other substances, which create certain (un)desired effects after not one, but several servings, may be subject to the law of increasing marginal utility (at least up to a certain point).

Let's look at an example of the law of diminishing marginal utility and how it determines your demand for a product. Let's say that you have the following marginal utility values when you buy gasoline:

Quantity of Gasoline (in Gallons) Purchased Per Month	Marginal Utility
1	350 utils
2	250 utils
3	200 utils
4	190 utils
5	185 utils
6	170 utils
7	163 utils
8	159 utils
9	155 utils
10	151 utils
11	147 utils
12	143 utils
13	141 utils
14	139 utils
15	137 utils
16	133 utils

The above table illustrates that if you don't have any gasoline, and you are offered to buy your first gallon, then your satisfaction increases by 350 utils. If you already own one gallon, and you are offered a second, your utility increases by 250 utils, and so forth. So how will you decide how many gallons of

gasoline to purchase? The answer to this question depends on the value you attach to what you have to **give up** to purchase the gasoline (the price of gasoline). This relates to your **affordability** to purchase the product.

Let's assume, for our example here, that the price of gasoline is \$5 per gallon. This is the cost to you and what you have to give up. Money has utility, just like products do. Let's assume that \$5 is worth 150 utils to you, and let's assume that this remains constant even as you spend your money throughout the month (realistically, as you have less money at the end of the month, the marginal utility of your money increases. But, in our example, for simplicity, we will assume that your money has constant marginal utility).

Using the marginal utility values in the above table, and knowing that \$5 (our hypothetical price of gasoline) is worth 150 utils to you, how many gallons of gasoline will you choose to purchase?

Answer: 10 gallons.

Explanation: When you buy your first gallon, you gain 350 utils in satisfaction. You only give up 150 utils (\$5). You gain 200 utils, so you decide to buy your first gallon of gasoline. Will you decide to buy your second gallon? You gain 250 utils, while you give up 150 utils. You will decide to buy your second gallon. You go through the same process through the tenth gallon. The tenth gallon only gives you 151 utils, while you give up 150 utils. It may not seem much, but you are still gaining an one util in addition to the additional utils from the first nine gallons. Will you decide to buy your eleventh gallon? It gives you 147 utils in additional utility, while it costs you 150 utils. If you were to buy your eleventh gallon, you would lose 3 utils. Clearly, you would not do this, and you would buy ten gallons, but not eleven.

What happens if the price of gasoline decreases to \$4.50? Let's assume that \$4.50 is worth 135 utils to you. Applying the analysis above, you conclude that you will purchase 15 gallons of gasoline, as this will maximize your satisfaction.

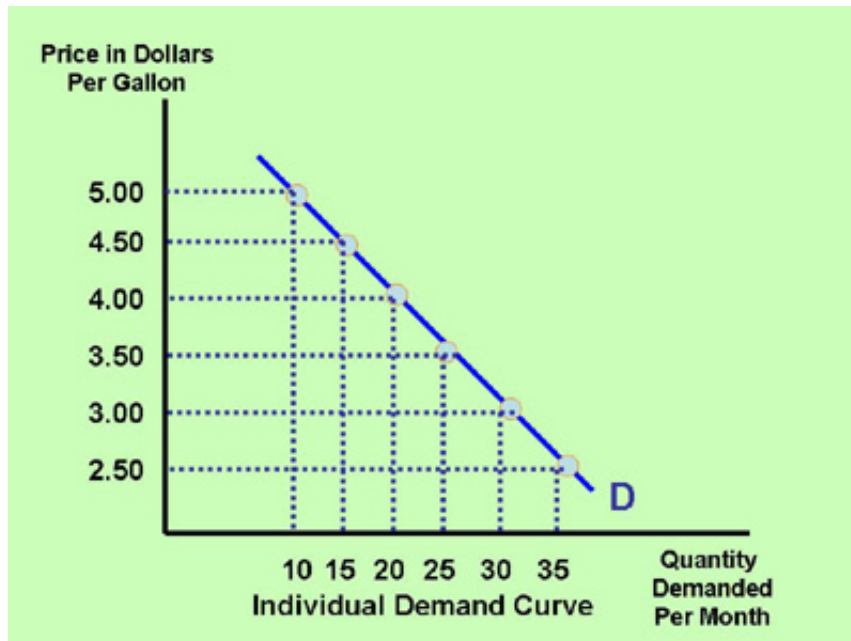
The same can be done for any other price. Below is a table that indicates these value preferences. This table also represents your individual demand curve for gasoline.

Your Own Individual Demand Curve

The graph in the previous paragraph shows the **market** demand for one product. Market demand is the total demand for a product by all consumers. Total demand is the sum of all **individual** buyers' demand. Below we look at one individual buyer's demand curve for gasoline.

Price per Gallon	Total Number of Gallons Purchased Per Month (Quantity Demanded)
\$5.00	10
\$4.50	15
\$4.00	20
\$3.50	25
\$3.00	30
\$2.50	35

A graph of this buyer's demand schedule for gasoline looks like this:



The Market Demand Curve

To arrive at the market demand curve we add every individual buyer's demand schedule. For example, if the market for gasoline consists of 1,000 buyers, then the market demand schedule looks like the following table (for simplicity, we assume that every buyer's demand schedule is identical to the individual in the previous paragraph).

Price per Gallon	Total Number of Gallons Purchased Per Month (Quantity Demanded)
\$5.00	10,000
\$4.50	15,000
\$4.00	20,000
\$3.50	25,000
\$3.00	30,000
\$2.50	35,000

Based on the numbers in the table above, the graph of the the market demand schedule for gasoline looks like this:



Section 3: The Law of Supply

Price and Quantity Changes

The law of supply states that, *ceteris paribus*, product suppliers offer more of a product at higher than at lower prices. If the product price is high, the supplier can make greater profits by selling more (assuming the cost of production is constant and there is sufficient demand). A video game, for which the demand is high and therefore the price as well, will be supplied at greater quantities because the higher price makes firms willing and able to supply more.

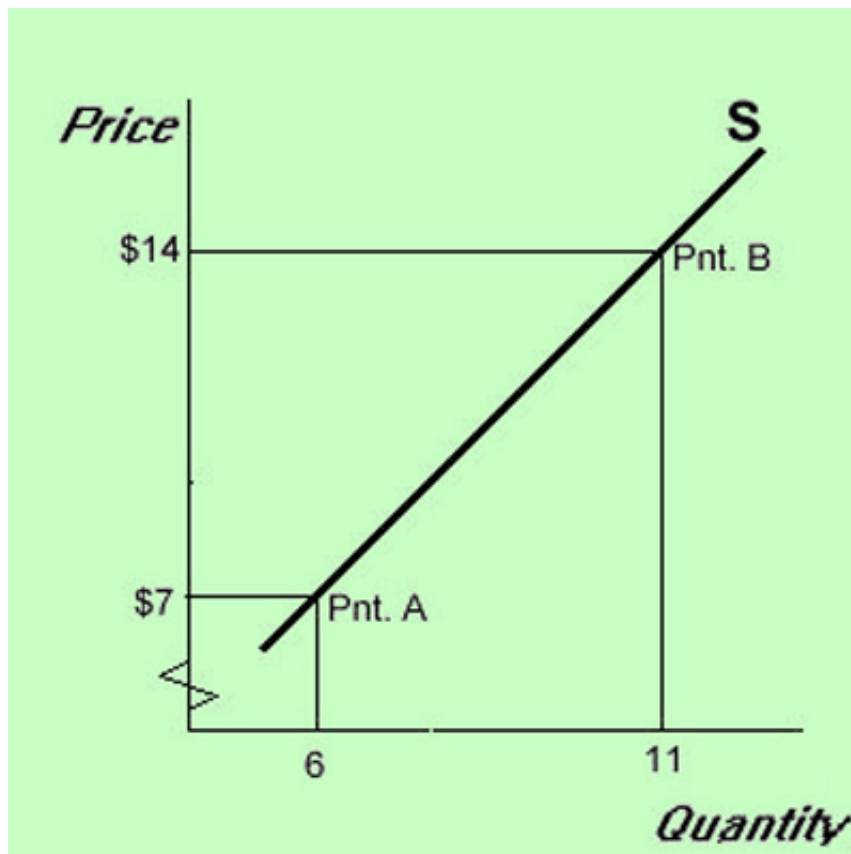
Income and Substitution Effects

When firms can get a higher price for their product, and they are still able to sell approximately the same amount, their income or revenue increases. This is the income effect of changing prices. The other effect is the "substitution effect." The supplier's substitution effect states that as the market price of a product increases, other competing products, *ceteris paribus*, will become less attractive to produce. Suppliers will substitute the higher priced product for the less expensive product (and vice versa). If the market price for Grover, the Sesame Street stuffed animal, increases in price, and Big Bird does not increase in price, then suppliers will want to make more Grovers. They are more attractive and more profitable to make compared to the Big Bird stuffed animals.

Section 4: The Supply Curve

Graphing the Supply Curve

A supply curve slopes upward from the bottom left to the upper right of the diagram. At higher prices, firms are willing and able to sell more than at lower prices. We say that there is a direct relationship between price and quantity supplied.



The above diagram shows that on supply curve S, suppliers supply 6 units of this product when the price is \$7 (point A) and 11 units when the price is \$14 (point B).

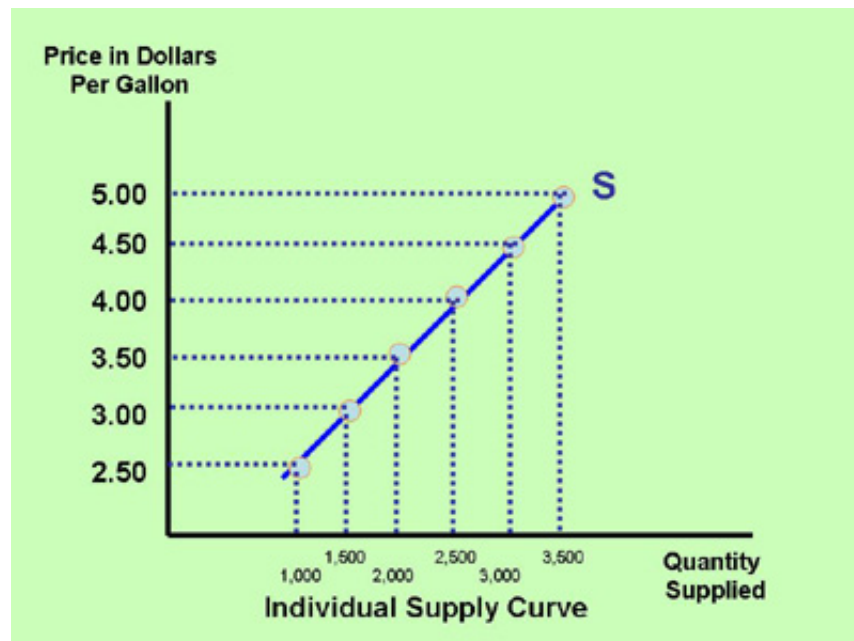
An Individual Firm's Supply Curve for Gasoline

Below is an example of a hypothetical supplier's supply schedule for gasoline. The supplier is willing and able to sell the quantities at the respective prices.

Price per Gallon	Total Number of Gallons Supplied Per Month (Quantity Supplied)
\$5.00	3,500
\$4.50	3,000
\$4.00	2,500
\$3.50	2,000
\$3.00	1,500

\$2.50	1,000
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A graph of this individual supplier's demand schedule for gasoline looks like this:

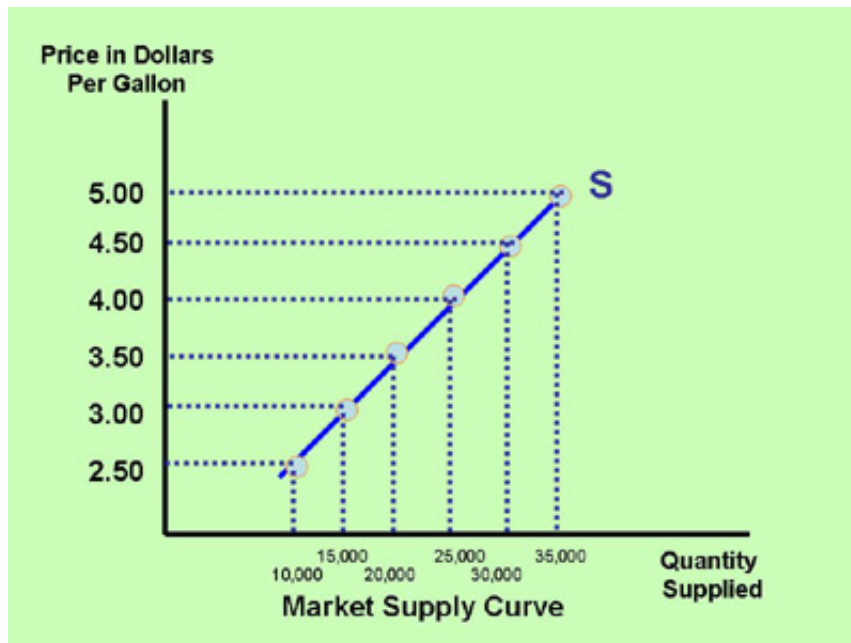


The Market Supply Curve for Gasoline

A supply curve for the entire market of this product is simply the sum of every individual supplier's supply schedule. For example, if the market for gasoline consists of 10 suppliers, then the market supply schedule looks like the following table (for simplicity, we assume that every supplier's supply schedule is identical to the individual supplier in the previous paragraph).

Price per Gallon	Total Number of Gallons Purchased Per Month (Quantity Demanded)
\$5.00	35,000
\$4.50	30,000
\$4.00	25,000
\$3.50	20,000
\$3.00	15,000
\$2.50	10,000

Based on the numbers in the table above, the graph of the market supply schedule for gasoline looks like this:



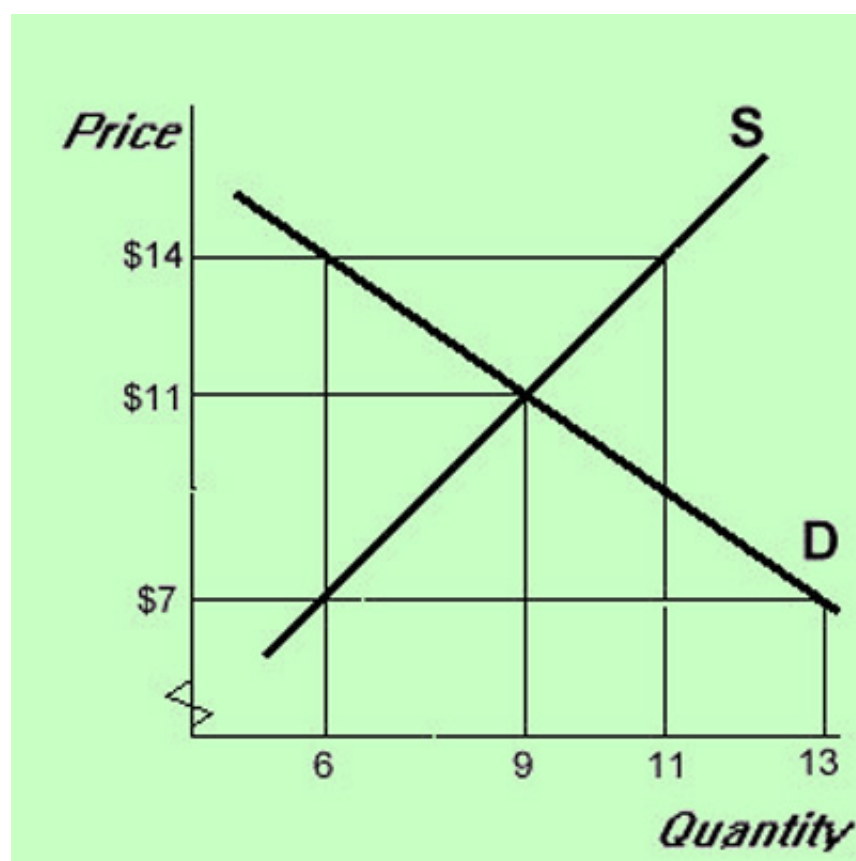
For a video explanation of how to graph a supply curve, please watch:

[YouTube Video](#)

Section 5: Equilibrium Price and Quantity

The Market Price and Quantity

In addition to the shortage, there are other consequences of the government's price ceiling. Because of the increased quantity demanded landlords have less incentive and because of the lower rent they have less rental income to maintain the rental properties. This usually leads to a deterioration of the rental units. Due to the shortage of rental units in the inner city, the demand for properties not subject to rent controls increases. This increases the price of non-rent-controlled properties.



In the graph above, the market is at equilibrium at a price of \$11 and a quantity of 9. If the price were set at \$7, a **shortage** of 7 products results. At \$7 the quantity demanded is 13 (from \$7 go straight over to the demand curve) and the quantity supplied is 6 (from \$7 go straight over to the supply curve). Similarly, if the price were set at \$14, a **surplus** of 5 units (11 minus 6) results.

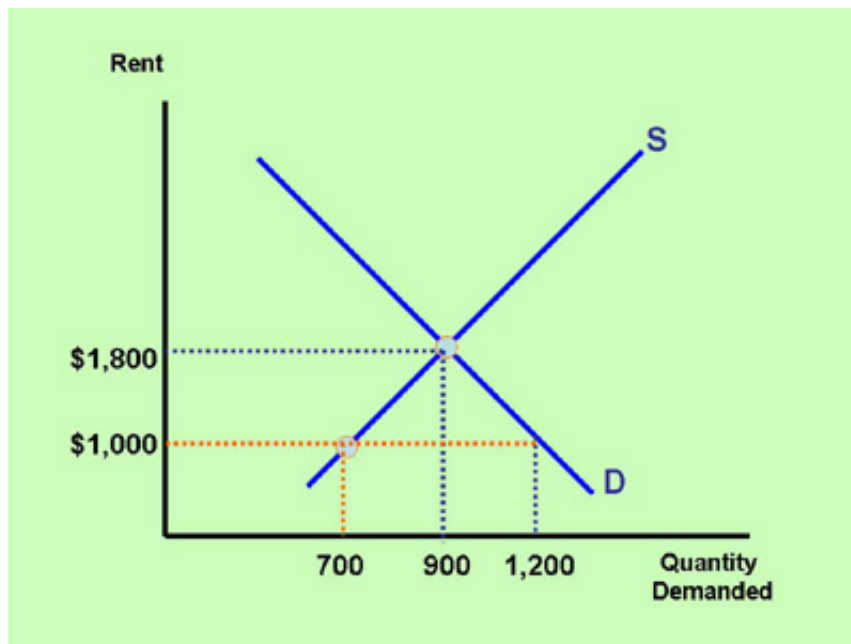
For a video explanation of the equilibrium price and quantity, please watch:

[YouTube Video](#)

Below are some supply and demand applications, in which we study what happens when the government, instead of the free market, determines the price.

The Case of Rent Control

Rent control is an example of a price set **below** the equilibrium point. This is called a **price ceiling**. In the graph below, the equilibrium (market) price of a rental unit is \$1,800 per month. The city government wants the rental units priced at no more than \$1,000 per month, so that more tenants can afford to live in the inner city. The lower-than-equilibrium rent causes the quantity supplied of rental units to decrease to 700 units, because suppliers have less incentive to build and own rental units at the lower price. The quantity demanded increases to 1,200, because the lower price encourages more buyers. This results in a shortage of 500 rental units (1,200 minus 700).



In addition to the shortage, there are other consequences of the government's price ceiling. Because of the increased quantity demanded landlords have less incentive to provide an excellent product, and because of the lower rent they have less rental income to maintain the rental properties. This usually leads to a deterioration of the rental units. Due to the shortage of rental units in the inner city, the demand for properties not subject to rent controls increases. This increases the price of non-rent-controlled properties.

Rent control also makes discrimination more likely. Hopefully, landlords don't discriminate when they accept tenants. However, when landlords have a waiting list of people applying for the lower-rent units, landlords who want to discriminate can more easily do so. At market prices, this is less likely to be the

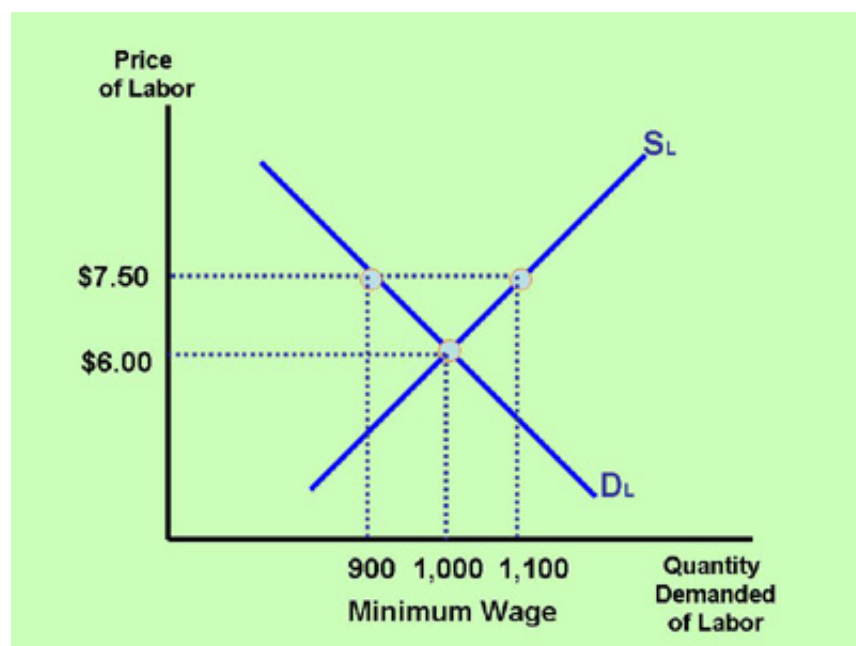


case. As rents are higher, there are far fewer waiting lists, and

landlords are more likely to accept tenants based on their ability to pay, rather than on their race, ethnic origin, and lifestyle. Despite these disadvantages, rent controls are still in existence in various big cities around the industrialized world. Politicians often focus on the short-term social benefits of helping the poor, but are not always aware of the long-term economic disadvantages. Furthermore, they receive pressure from tenants, who ask for lower rent and more-affordable housing. Politicians are tempted to oblige tenants' wishes, because there are far more tenants who vote than landlords.

The Case of the Minimum Wage

The minimum wage is an example of a price set **above** the equilibrium point. This is called a **price floor**. In the graph below, the equilibrium price of labor (the market wage) is \$6.00 per hour. The government determines that it wants firms to hire workers at a minimum of \$7.50, so that workers can earn more money per hour and better afford their daily expenditures. The higher-than-equilibrium wage causes the quantity supplied of labor to increase to 1,100 workers, because workers have more incentive to work at a higher wage. The quantity demanded of labor decreases to 900 workers, because the higher wage discourages firms from hiring workers. This results in a surplus of workers (unemployment) of 200 workers (1,100 minus 900).

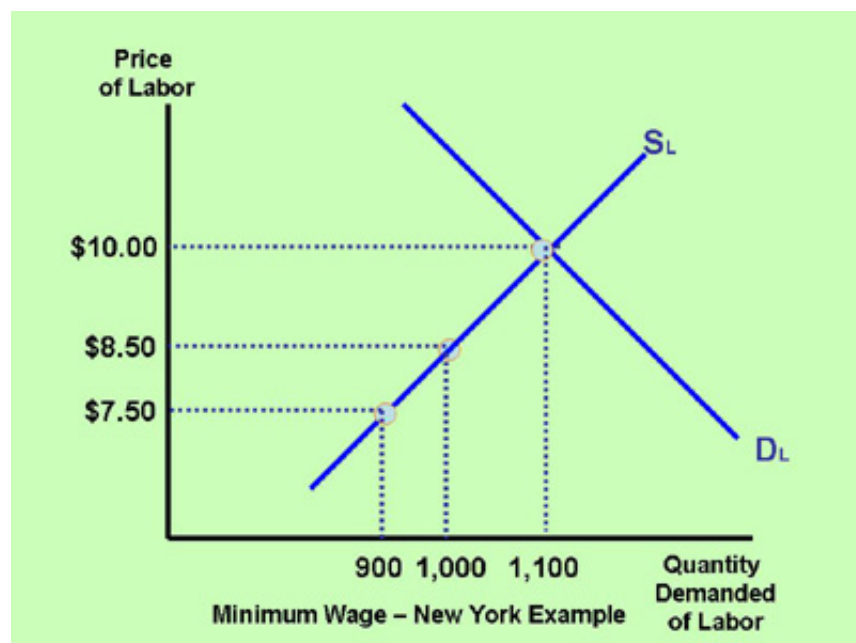


Minimum wage is a hotly debated topic. The graph above predicts that an increase in the minimum wage causes unemployment. Some studies, however, claim that an increase in the minimum wage has no significant effect on unemployment. Both studies can be correct, depending on the market conditions. Below is an example of a case study in which the minimum wage increases, but there is no effect on employment or unemployment.

The Case when the Market Wage is above the Minimum Wage

Let's say that the equilibrium (market) wage in the New York metropolitan area for a certain type of worker is \$10.00 per hour (see graph below). If the state government of New York raises the minimum wage from \$7.50 to \$8.50 (hypothetical example), the minimum wage will still be below the market

wage. Therefore, there is no effect of an increase in the minimum wage on employment.



The Case when the Market Wage is below the Minimum Wage

If in another state the equilibrium (market) wage is \$4.50 per hour, and the state government increases the minimum wage to \$6.50 per hour, then businesses are required to pay many workers more per hour compared to what they were paying at the market wage. This will increase the incomes of workers who are able to keep their jobs. And it will lead to unemployment of workers (especially full-time workers), because the higher wage decreases the quantity demanded of labor and increases the quantity supplied.

Critically Analyzing Minimum Wage Studies

As you can see, the effect of an increase in the minimum wage differs, depending on whether the market wage is above or below the minimum wage. Another reason for discrepancies in studies on the minimum wage is that employment definitions vary. Economists Card and Krueger concluded in their study on the minimum wage that after the minimum wage increased in New Jersey, employment actually rose. The measure of employment they used was "the number of jobs held by people." However, another measure of employment, which they did not use, is "the number of hours worked by people." Using the latter definition, employment decreased. To illustrate this difference, consider the following example.

Let's say that as a result of an increase in the minimum wage, the number of full-time jobs decreases by 400, and the number of part-time jobs increases by 500. This can be expected as businesses, faced with a higher wage, decide to replace full-time workers with part-time workers in order to save money on benefits and reduce the total hours worked. Assuming that full-time workers work a 40-hour week, and part-time workers work a 20-hour week, the total number of hours worked declines by 16,000 (400 workers times 40) hours, and increases by 10,000 (500 times 20) hours. On balance, the number of hours worked decreases by 6,000. However, the total number of jobs increases by 100. As you can see, measuring employment by the total number of jobs (this is how our nation's unemployment rate is calculated and this is the definition Card and Krueger used - see Unit 1, section 7 on critical thinking) can

be deceiving and can lead to bad government policy.

For a video explanation of how the minimum wage affects employment, please watch:

[YouTube Video](#)

Section 6: Demand Determinants

Reasons for a Shift in the Demand Curve

Demand can increase or decrease. In this case, the demand curve shifts to the right or to the left, respectively. The following are reasons:

1. A change in buyers' real incomes or wealth.

When buyers' incomes change, we distinguish between two products: normal products and inferior products.

The demand for a normal product increases if buyers experience an increase in real incomes or wealth. If buyers' real incomes increase, they can afford to purchase more electronic devices, clothes, food, and other products. Consequently, the demand for these products increases.

However, some products may experience a decrease in demand as buyers' real incomes increase. These products are called **inferior products**. A person who is forced to eat macaroni and cheese each day on a minimal budget may choose to buy steak when her/his income increases. This means that the demand for macaroni and cheese decreases as this buyer's income increases. In this case, macaroni and cheese is considered an inferior product, and steak is considered a **normal product**. Another example of an inferior product is public transportation. Typically, as buyers' incomes increase, the demand for public transportation decreases (and vice versa).

The term "inferior" in economics is a bit of a misnomer because it does not mean that the quality of the product is inferior (the quality of the macaroni and cheese may be perfectly fine). It merely refers to the product's demand changes as a result of buyers' income changes.

2. Buyers' tastes and preferences.

As a product becomes more fashionable or useful, its demand increases. Big screen televisions, smart phones, electric vehicles, organic food, online products, and virtual reality games have all gained in popularity and have experienced increases in demand. As some products gain in popularity, others lose. The demand for the less popular products decreases.

3. The prices of related products or services.

Consider the market for potato chips. The demand for it will go down (assuming no other changes) if the price of a related good, for example, pretzels, decreases.



Potato chips and pretzels are so-called substitutes.

If the price of a substitute decreases, then the demand for the other product decreases (and vice versa). A related good can also be a complementary product. This is a product consumed not in place of, but along with, another product. A decrease in the price of potato chips increases the demand for potato chip dip. If the price of a complementary product decreases, the demand for the other product increases (and vice versa).

4. Buyers' expectations of the product's future price or the product's future availability.

If people believe that toilet paper will become more expensive, or if people expect there to be a shortage in the near future, more people will buy the product now (and vice versa). This increases current demand, and shifts the demand curve to the right. This will have the eventual effect of actually increasing the real price in the short run (an increase in demand increases the price). It is a self-fulfilling expectation, a common phenomenon in economics.

5. Buyers' expectations of their future income.

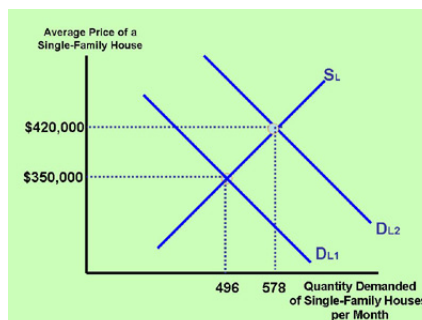
When buyers expect their income to increase, they will increase their demand for normal products and decrease their demand for inferior products. Many people anticipate their future increased (or decreased) incomes by changing their consumption habits now.

6. The number of buyers (population).

If the population of buyers of a certain product increases, we experience an increase in the demand for that product. With the aging of the Baby Boomers we can anticipate a rise in the demand for products that senior citizens typically purchase (insurance, health care, travel, nursing care). If we experience another baby boom, the demand for baby products will increase.

Section 7: The Effect of a Change in Demand on Equilibrium Price and Quantity

An Increase in Demand



Demand changes for any of the six reasons listed in the previous section.

When the demand curve shifts to the right **demand** increases. The market price increases, as does the equilibrium quantity (in the short run).

A Decrease in Demand

When the demand curve shifts to the left, equilibrium price and quantity decrease (in the short run).

Video Explanation

For a video explanation of how a change in buyers' incomes changes the demand (and the equilibrium price and quantity) for a normal good, please visit:

[YouTube Video](#)

Section 8: Supply Determinants

Reasons for a Shift in the Supply Curve

Supply can increase or decrease. In this case, the supply curve shifts to the right or to the left respectively. The following are reasons:

1. An advance in technology.

An advance in the technology of making the product will lower the cost of producing it. This means that the firm increases its profits, and it has more incentive to increase its supply.



2. A change in the price of an input used to make the product.

When the price of an input, such as labor, raw materials, machinery, or land, decreases, the firm makes more profit per product and is willing and able to increase the supply of the product (and vice versa).

3. A change in taxes, subsidies, or regulations.

Taxing or imposing additional regulations on the manufacturing of a product lowers the supply, because the total cost of making the product increases. A subsidy, a government grant to a business or individual, or a reduction in regulations increases supply. Public schools, community colleges, and public universities receive subsidies from local and state governments. These additional funds allow schools to supply more courses and hire more teachers and professors than would be the case if they did not receive government funds.

4. The number of suppliers.

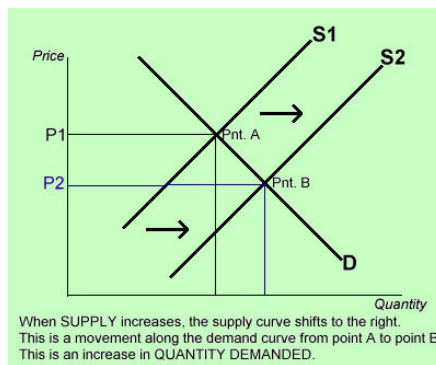
When more firms decide to enter the market, the supply of the product increases (and vice versa). In some industries, the number of suppliers is controlled by industry agencies, which require licenses, permits, diplomas, etc. The American Medical Association sets strict requirements regarding the entry of doctors into the industry. This safeguards a certain level of quality and protects consumers, but also restricts the number of suppliers, and keeps doctors' prices higher than otherwise would be the case. These changes shift the supply curve (see next section). A shift in the supply curve is called a change in supply (not quantity supplied).

If a natural disaster (like a flood or hurricane) occurs, it takes away production capacity. This decreases supply.

Section 9: The Effect of a Change in Supply on Equilibrium Price and Quantity

An Increase in Supply

Supply changes for any of the four reasons listed in the previous section.



An increase in **supply** is illustrated by a rightward (or downward) shift of the supply curve. This decreases the price and increases the quantity sold.

A Decrease in Supply

A decrease in **supply** is illustrated by a leftward (or upward) shift of the supply curve. This increases the price and decreases the quantity sold.

Section 10: The Effect of Changes in Both Demand and Supply on Equilibrium Price and Quantity

A Summary of how Demand and Supply Changes Affect Prices and Quantities

The following summarizes the important relationships between changes in demand and supply and their corresponding equilibrium prices and equilibrium quantities changes. These are changes that take place in the short-term (usually within several months). In the long run (one year or longer), most products (especially manufactured goods subject to a fair amount of competition) will experience further price and quantity changes. Long run price changes are discussed in more detail in a later section in this unit. When we refer to "equilibrium price" it represents the price or market price, meaning the price that the grocery store, department store, gas station, etc. charges in a free market. When we mention "equilibrium quantity", it represents quantity or the amount of a certain product bought and sold in a store or where ever goods and services are sold.

When Demand Increases ==> Price Increases and Quantity Increases
When Demand Decreases ==> Price Decreases and Quantity Decreases
When Supply Increases ==> Price Decreases and Quantity Increases
When Supply Decreases ==> Price Increases and Quantity Decreases

A Simultaneous Increase in Demand and Supply

From the previous sections, we know that an increase in demand increases equilibrium price and quantity (and vice versa), and an increase in supply decreases equilibrium price and increases quantity (and vice versa). What happens if both demand and supply change at the same time?

Let's analyze the following examples.

Example 1

Problem: Suppose that you know that consumers' incomes have gone up, and that an advance in technology has lowered the cost of making computers. Assuming that a computer is a normal good, what will happen to the equilibrium price and quantity of computers as a result of these two simultaneous changes?

Solution: An increase in consumers' incomes increases the demand for computers. This increases the equilibrium price and equilibrium quantity. An advance in technology increases the supply. This decreases the equilibrium price and increases the equilibrium quantity. Combining these two effects, the equilibrium quantity increases because the equilibrium quantity increases in both instances. The equilibrium price increased and then decreased, so on balance, it will either increase, decrease, or stay the same, depending on the size of the shifts in the curves. If demand increases more than supply, then the price increases, and vice versa. If we don't know the magnitude of the shifts, we say that the price is indeterminate.

In summary:

Consumer Incomes ? ? Demand ? ? Price ? and Quantity ?

Advance in Technology ? Supply ? ? Price ? and Quantity ?

Combined Effect = Price change unknown (indeterminate) and Quantity increases

Example 2

Problem: Buyers expect prices of jewelry to increase in the near future, and at the same time, the government decides to tax the production of jewelry. What effect does this have on the market price and output of jewelry?

Solution: Current demand for jewelry increases because buyers expect the price to increase in the future. This increases the equilibrium price and the equilibrium quantity. Supply of jewelry decreases because the increased tax makes it less attractive for firms to supply the product. This increases the price of jewelry and decreases the quantity bought/sold. The combined effect is that the price of jewelry increases, and the equilibrium quantity change is indeterminate. Note that when both demand and supply shift, one variable (price or quantity) experiences a definite change, and the other is indeterminate (unless you know the magnitude of the shifts). When only one curve shifts, both equilibrium price and quantity experience a definite change.

In summary:

Expected Future Price ? ? Demand ? ? Price ? and Quantity ?

Production tax ? ? Supply ? ? Price ? and Quantity ?

Combined Effect = Price increases and Quantity change unknown (indeterminate)

Video Explanations

For video explanations of how changes in both demand and supply affect the equilibrium price and quantity of a product, please watch the following:

[YouTube Video](#)

[YouTube Video](#)

[YouTube Video](#)

[YouTube Video](#)

The labor market is a special case of supply and demand. The demand for labor is the businesses' willingness and ability to hire workers. The supply of labor is the workers' willingness and ability to work at certain wage rates. For a labor market application of supply and demand changes and their effects on the equilibrium price of labor (the wage rate) and the equilibrium quantity (the number of workers hired), watch:

[YouTube Video](#)

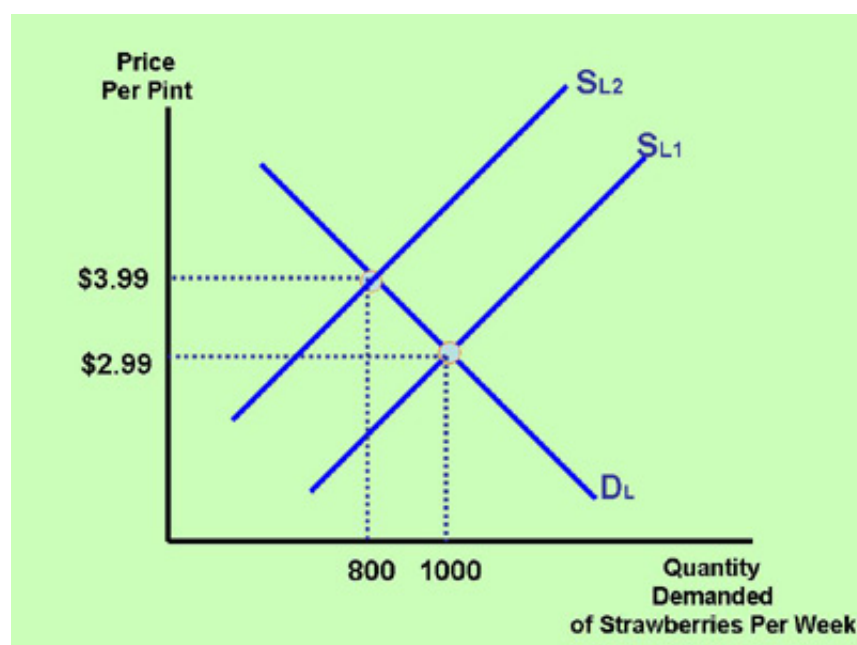
Section 11: Demand versus Quantity Demanded and Supply versus Quantity Supplied

The Difference Between Demand and Quantity Demanded

We learned in an earlier section that as the price of a product increases, the amount purchased by buyers decreases. This is the law of demand. In a more recent section, we noticed that as demand increases, the price of a product increases. When you look at these two statements together, it may appear confusing and contradictory. However, the two statements are both valid. It is merely a matter of what causes what; in other words, which is the cause and which is the effect? To understand the difference more clearly, we need to study the difference between **demand** and **quantity demanded**.

Quantity Demanded

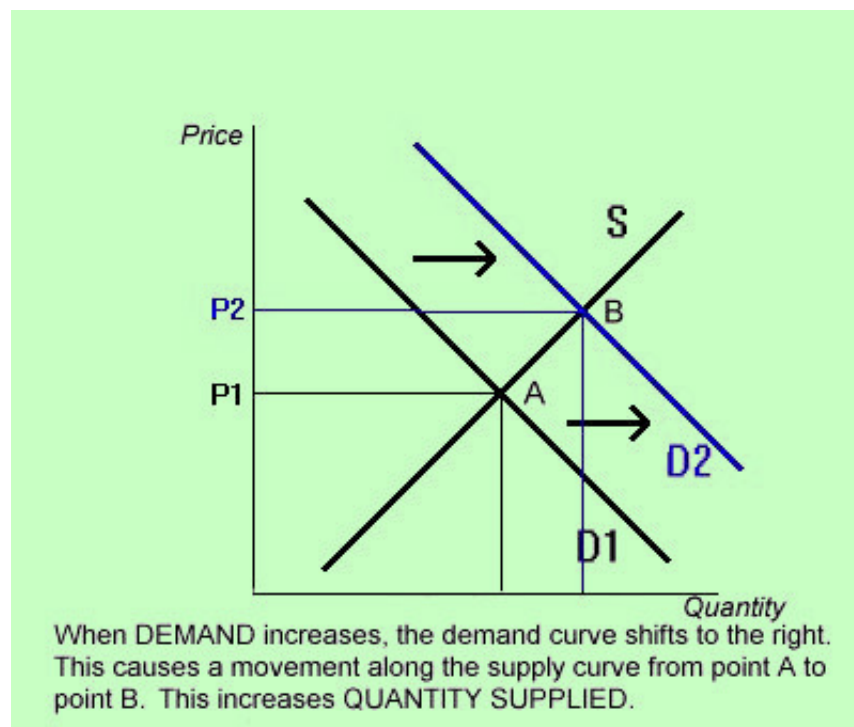
If the market price of a product decreases, then the **quantity demanded** increases, and vice versa. For example, when the price of strawberries decreases (when they are in season and the supply is higher; see graph below), then more people will purchase strawberries (the quantity demanded increases). A quantity demanded change is illustrated in a graph by a movement **along** the demand curve.



Demand

When one or more of the six demand determinants listed in Section 6 changes, then **demand** changes. For example, when buyers' incomes increase, the **demand** (not quantity demanded) for a normal product increases. Or when the price of a substitute product decreases, then the demand for the product in question decreases. Or when the number of buyers increases, the demand increases, and the price of the product increases. An increase in demand is illustrated in a graph by a **rightward shift** in the demand curve.

The following graph illustrates an increase in **demand**:



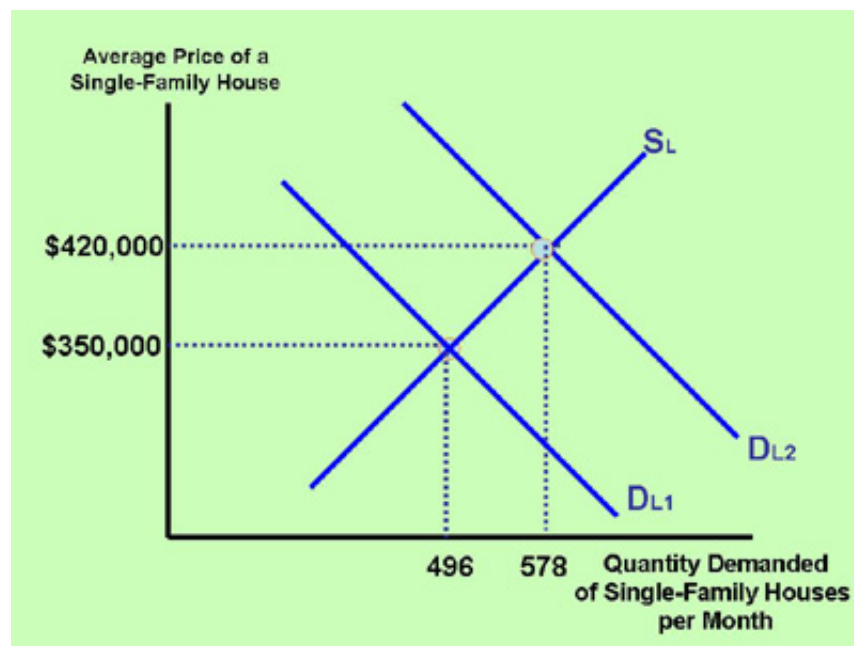
In the graph above, **demand** increases as D1 shifts to D2. **Quantity supplied** increases in the above case as the equilibrium point shifts along the supply curve from point A to point B.

The Difference Between Supply and Quantity Supplied

The distinction between **supply** and **quantity supplied** is similar to the difference between demand and quantity demanded.

Quantity Supplied

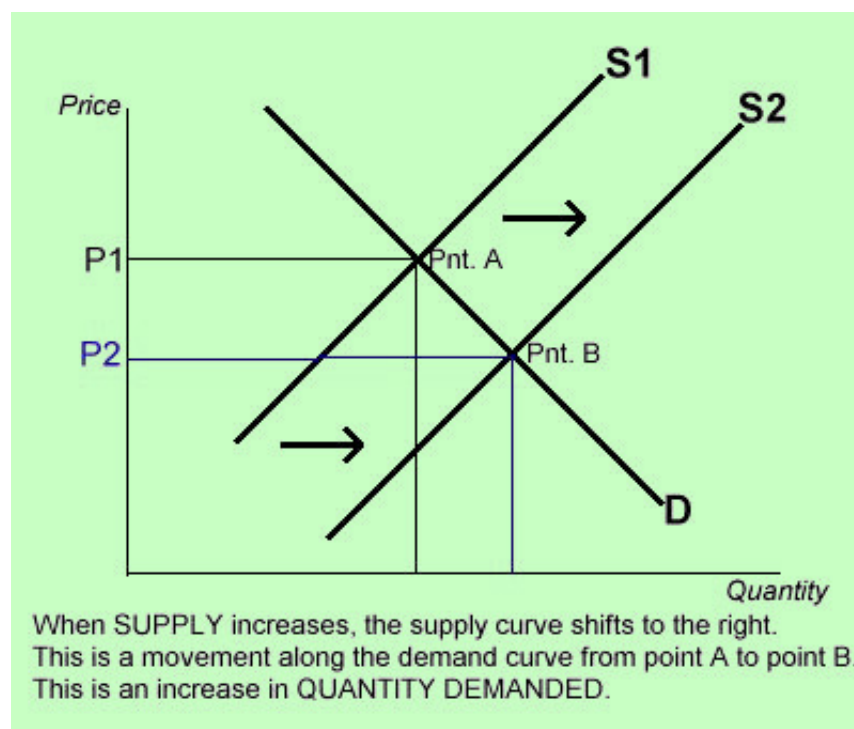
If the market price of a product increases, then the **quantity supplied** increases, and vice versa. For example, when housing prices increase (when the demand for houses has been strong), then more people will want to sell their house (quantity supplied increases). A quantity supplied change is illustrated in a graph by a movement **along** the supply curve.



Supply

When one or more of the four supply determinants listed in Section 8 changes, then **supply** changes. For example, when technology advances, or the cost of production decreases, **supply** increases. An increase in supply is illustrated in a graph by a **rightward shift** in the supply curve.

The following graph illustrates an increase in **supply** and an increase in **quantity demanded**.



The above diagram illustrates that supply increases as S_1 shifts to S_2 , and quantity demanded increases as the equilibrium point shifts along the demand curve from point A to point B.

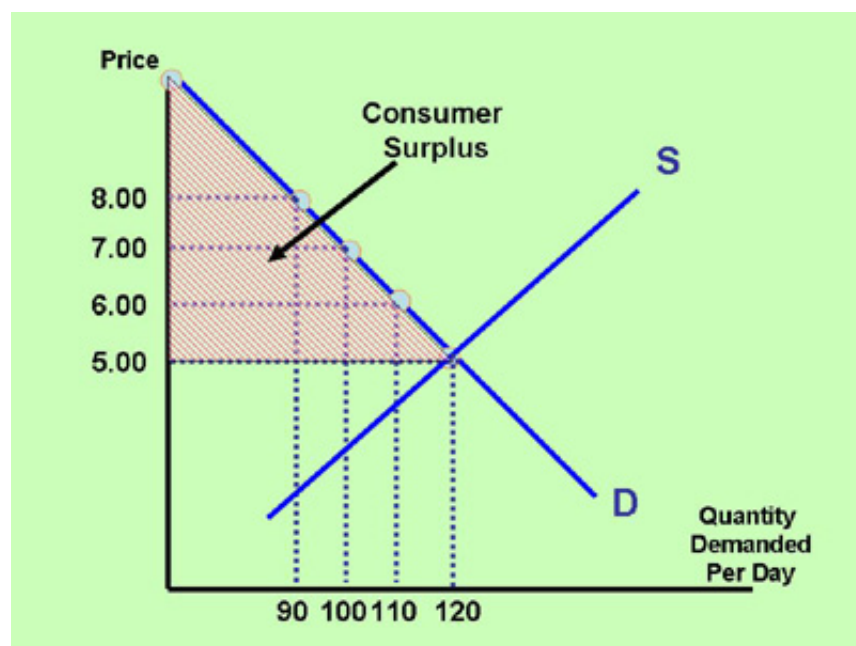
For a video explanation of the difference between demand and quantity demanded and supply and quantity supplied, please watch:

[YouTube Video](#)

Section 12: Consumer Surplus and Producer Surplus

Consumer Surplus

In the graph below, the supply and demand curves intersect at an equilibrium price of \$5 and an equilibrium quantity of 120 products. If the price had been \$6, buyers would have purchased 110 products. If the price had been \$7, buyers would have purchased 100 products. If the price had been \$8, buyers would have purchased 90 products, and so forth. This means that quite a few buyers would have been willing and able to pay more for the product than they are actually paying at the equilibrium price of \$5. At the equilibrium price of \$5 everyone pays that price, including the buyers who would have been willing to pay a higher price. The difference between how much consumers value a product and how much they actually pay for it at the equilibrium price is called **consumer surplus**. The consumer surplus in the graph below is illustrated by the shaded triangle.



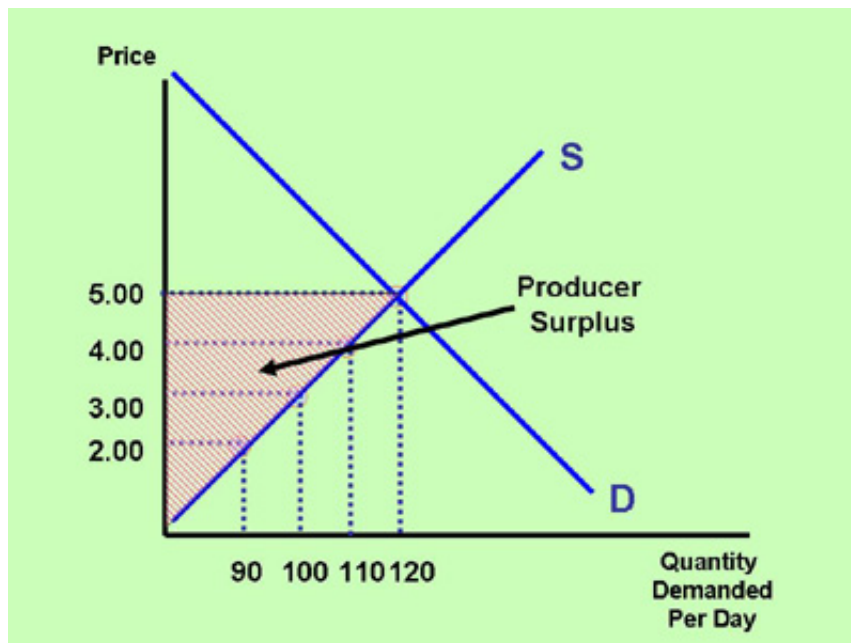
For a video explanation of consumer surplus, and how consumer surplus increases when demand and supply simultaneously increase, please watch:

[YouTube Video](#)

Producer Surplus

Producer surplus is similar to consumer surplus, but it measures the benefits of a trade for producers. Producer surplus is the difference between the minimum price at which producers would have been willing to produce the product and how much they are actually receiving at the equilibrium price. The producer surplus in the graph below is illustrated by the shaded triangle.

The total additional benefit to society of trading this product is the sum of consumer surplus and producer surplus. Can you figure out what happens to consumer surplus and producer surplus if both demand and supply increase (both curves shift to the right)?



Because the terms are so similar, it is easy to confuse a regular surplus, and a consumer or producer surplus.

A regular surplus (of a product) happens when businesses are charging a price that is higher than the equilibrium price. This happens when the price charged is above the equilibrium price (above the intersection of the supply and demand curves). For example, if a product's equilibrium price is \$5 but a business is charging \$6 (perhaps because of a government mandate), then there will be a surplus of products (businesses are producing more than what consumers are buying).

When we discuss consumer surplus, the price charged by businesses is the equilibrium price (it is not higher than the equilibrium). Consumer surplus is the concept that consumers benefit and gain value from buying a product at the equilibrium price. So let's say that the equilibrium price of a product is \$5. If 80 people would have been willing to pay \$6 for the product (because they value the product a lot) then the consumer surplus of these 80 people is \$1 each (or \$80 total). They are valuing the product at \$6, but they are paying the equilibrium price of \$5 per product.

The concept of producer surplus is the same as consumer surplus, except that it applies to producers who sell the product instead of consumers.

For a video explanation of producer surplus, please watch:

[YouTube Video](#)

Section 13: Price Changes in the Short Run and in the Long Run

Categories of Products

Prices of some categories of goods increase in the long run as demand rises, while others do not. Here we distinguish between products that are in **limited supply**, such as land, labor, raw materials, and sports and performance event tickets, and **manufactured** products, or ones that are in nearly unlimited supply in the long run. The latter category of products includes products such as grocery items, clothes, cars, and electronic products.

Products in Limited Supply

In the long run, prices of products that are in limited supply fluctuate much more with changes in demand than products that are in abundant supply. Examples of limited supply goods and services include land, labor, natural resources such as oil, gas and minerals, tickets to major sporting events (the World Series, the Superbowl, or the World Cup Soccer final), and products supplied by a monopoly.

If, for example, the demand for land in a certain area rises because of increased population and increased housing activity, the price of the land will increase. Because the supply of land is limited, the price of the land can remain high for a long period of time as long as the demand remains high.

Products supplied by a monopoly are limited because the firm may be the sole owner of a resource, or the firm may have a patent, a license, or other government approval to be the only supplier. The limited supply will cause the price of the product or service to be high and remain high in the long run if the



demand is high.

Manufactured Products

Prices of products in abundant supply, or so-called manufactured products (except those produced by a monopoly), generally do not remain high in the long run. For example, let's take a look at the price of cheese. When the demand for cheese increases, the price increases in the short run. A higher price of cheese means that profits for the suppliers will be higher, assuming that the cost of production remains



constant. If the profits to produce and sell cheese exceed the average level of profits in other industries, more entrepreneurs (more cheese suppliers) will enter the industry. This increases supply and brings the price back down in the long run. Thus, in the long run the price will settle at a level where profits are normal or average and not excessive.

Prices of manufactured products are set such that they merely cover the cost of production, plus a fair (not excessive) allowance for a profit.

Section 14: The Free Market System and Externalities

The Free Market

In a free market economy, prices of goods and services, wages, interest rates, and foreign exchange values are determined by supply and demand. There is no interference from a government in the form of price controls, minimum or maximum wage laws, or other regulations affecting the market price of a product. No economic system is perfect, but a free market has been shown to be economically most efficient and one that leads to the highest standard of living. The following are specific advantages of a free market system.

Advantages of a Free Market System

1. Products are priced at their true worth.

The most important advantage of a free market system is that products are priced at their true "worth." The product's true worth is based on how much buyers and sellers value the product. This is reflected in the demand and supply of the product. Free market prices provide sellers with the greatest incentive to produce, and it ensures efficient production. Producers are always looking for the lowest cost and most efficient means to produce. It also provides consumers with the greatest purchasing value, as only those products are produced that consumers value. The demand for a resource (for example, labor) is based on how much businesses value the worker, which in turn is based on how much consumers value the product. The supply is based on the availability and cost of resources to make the product. The supply of labor is based on how much workers value the income from their work relative to the time sacrifice they are willing and able to make. If a certain occupation's income is high, consumers must be valuing the product highly, and subsequently, a worker has a greater incentive to enter the occupation. This responsiveness in the price system is what maximizes total economic value in society.

2. Greater incentives to work and a higher standard of living.

A free market with relatively low taxation encourages people to work hard and innovate. This profit incentive provides competition and entrepreneurship. Entrepreneurship leads to creation of jobs and production of products, which raise people's standards of living. Countries that have limited government interference in the free market have shown to be the most productive. The standard of living in politically and economically free, or mostly free, countries is the highest in the world, and poverty measured in absolute standard of living is the lowest.

3. Greater freedom.

A free market allows people the freedom to choose their occupation and the products they can afford to buy. Countries that encourage free markets while discouraging economic and social discrimination also usually allow for greater degrees of income mobility. People have opportunities and the freedom to improve their economic positions through innovation and hard work. Even poor immigrants who come to the country with nothing but their own courage and determination often succeed and work their way up the economic ladder.

Some claim that poor people in a free market system are not free because they cannot afford many of the luxuries that high income people have. Bear in mind though that as free market economies evolve, many products that were at first not affordable to the poor are now cheaper and affordable. Twenty years ago computers and mobile phones were too expensive for most people. Now just about every household has multiple computers and phones. New products are expensive at first because businesses have to recover millions and sometimes billions of dollars in research and development costs. Wealthy people buying these products when prices are high allow businesses to earn profits and to continue to sell and improve these products. Eventually prices decrease and they become affordable to many.

Disadvantages of a Free Market System

There are several disadvantages of a free market system, including the existence of

1. Income inequality.

This is listed as a disadvantage but, depending on your current or expected income or personal philosophy, you may see it as an advantage. In a free market system, a significant degree of income inequality is inevitable because workers get rewarded based on their productivity and different people have different productive capacities. Most people like some but not too much income inequality. Governments can narrow income inequalities by imposing higher tax rates on wealthier households, and/or by providing subsidies and government handouts to lower-income households. If products are still too expensive for some and are essential for survival (food, housing, health care and medicine), governments can provide vouchers or subsidies or impose price floors and ceilings (scroll down in this section for more details about price controls). Significant government redistribution of incomes may help some people, but reduce economic inefficiency and often have harmful unintended consequences in the long run (see one of the paragraphs below for an explanation of this).

2. There are externalities.

Externalities are benefits or costs that are generated apart from the benefits or costs related to the trade itself. An externality can be positive or negative. An example of a negative externality is pollution caused by a factory. If a factory pollutes, the polluted area and its residents will suffer. This imposes a cost on the residents, even though the residents may not be direct parties to the trade of the product produced by the factory. Since this cost is not reflected in the price of the product, governments often impose pollution fees or taxes. These funds can then be used to clean up the polluted area or subsidize the expense associated with the pollution cost.

Examples of positive externalities are health care services, education and training. When doctors, hospitals and community health organizations provide services (for example, inoculations) to keep people healthy, it also benefits people who are not using the health services. When fewer people get sick, especially if they are contagious, fewer other people get sick, too. In other words, even people not purchasing health services benefit from health services. Consequently, governments feel justified to collect taxes from everyone (since everyone benefits) in order to subsidize health care services for all.

Education and training benefit society in general, as relatives, friends, and businesses share in the benefits from the increased knowledge of the trained individual (assuming this person interacts with these members of society).

Most economists agree that government intervention in order to correct externalities is justified.

3. There are greater incentives for corruption and illegal activities.

Because free markets lead to higher standards of living and higher incomes, the financial rewards for cheating and breaking the law (if the person or business is not caught) are also greater. For example, if a bank knows that by breaking the law and deceiving its customers it can earn an additional \$500 million this year, the temptation for a bank to engage in this kind of behavior is great. Similarly, if financial rewards for athletes are significant, it encourages more athletes to cheat. In an economic system in which high incomes and high rewards don't exist (usually a non-free market system), these temptations are less prevalent (even though many citizens in less free and less-developed countries now engage in cyber crimes in order to steal money from people and businesses in wealthier countries).

Illegal and unethical behavior harms the efficient operations of a free market. Proponents of free markets support governments who punish this type of behavior via a strong and honest legal system.

Public Goods and the Free Rider Problem

Public goods are goods and services provided by the government without a direct charge to the user of the good. Examples of public goods are public education, public transportation, public roads, bridges, highways, defense, a legal system, and police and fire protection. In general, it is difficult or undesirable for these goods to be provided by private businesses. Defense, for example, has to be provided by a government because it is difficult to charge individuals for this service. Thus, the private sector may under-allocate resources relative to our needs in the case of public goods.

Typical of publicly provided goods and services is that some people contribute very little or nothing to the revenue (taxes) that the government collects. This means that they get to use the good or service for free, without any cost. This is called the **free rider** problem. Even for people who contribute taxes, their marginal cost of using the public good or service is less than their marginal benefit and therefore there tends to be over-consumption of this good or service.



Let's take a look at public transportation, for example.

If public transportation were to charge each user the actual cost of the service, it may charge, for example, \$4 per ride. People will use the service as long as the benefit of each ride exceeds the marginal cost of each ride (\$4). However, if the government decides that the cost of public transportation will be borne by

society and not by each individual user, the following will happen. Each ride still costs the government \$4. If there are 200 riders, the total cost to the government is \$800. Let's say that there are 8,000 taxpayers contributing to the funds to pay for public transportation. This means that each taxpayer contributes an average of \$0.10 to pay for public transportation.

If we increase the number of riders from 200 to 201, the total cost to the government increases by \$4. As the cost is borne by 8,000 taxpayers, the marginal cost for each tax-paying citizen is only \$0.10. For most riders the marginal benefit of using public transportation is greater than \$0.10, so the tendency is for users to over-consume this product, as long as the government continues to not charge for individual use of the public transportation. This free rider phenomenon is typical of all publicly provided goods, and is a disadvantage because it leads to over-consumption and inefficiency. For this reason, most economists support private production, as long as individuals can be charged for the service separately. Defense, police, and fire protection, by nature, must be publicly provided. Banking, insurance, and retirement plan services, for example, can be privately provided. Many of these services are, indeed, provided by the private sector. However, some are not. Some economists would like to see government unemployment insurance programs (Unemployment Compensation), government banking insurance programs (the Federal Insurance Deposit Corporation), public health care programs, and government retirement systems (Social Security) be replaced by private companies. Even the provision of roads and highways can, in the future, be provided by private companies, as new and less-expensive computer scanning equipment becomes available.

Free Market Interferences

When a government interferes with the workings of the free market, inefficiencies in the market occur in the form of shortages, surpluses, misallocations of resources, malinvestments, and business losses. Government interferences in the area of prices, wages, interest rates, profits, etc. may benefit some groups or individuals. However, from a macroeconomic and efficiency (productivity) point of view, these actions are usually harmful, especially in the long run.

Price Ceilings

A price ceiling is a price below the free market price. Let's say a product's equilibrium price is \$10 and the government requires manufacturers to sell the product for \$8. Consumers prefer buying the product at this lower price. However, producers, faced with lower revenue, will have much less incentive to make the product. Some may produce the product with cheaper ingredients and at a lower quality to try to bring the cost down to less than \$8. Other manufacturers will stop producing the product. A shortage of the product likely results.

Price Floors

A price floor is a price above the free market price. Sometimes governments require the price of a product or resource (for example, labor) to be higher than the market price (or wage). Governments do this to help suppliers. If the market price is \$10, and the government establishes it at \$14, then producers have an incentive to produce more. They will experience higher profits per product. However, the higher price turns away consumers. Consequently, less of the product will be sold in the market, and surpluses result.

The government's purpose for interfering with market prices (for example, setting a minimum wage) is to remedy social problems, such as poverty and homelessness. Economic evidence shows that this interference is usually accompanied by other, sometimes more severe, problems in the long run.

Rent Control

In the case of rent control in large cities, the government requires landlords to keep the rent of their apartments and houses below the free market level. The result is that it becomes unprofitable for many landlords to invest in property or build additional properties. The rent that the government allows is not worth the landlord's expenses and investments. Furthermore, it is more attractive for builders and landlords to invest in areas in which there is no rent control. Consequently, the supply of properties in the rent-controlled area decreases and shortages occur. The tenants who rent at the government-controlled price may feel fortunate at first. However, the property will suffer from poor maintenance because the landlords have no incentive to invest money in it and because there is a long waiting list of tenants. Rent control also prevents thousands of people from acquiring anything at all because the artificially low rent discourages potential builders from building additional dwellings.

Correcting Income Inequalities

The government reduces income inequalities by imposing high taxes on the wealthy and providing government handouts to the poor. By doing this, the government runs the risk of taking away incentives for workers to be productive. If a productive worker and a non-productive worker receive the same rewards (after taxes and government handouts), why work hard?

Taxation

Given that some functions of government are essential to the effective operation of our economy, it is essential that government collects at least some taxes. It also seems fair that high-income earners contribute more to the government than low-income earners. However, a government is wise to ensure that more-productive workers are rewarded appropriately for their efforts. If a government redistributes incomes too much by levying high rates of taxation, people lose the incentive to innovate, produce, work hard, and create jobs. Too much redistribution of incomes leads to a decrease in employment and a decrease in a country's standard of living, as has been evident in the failing economies of past and current communist nations.

Crony Capitalism

When a bank fails, should a government bail it out in order to avoid job losses? When an economy struggles, should a government increase its spending or increase the money supply in order to stop the economy from stagnating? Many people support these types of government actions and believe that they are part of capitalism. However, these are examples of "crony capitalism". Pure capitalism needs businesses to fail if they are inefficient or mismanaged. Government bailouts and other types of corporate welfare may save some jobs in the short run, but hurt productivity, employment, and the overall standard of living in the long run because rewarding inefficient businesses encourages them to continue to be inefficient. Bailouts and increased government spending also raise taxes and national debts, and therefore hurt efficient businesses who then may not be able to hire as many workers as they otherwise would have.

Introduction

What's in This Chapter?

In Unit 2, we learned that if the price of a product increases, the amount demanded decreases. But how much does it decrease? The "how much" describes the concept of price elasticity of demand. If the price of a product increases and the amount demanded decreases by a lot, then the product is elastic. If it decreases by a little bit, or not at all, then the product is inelastic.

Different products have different elasticities, and different people have different elasticities. Businesses use the various elasticities of people and products to make better decisions about how to maximize their profits. For example, airlines often charge more to business travelers than to tourists, because business travelers have lower price elasticities of demand. Airlines attempt to distinguish between business travelers and tourists by placing restrictions (for example, Saturday stay required) on when and how long people can fly for certain fares. Governments can also use elasticity in determining the amount of tax on a product. There are high taxes on low-elasticity products such as gasoline and cigarettes, because raising taxes on gasoline or cigarettes is expected to not significantly affect the amount of these products demanded.

This unit will also discuss other types of elasticities, such as income elasticity of demand, cross price elasticity of demand, and price elasticity of supply



Section 1: Demand Curves and Elasticity

Price Elasticity of Demand

Price elasticity of demand measures the responsiveness of buyers to a price change. If the price of gasoline increases by 10%, how will this affect the amount of gasoline purchased? Will the amount purchased decrease by more than 10%? Will the amount purchased decrease by less than 10%? Will the amount purchased decrease by exactly 10%? Or will the amount purchased not change at all? Once we know the price elasticity of demand, we can answer these questions, because price elasticity of demand measures the relationship between the percentage change in the amount purchased and the percentage change in the price.

To calculate price elasticity of demand, we need to have price and quantity demanded data. A demand schedule and its corresponding demand curve give us the data. How do we know the location and shape of a product's demand curve?

The Derivation of a Demand Curve

Economists who estimate the shape and the location of a product's demand curve, usually look at the following:

1. **Historical data.**

Price and quantity data show how consumers have responded to past changes in the price and quantity demanded of the product. Price and quantity demanded changes must be looked at in isolation of other variables. Prices may change, but so may other variables, such as buyers' incomes and prices of related products. It is, therefore, important to estimate price and quantity demanded changes assuming other variables remain constant (*ceteris paribus*).

2. **Surveys.**

You can simply ask consumers how they would respond to a future change in the price of the product. This may not always be accurate, because consumers don't always know in advance how they will respond to a price change. However, data from surveys allow economists to estimate the location and slope of a demand curve. When we know the location and the slope (the angle) of a product's demand curve, we can determine its **price elasticity of demand**.

The Formula for Price Elasticity of Demand

The law of demand states that as the price of a product decreases, quantity demanded increases, and vice versa. Elasticity measures **how much** less people buy of that product when the price rises, and vice versa.

We calculate price elasticity of demand by looking at the ratio of

e = The percentage change in quantity demanded divided by the percentage change in the price of the product

Or abbreviated:

e = % change in Q / % change in P

Where:

1. The % change in Q = the change in quantity demanded / the average of the two quantities demanded.

And:

2. The % change in P = the change in price / the average of the two prices.

The above formula for calculating percentages is called the "arc" formula. There are other ways to calculate percentages, but the arc formula is the most accurate and most commonly used in economics.

Examples of how to Use the Formula for Price Elasticity of Demand

Let's look at several examples to see how to use the formula in the previous paragraph.

Example 1

Problem: Let's say that a department store sells pillows, and that in a typical week, buyers purchase 6 pillows when the price is \$21. After the department store decreases its price to \$19, it observes that buyers now purchase 10 pillows per week. Given these changes, what is the price elasticity of demand for the department store's pillows?

Solution: Remember that $e = (\text{the change in quantity demanded} / \text{the average of the two quantities demanded}) / (\text{the change in the price} / \text{the average of the two prices})$.

The change in the quantity demanded is 10 pillows minus 6 pillows, or 4. The average of these quantities is 8 (the sum of the two quantities (6 plus 10) divided by 2).

The change in the prices is \$21 minus \$19, or \$2. The average of the two prices is \$20 (the sum of the two prices (\$19 + \$21) divided by 2).

Therefore:

$$e = ((10 - 6) / 8) / ((\$21 - \$19) / \$20)$$

$$= (4 / 8) / (\$2 / \$20)$$

$$= (.5) / (.1) = 5.$$

Therefore, the price elasticity of demand for the above product is 5.

The 5 means that the percentage change in the amount purchased is 5 times greater than the percentage change in the price. In other words, buyers are very sensitive to this price change. When the pillows decreased in price, buyers responded strongly. The price decreased by only 10% (.1), but the amount purchased increased by 50% (.5).

Officially, the above number is -5 (negative 5), because the price **decreased**, while the quantity purchased **increased**. Because price elasticity of demand is always a negative number, economists leave out the negative sign, and express price elasticity of demand as its positive, or absolute, value.

Example 2

Problem: A grocery store observes that at \$2/gallon, buyers purchase 800 gallons of milk per day. At \$3/gallon, buyers purchase 700 gallon of milk per day. What is the price elasticity of demand for milk?

Solution:

1. The change in quantity demanded = 100
2. The average quantity demanded = 750
3. The change in price = \$1
4. The average price = \$2.50
5. So, $e = (100 / 750) / (\$1 / \$2.50)$
 $= (.133) / (.4)$
 $= .3325$

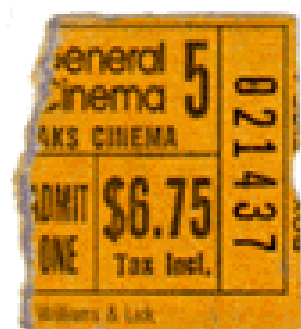
So the price elasticity of demand for milk given the above data is .3325. This means that if milk increases in price by 40% (.4), then the quantity demanded of milk decreases by 13.3% (.133). Relatively speaking, buyers are not very sensitive to a price change.



Example 3

Problem: A movie theater observes that at \$6 per movie ticket, 1,800 people attend the movie each week. At \$4.80 per movie ticket, 2,600 people attend the movie each week. What is the price elasticity of

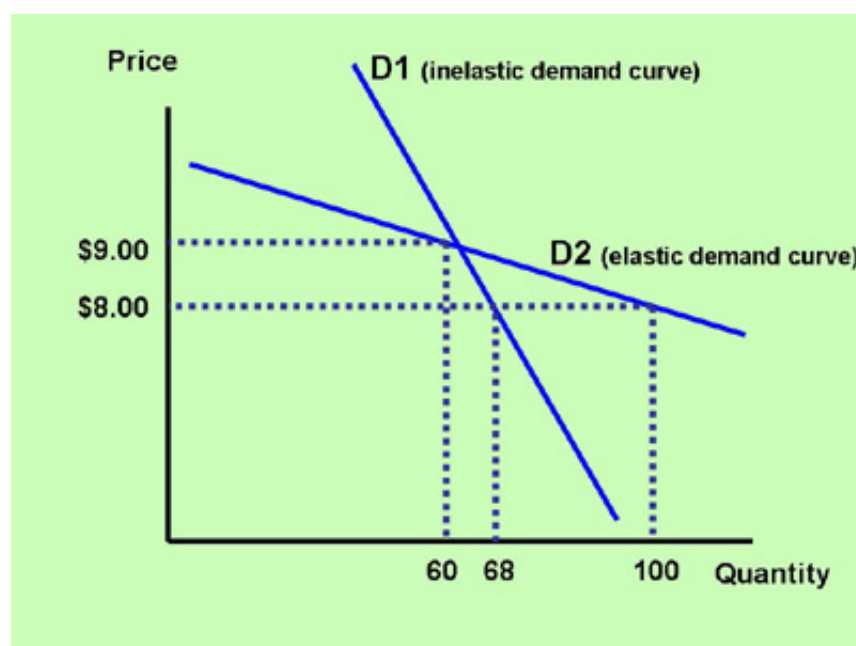
demand for movie tickets?



Section 2: Elasticity and the Slope of the Demand Curve

Demand Curves and Elasticity

Elasticity affects the slope of a product's demand curve. A greater slope means a steeper demand curve and a less-elastic product. In the graph below, the steeper demand curve, D1, shows a change in quantity demanded of 8 products (from 60 to 68) when the price changes by one dollar (from \$9 to \$8). The flatter demand curve, D2, shows a change in quantity demanded of 40 products (from 60 to 100) when the price changes by \$1 (from \$9 to \$8). Clearly, the flatter demand curve shows a much greater quantity demanded response to a price change. Therefore, it is more elastic.



For a video explanation of how elasticity and the slope of the demand curve are related, please watch:

[YouTube Video](#)

Perfect Elasticity and Perfect Inelasticity

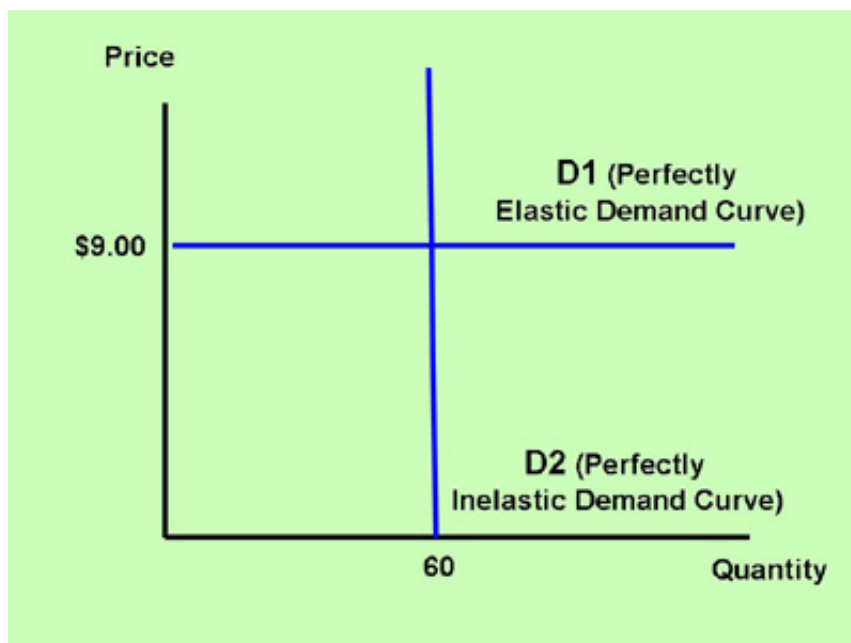
Perfect elasticity is when a product can only be sold at one price (as in the case of a perfectly competitive firm - see our Unit 6). If the price changes then the quantity demanded changes to zero. In the graph below, if the demand curve is D1 (perfect elasticity), buyers only buy the product at \$9. They buy nothing at any other price.

Perfect inelasticity is when buyers purchase a certain quantity (60 in the graph below), regardless of the price. They buy 60 products at \$1 or \$2 or \$100 or any other price.

Perfect elasticity and perfect inelasticity are two extremes. No product is perfectly elastic or perfectly inelastic. However, some products come close. A medicine that is the difference between life and death is close to perfectly inelastic. If their lives depend on it, buyers are willing to pay just about anything to get it.

A product that has many substitutes comes close to being perfectly elastic. A farmer, who sells grain competes with other farmers selling the same product. Grain from farmer A is nearly identical to grain from 100 or more other grain farmers. Therefore, if farmer A raises her/his price above the market price (for example, \$9), then buyers will purchase zero products from farmer A (assuming the other farmers keep their price at \$9). The farmer also cannot lower her/his price, because it would lower her/his profits to a level where (s) (s)he would go out of business. Thus, the farmer faces a horizontal demand curve and a market-controlled equilibrium price.

Another example of products that have close to perfect elasticity are the newspapers and magazines sold in newspaper stands in large cities. Competitors are selling these products at the exact same price due to the intense amount of competition between them.



Section 3: Determinants of Price Elasticity of Demand

Elasticity Determinants

Some products are elastic (buyers are price sensitive), and some products are inelastic (buyers are not price sensitive). What makes people more sensitive to one product's price change compared to another product's price change? Some people will choose to not buy a car if its price increases by 10%, but are unaffected by an increase of 10% in the price of a bag of salt.

The three determinants of price elasticity of demand are:

1. The availability of close substitutes.

If a product has many close substitutes, for example, fast food, then people tend to react strongly to a price increase of one firm's fast food. For example, if Burger King increases its prices by 10% and competitors like Wendy's, McDonald's, Taco Bell, and Subway don't, then many customers will switch to these competitors and Burger King's quantity demanded will decrease significantly. Thus, the price



elasticity of demand of this firm's product is high.

2. The importance of the product's cost in one's budget.

If a product, such as salt, is very inexpensive, consumers are relatively indifferent about a price increase. Therefore, salt has a low price elasticity of demand. Cars are expensive and a 10% increase in the price of a car may make the difference whether people will choose to buy the car or not. Therefore, cars have a higher price elasticity of demand.

3. The period of time under consideration.

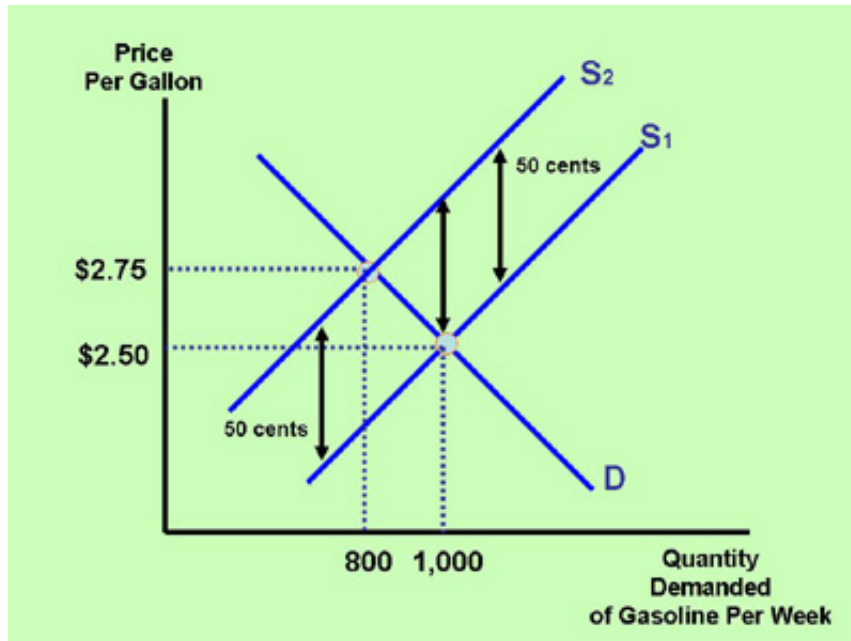
Price elasticity of demand is greater if you study the effect of a price increase over a period of two years rather than one week. Over a longer period of time, people have more time to adjust to the price change. If the price of gasoline increases considerably, buyers may not decrease their consumption much after one week. However, after two years, they have the ability to move closer to work or school, arrange carpools, use public transportation, or buy a more fuel-efficient car.

Elasticity and the Effect of a Tax Change on the Price of the Product

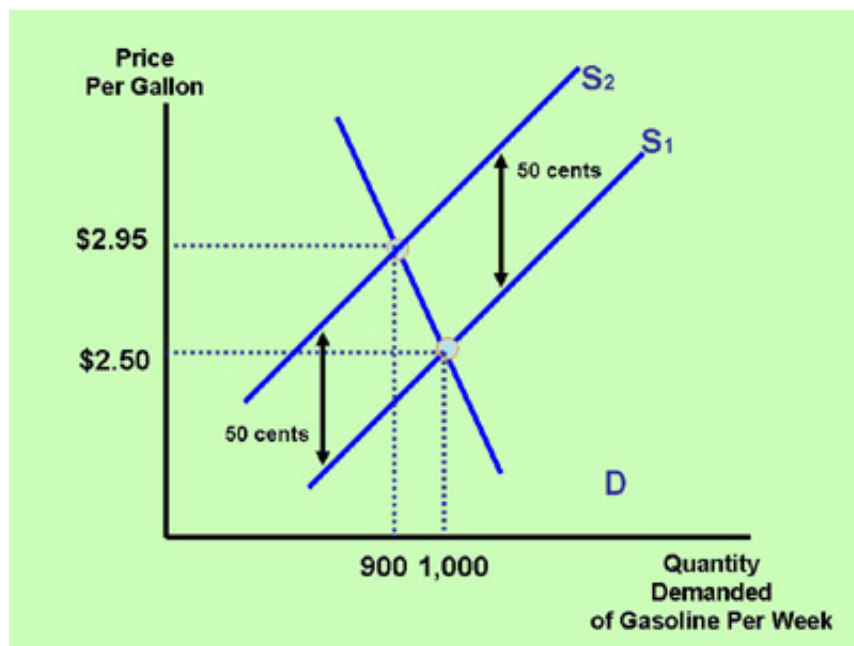
If a government increases the sales tax on a product by 50 cents, does that mean that the equilibrium price of the product will increase by 50 cents? The answer is no. Typically, the equilibrium price will increase

less than 50 cents. How much it will increase depends on the product's elasticity. Let's take a look at an example.

Let's assume that a state government increases the tax on gasoline by 50 cents. This means that the cost of supplying the gasoline increases by 50 cents. In the graph below, the supply curve shifts leftward. Note that the vertical difference between supply curve S_1 and supply curve S_2 is 50 cents (the increase in the cost of supplying the gasoline). The equilibrium price, however, did not increase by 50 cents, because the demand curve is sloped at an angle. The burden of any tax is typically shared between consumers and suppliers. In the graph below, the tax is shared equally as the price increases by 25 cents.



In the graph below, the demand curve is steeper than the demand curve in the graph above. This means that the product is less elastic. Consequently, most of the burden of the tax is born by the consumers. In general, for less-elastic products (steeper demand curves), the burden of the tax is mostly on the consumers. For more-elastic products (flatter demand curves), the burden of the tax is mostly on the suppliers.



Section 4: Elasticity and Total Revenue

Definition of Elastic, Inelastic, and Unit Elastic Demand

By definition:

1. A product is elastic when its elasticity is greater than 1.

When a product is elastic and its price changes, the percentage change in quantity demanded is greater than the percentage change in the price. For example, if buyers purchase 20% fewer products as a result of a 10% price increase, then the product is elastic.

2. A product is inelastic when its elasticity is less than 1.

The numerator (percentage change in quantity demanded) of the elasticity formula is less than the denominator (percentage change in price). For example, if buyers purchase 6% fewer products as a result of a 15% price increase, then the product is inelastic.

3. A product is unit elastic when its elasticity is equal to 1.

If a product's price rises by 8% and its quantity demanded decreases by 8%, then the product is unit elastic.



Elasticity and Revenue

When a product is elastic, and its price rises, what happens to the firm's total revenue?

A firm's total revenue is equal to the number of products it sells times the price of the product. Therefore:

Total Revenue = Price times Quantity

or

$TR = P \times Q$

For example, if a store sells 30 pairs of shoes at \$10 each, then its revenue equals 30 times \$10, or \$300. If the store sells 20 pairs of shoes after the price increases to \$25, then its total revenue equals 20 times \$25, or \$500. Thus, the store's total revenue increases.

In the above example, P (the price) increased, so, therefore, Q (the quantity demanded) decreased, and total revenue increased. Does a price increase always lead to total revenue increase? The answer is "no". It depends on the product's elasticity. Let's look at the following example.

A supermarket sells 50 oranges at \$1 each. Its revenue equals 50 times \$1 or \$50. If the store sells 20 oranges after the price increases to \$2, then its revenue equals 20 times \$2, or \$40. Thus, the store's revenue decreases.

If a product is **elastic**, the percentage change in the quantity demanded change is greater than the percentage change in the price. Therefore, for an elastic product, if the price increases, the percentage change in the quantity demanded decreases by a greater amount, and the firm's revenue will decrease, and vice versa.

If a product is **inelastic**, the percentage change in the quantity demanded change is smaller than the percentage change in the price. Therefore, for an inelastic product, if the price increases, the percentage change in the quantity demanded decreases by a smaller amount, and the firm's revenue will increase, and vice versa.

In summary:

Section 5: Income Elasticity of Demand, Cross Price Elasticity of Demand, and Price Elasticity of Supply

Income Elasticity of Demand

Income elasticity of demand measures the percentage change in a buyer's purchase of a product as a result of a percentage change in her/his income. So income elasticity of demand is

$e_i = \text{the percentage change in demand} / \text{percentage change in income}$
or
 $e_i = (\text{change in demand} / \text{average demand}) / (\text{change in income} / \text{average income})$

Example 1

If a person decides to buy 20% more bananas because of a 10% income increase, the person's income elasticity of demand for bananas is 20% / 10%, or 2.

Example 2

If a person decides to buy 50% **fewer** boxes of spaghetti because of a 20% income increase, the income elasticity of demand for spaghetti is (-50%) / (+20%), or -2.5. Note that when income elasticity is negative, the product is an "inferior" product (see Unit 2 for the difference between inferior and normal products). A person may decide to buy fewer boxes of spaghetti after an income increase, because the person can now afford to buy more expensive substitutes.

Unlike **price** elasticity of demand, we cannot ignore the minus sign for **income** elasticity of demand, because income elasticity of demand can be either positive (for a normal good), or negative (for an inferior product).

Cross Price Elasticity of Demand

In the case of a product that has a substitute (like oranges and apples), the price change of one product affects the demand for the other. Cross price elasticity of demand measures this effect. The formula for the cross price elasticity of demand for product A relative to a price change in product B is



$e_{cp} = \text{the percentage change in the demand for product A} / \text{the percentage change in the price of substitute product B}$
or
 $e_{cp} = (\text{change in the quantities of product A} / \text{the average of the quantities of product A}) / (\text{change$

in price of product B / average of product B prices)

Example 1

Problem: What is the cross price elasticity of demand for Pepsi if the demand for Pepsi decreases by 10% after the price of Coke decreases by 5%?

Solution: Coke and Pepsi are substitute products. If Pepsi's demand decreases by 10% because Coke's price decreases by 5%, and assuming no change in the price of Pepsi and no change in other variables in the economy (*ceteris paribus*), then the cross price elasticity of demand for Pepsi relative to a price change in Coke is

$$e_{cp} = (-10\%) / (-5\%) = +2.$$

Example 2

Cross price elasticity of demand can also be computed for complementary products. Complementary products are products that are consumed together. Computer software and personal computers are complementary products.

Problem: What will be the cross price elasticity of demand for computer software if the demand for computer software increases by 45% because of a decrease of 15% in the price of personal computers?

Solution: The cross price elasticity of demand for computer software relative to a price change in personal computers is

$$e_{cp} = (+45) / (-15) = -3.$$

For cross price elasticity of demand, if the number is negative, the two products are complements. If the number is positive, the two products are substitutes.

Price Elasticity of Supply

Price elasticity of supply measures the percentage change in the quantity supplied by producers divided by the percentage change in the price of the product. We know from the law of supply that as the equilibrium price of the product increases, producers will supply more of the product. How much more will they supply as the price of a product increases by, for example, 10%?

Example 1

Problem: What is the price elasticity of supply if producers increase their quantity supplied by 30% as a result of a 10% price increase in the market price?

Solution: The price elasticity of supply is

$$e_s = (+30) / (+10) = 3$$

Price elasticity of supply is always positive, because the law of supply states that (*ceteris paribus*) as the market price increases, the quantity supplied increases.

In the above example, the price elasticity of supply is greater than 1. This means that it is elastic. An important determinant of price elasticity of supply is time. If a supplier is not able to increase its supply within a certain period of time because it doesn't have the resources to expand, or the resources are very inflexible (large pieces of machinery, fixed amount of land, etc.), then the price elasticity of supply is low. On the other hand, if a supplier's production process is very flexible, then its ability to expand its supply is greater. This increases the price elasticity of supply.

Video Explanation

For a video explanation of income elasticity of demand, cross price elasticity of demand, and price elasticity of supply, please watch:

[YouTube Video](#)

Introduction

What's in This Chapter?

This unit describes typical production behavior of businesses, and explains the difference between short-run and long-run production behavior. Businesses use different types of resources to produce their products. These resources include variable resources and fixed resources. Some businesses use primarily variable resources, and others rely on a large amount of fixed resources.

When we know something about a firm's production behavior, we can derive its cost functions. The relationship between production data and costs is discussed. This provides the foundation for a detailed description of cost functions in the next unit (Unit 5).

The last two sections of this unit discuss factor prices, the determination of wage and interest rates, and the concept of present value.



Section 1: Factors of Production

Factors of Production

The three types of factors of production (inputs) are:

1. Land.

Land includes land and other natural, non-man-made materials, such as raw materials, energy sources, and trees. The payment for the use of land is called "rent."

2. Labor.

Labor includes all forms of human productive effort, from blue collar (manual labor) to white collar (office and management work) to entrepreneurial activities (organizing resources, coming up with ideas, taking risks) to professional athletes and celebrities. Rewards for non-entrepreneurial labor are called wages, salaries, bonuses, or commissions. In this and future units, we will refer to all of these payments as "wages." We will refer to payments for entrepreneurial activities as "profits."



3. Capital Goods.

Capital goods represent the man-made machines, equipment, buildings, and other tools used to produce products. When we use the term "capital" by itself, we refer to money used to finance the purchase of capital goods. When businesses borrow money to purchase capital goods, they pay "interest" to the lenders.

Factor Prices

Factor prices are the payments for land, labor, and capital goods. They include

1. Wages.

Wages are the payments and rewards for (the price of) non-entrepreneurial labor.

2. Rent.

Rent is the payment and reward for the use of land.

3. Interest.

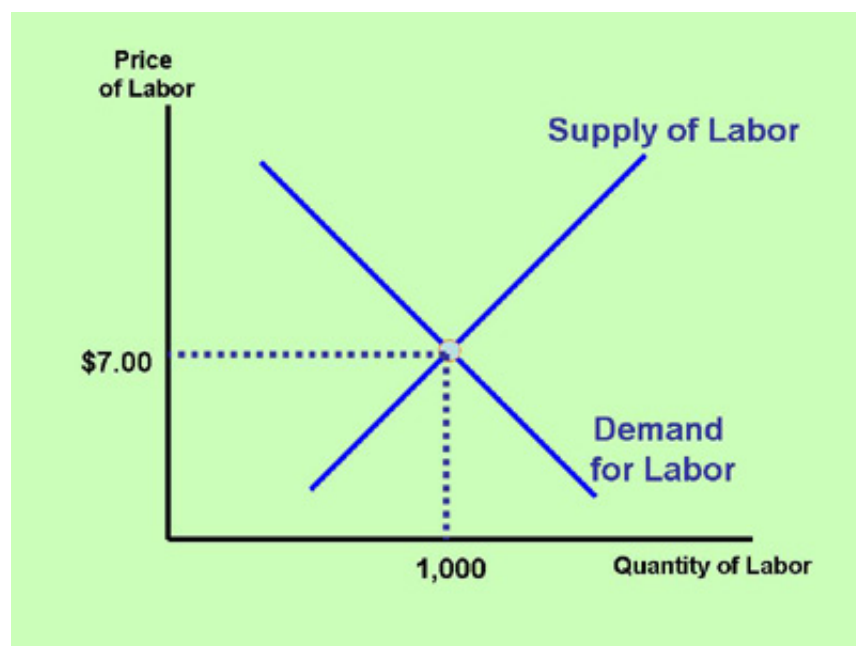
Interest is the payment and reward for capital (money) used to purchase capital goods.

4. Profits.

Profits are the payments and rewards for entrepreneurial efforts.

Factor Prices in the Free Market

Without government interference, prices of labor and land are determined by the supply and demand of these factors of production. If the demand for land increases (*ceteris paribus*), then the price of land increases, and vice versa. If the demand for a particular type of labor increases, then the price of this labor (the wage) increases, and vice versa. The graph below illustrates that in this example market, the equilibrium wage rate in the market occurs at a value of \$7. Just like the equilibrium price of a regular product, the equilibrium wage rate occurs at the intersection of the demand and the supply curve.



An increase in the demand for labor is illustrated by a rightward shift of the demand curve (see also Unit 2). This increases the equilibrium market wage. Conversely, a decrease in the demand for labor (a leftward shift of the curve) lowers the equilibrium wage. If we were to increase the supply of labor (a rightward shift of the supply curve), the wage rate would decrease, and vice versa. Famous athletes and other celebrities earn high wages because the demand for their services (labor) is very high, and the supply is low.

Government Price-Setting

As is true for products such as apples, computers, and houses, free market prices lead to the most economically efficient allocation of resources. If the government sets a price above or below the free

market equilibrium level, then a surplus or shortage of the factor of production will occur (see Unit 2). In a free and competitive market there are no long-run surpluses or shortages, and consumer and producer surplus are at their highest level. This is the definition of economic efficiency. Governments usually have good social intentions in controlling and setting the price different from the equilibrium price. A specific group may benefit in the short run, but economic efficiency suffers.

In addition to avoiding surpluses and shortages, a free competitive market system provides businesses with the most incentive to produce as efficiently as possible. The profit motive encourages businesses to increase productivity. Greater productivity in the long run leads to more jobs, higher real wages, and better products.

Section 2: Production Functions and the Law of Diminishing Marginal Production

Production Functions

A production function is a relationship between inputs (factors of production) and outputs (products). It illustrates how many workers and machines it might take to produce, for example, 1 bushel of wheat, 2 bushels of wheat, or 1,000 bushels of wheat.



Short Run versus Long Run

The short run is a time period during which a business cannot vary one or more factors of production. In other words, at least one input is fixed.

The long run is a time period during which the firm has the flexibility to change all inputs. It can buy more or bigger machines, hire more workers, and expand the building.

The length of the short and long runs varies for each company. For example, if a steel plant cannot vary the size of its factory and the number of its machines for a period of three years, then the short run for this company is a period shorter than three years, and the long run is a period longer than 3 years. On the other hand, if an Internet-based company can vary all of its factors of production, including the space in which it operates, the number of computers, and the number of workers, within three weeks, then the short run for this Internet-based company is a period shorter than three weeks, and the long run is a period longer



than three weeks.

Fixed and Variable Inputs

Fixed inputs remain constant in the short run, even as production decreases or increases. Examples of resources that are typically fixed in the short run include land, heavy machinery, buildings, and workers on long-term contracts.

Variable inputs can be varied in the short run. They increase or decrease as production increases or decreases. Inputs that are typically variable in the short run include hourly and part-time labor, office supplies, energy, and raw materials.

Total, Average, and Marginal Production

The table below contains a hypothetical car manufacturer's production schedule during a short-run period of time. We assume that the firm has fixed and variable inputs. For example, it has a fixed amount of land (and buildings) and a fixed number of machines with which to work. The only variable input is the



number of workers.

Marginal means "additional." **Marginal** production of labor is how much one additional worker adds to the total production. If a fourth worker joins the company and total production increases from 15 to 19, then the marginal production of this fourth worker is 4. **Average** production of labor is the production per worker. It is the total production divided by the number of workers. If total production is 15 at 3 workers, then average product of labor is 15 divided 3, or 5.

Number of Workers	Amount of Land in Acres	Total Production of Cars	Average Production of Labor	Marginal Production of Labor
0	2	0	-	
1	2	3	3	

2	2	7	3.50	
3	2	15	5	
4	2	19	4.75	
5	2	22	4.40	
6	2	23	3.83	

The Law of Diminishing Marginal Production

The law of diminishing marginal production states that when a firm uses a variable input, such as labor, the additional productivity of workers who are hired at a later stage is less than the additional productivity of workers who were hired first. In the table above, the firm can hire from 0 to 6 workers. The additional production of the first worker is 3 products. The additional production of the second worker is 4 products, and the additional production of the third worker is 8 products. Thus, the marginal production for the first three workers rises. This occurs because these first three workers are able to specialize in the work that is best suited to them.

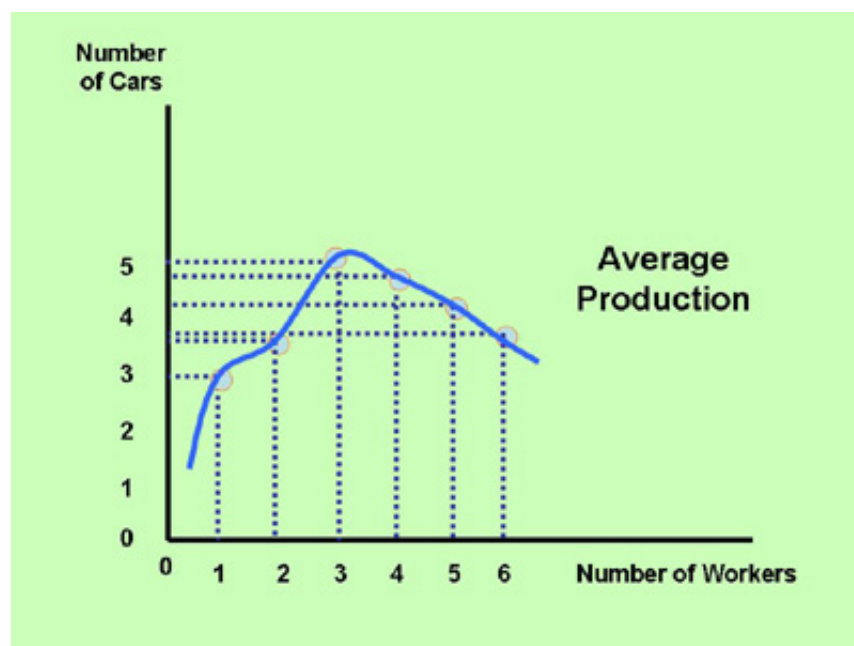
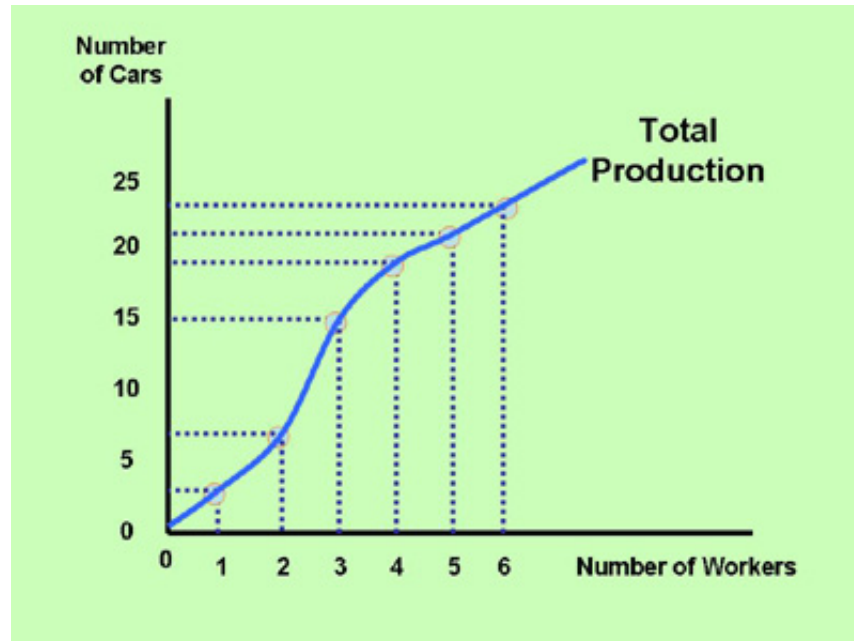
The specialization opportunities diminish for workers 4, 5, and 6. Because of the fixed inputs, there are not enough machines and offices to comfortably accommodate these additional employees. Subsequently, these workers are not as productive as the first three workers. Additional output of the fourth worker is only 4 products. The fifth worker adds only 3 products, and the sixth employee only contributes one additional product. The decrease in marginal production after a certain number of workers is known as the Law of Diminishing Marginal Production.

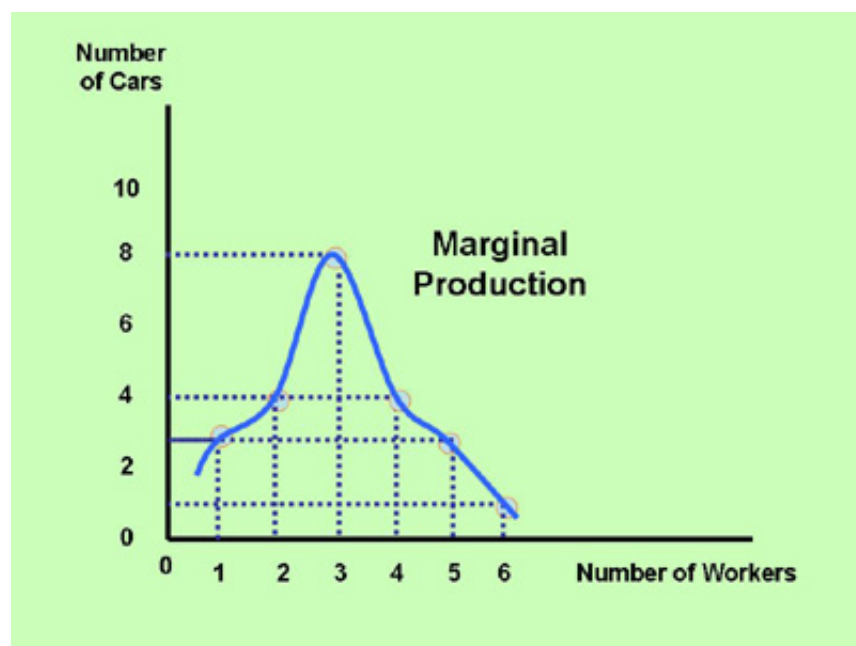
The law of diminishing marginal production only occurs in the short run. In the long run, it is possible to add machines and increase the size of an office or factory. Therefore, the short-run reasons for diminishing marginal production are non-existent in the long run.

In the long run, average and marginal production can decrease, but this occurs for different reasons. A company can grow too large and bureaucratic and lose efficiency. When this happens, we experience "decreasing returns to scale" and "diseconomies of scale." These concepts are further explained in the next unit (Unit 5).

Total, Marginal, and Average Production Graphs

Below are graphs of the total production, marginal production, and average production of labor. The graphs are based on the data from the table above.





Another Example of a Firm's Production Function

In the table above, the number of workers changed by one with each row. Below we look at a production function in which the number of workers changes by 5 with each row. This changes how we compute marginal production.

Number of Workers	Amount of Land in Acres	Total Production of Cars	Average Production of Labor	
0	20	0	-	
5	20	10	2	
10	20	30	3	
15	20	70	4.67	
20	20	100	5	

To obtain the values for marginal production in the table above, we have to divide the change in total production by the change in the number of workers (5 in the table above).

In the first table on this page, the number of workers changes by only 1 for each row. In this case, the marginal production is the change in total production divided by 1, which is simply the change in total production. In the second table, the number of workers changes by 5 with each additional row. Therefore, in the second table, the marginal production is the change in total production divided by 5.

Example

Problem: What is the marginal production at a level of 15 workers?

Solution: The total production at 15 workers is 70 cars. The total production in the previous row with 10 workers is 30 cars. Marginal production, therefore, is 40 (70 minus 30) divided by 5 (which equals 8).

Video Explanation

For a video explanation of a production function and the calculation of average and marginal production, please watch:

[YouTube Video](#)

Section 3: The Relationship Between Production and Costs

Total, Average, and Marginal Cost Calculations

Once we know a firm's production behavior, and we know what each factor of production costs, we can derive the firm's total, average, and marginal costs. Below we have copied the firm's production behavior from the first table in the previous section (Section 2).

Number of Workers	Amount of Land in Acres	Total Production of Cars	Average Production of Labor	
0	2	0	-	
1	2	3	3	
2	2	7	3.50	
3	2	15	5	
4	2	19	4.75	
5	2	22	4.40	
6	2	23	3.83	

Let's assume that the three factors of production used to produce the products in the table are workers, land, and machines. The cost of these factors of production are as follows:

1. Each worker costs the firm \$4,000 per month.
2. Each acre of land costs the firm \$1,000 per month.

3. Each machine costs the firm \$600 per month.

The table below illustrates the total cost at each number of workers.

Number of Workers	Total Worker Cost	Amount of Land in Acres		Total Machine Cost	Total Dollar
0	0	2		3,000	5,000
1	4,000	2		3,000	9,000
2	8,000	2		3,000	13,000
3	12,000	2		3,000	17,000
4	16,000	2		3,000	21,000
5	20,000	2		3,000	25,000
6	24,000	2		3,000	29,000

Total monthly worker cost is the number of workers times the cost per worker. For example, at 3 workers, the total worker cost is 3 times \$4,000, which equals \$12,000.

Total monthly land cost is the number of acres used times the cost per acre. The firm uses 2 acres, so the total monthly land cost is 2 times \$1,000, which equals \$2,000. This cost is fixed in the short run, regardless of the number of workers employed and the number of products produced.

Total monthly machine cost is the number of machines times the cost per machine. The firm uses 5

machines, so the total monthly machine cost is 5 times \$600, which equals \$3,000. This cost is fixed in the short run, regardless of the number of workers used and the number of products produced.

Total monthly cost of all factors of production is the sum of the three factor costs. For example, at 3 workers, the total cost is \$12,000 plus \$2,000 plus \$3,000, which equals \$17,000.



Average monthly cost is the total monthly cost per car. For example, at 3 workers, total production is 15 cars. Total monthly cost is \$17,000. Therefore, the average cost is \$17,000 divided by 15, which equals \$1,133 (rounded to whole dollars).

Marginal monthly cost is the additional cost per car. For example, at 3 workers, the total cost increases by \$4,000 compared to what it is at 2 workers. Total production increases by 8 products (from 7 to 15). Therefore, marginal cost is \$4,000 divided by 8, which equals \$500.

The next unit (Unit 5) elaborates on the various cost functions, discusses the difference between implicit and explicit costs, illustrates graphs of these functions, and discusses long-run cost behavior.

Video Explanation

For a video explanation of how production and costs are related, please watch:

[YouTube Video](#)

Section 4: Factor Price Interferences

Examples of Government Price Controls

In most countries around the world when it comes to factor prices, there is a significant degree of government interference. In the labor market, the establishment of a minimum wage means that the wages of certain workers are higher than the free market wage. In some markets, there also may be a cap (a maximum) on wages. For example, in the sports world, some teams are subject to salary caps (these are usually imposed by the league and not by the government). In most Muslim economies, businesses are not allowed to charge interest on money they lend. In most non-Muslim economies, interest rates are determined by the free market. However, countries' central banks and central monetary agencies heavily influence interest rates by controlling the money supply.



Setting is rent control. Many large cities around the world require landlords in certain areas to charge rent that is below the free market rent.

Price Interference in the Labor Market: the Minimum Wage

Politicians in industrialized countries often establish a minimum wage in most industries (some industries, for example, restaurant servers, are excluded, because they rely mostly on gratuities). The purpose of a minimum wage is to guarantee any worker a minimum level of income, so that the worker can live at a minimum level of subsistence. Supporters of the minimum wage fear that some businesses exploit workers by paying them a wage that is too low and one that will not allow the workers to pay for essential living expenses. There are disadvantages to establishing a minimum wage, as well. The advantages and disadvantages of a government-established minimum wage are listed below.

Advantages and Disadvantages of a Minimum Wage

Advantages of a minimum wage that is set above the market wage include:

1. Increase in minimum wage worker earnings.

Workers who continue to work approximately the same number of hours or more as before the establishment of the minimum wage earn a greater income as compared to if no minimum wage existed. This doesn't mean that total income for the entire economy increases (so an increase in the minimum wage does not stimulate the economy) because a \$1 increase in a worker's earnings means a \$1 decrease in the income of the business paying the wage (*ceteris paribus*). Only if a higher minimum wage makes workers more productive, then an argument can be made that both workers and businesses benefit. Realistically though, productivity gains precede wage increases. In other words, if workers become more productive, then business profits increase and this allows businesses to pay higher wages. The opposite is not true. Higher wages imposed by government law (minimum wage) do not improve workers' productivity in the long term (studies show that in the first month or so, productivity increases, but then

returns to previous levels). The above is a good example of how people confuse cause and effect. Greater productivity leads to higher wages, but higher wages alone do not lead to greater productivity in the long run.

2. More incentive to find a job.

A higher minimum wage gives unemployed workers more incentive to search for a job. This increases the quantity supplied of labor.

3. Less chance for exploitation.

In regions where citizens are not mobile (they have little choice but to work for the few firms in the area), businesses may be paying their workers less than the workers deserve and less than what they are worth. Establishing a minimum wage provides these workers with a wage closer to their worth.

Disadvantages of a minimum wage that is set above the market wage include:

1. Decrease in the total number of hours worked.

A higher minimum wage (if the minimum wage is set above the market wage) leads to an increase in a business's cost of production. This results in a decrease in full-time employment.

An increase in the minimum wage causes business costs to increase. In an effort to save costs some businesses (especially small businesses) choose to lay off full-time workers (who usually receive benefits) and replace them with part-time workers (who usually don't receive benefits). This may leave the unemployment rate unchanged (it may even lower the unemployment rate if for example, 10 full-time workers are laid off and 12 part-time workers are hired), but it will lower the total number of hours worked and it will lower overall income.

2. Unemployment amongst less experienced people rises.

Unemployment amongst people with less experience, less education and fewer skills increases when the minimum wage is raised. A higher minimum wage means that more people apply for minimum wage jobs, so the business has a greater pool of people to choose from and therefore can be more selective. The people in this pool with the least experience and skills will not get hired. For example, during periods when the minimum wage increases significantly above the free market wage, unemployment of teenagers rises considerably. Minorities in this group are especially hard hit.

3. Increase in prices.

Higher production costs for businesses may result in higher prices. If the overall cost of wages increases for a business, it may choose to increase the prices of its products. This is harmful to consumers, and it may also lead to a decrease in exports, as foreign countries have to pay higher prices for our products.

4. Lower profits.

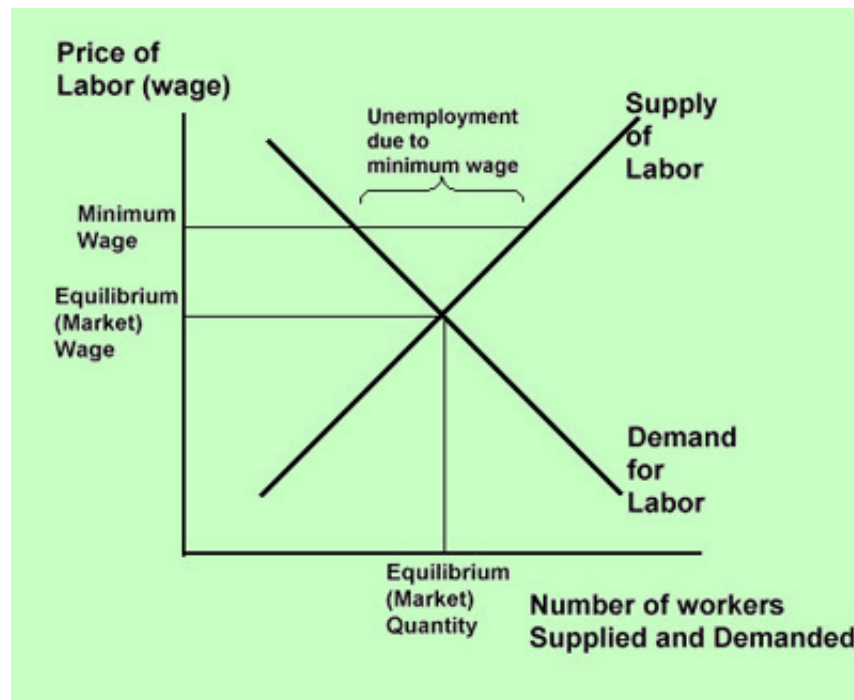
Higher production costs for businesses result in lower profits for businesses. Therefore, businesses have less ability to provide funds for business expansions, research and development, benefits, and training.

5. Decreased worker incentive to be productive.

Automatic increases in the minimum wage result in less incentive for the worker to be productive. While at first (within the first month of a minimum wage increase) workers may feel motivated to work harder,

in the long run, if workers know that they will get a raise automatically, as established by law and not by their performance, they will lose the incentive to **earn** the increase in their wage.

Below is a graph of a market for labor. Businesses demand the labor. Citizens supply the labor. In a free market, the equilibrium wage is at the intersection of the demand and supply curves. If the government sets the minimum wage above the equilibrium wage, the quantity demanded of labor decreases, and the quantity supplied of labor increases. This results in a surplus of labor. *Ceteris paribus* (all other things remaining constant), this increases unemployment.



Labor Unions and Wages

Labor unions are supported by most industrialized governments and pro-union labor laws. Unions protect workers' rights, and can serve a useful purpose in negotiating with a business that treats workers less than fair. However, unions can also contribute to above-market wages and higher prices. Their collective bargaining powers and strike threats push wage rates well above free market levels, raise prices, and often place companies at an internationally competitive disadvantage. Furthermore, unions' restrictions about what workers are allowed to do, how much they are allowed to work, and other staffing requirements, lead to inefficiencies in production and raise businesses' cost of production. These inefficiencies may lead to long-run unemployment, if firms go bankrupt or move abroad.

Unions may be credited for improved working conditions and higher wages. However, improved working conditions and higher wages are only possible if firms can afford them. Only increased productivity and increased profits allow firms the means to improve working conditions and increase wages. When unions have suggested measures that have led to productivity improvements, it has been beneficial. But most of the time, unions suggest changes that may increase short-term employment, but hinder productivity and technological advances. Greater profits made possible by business investments in a competitive environment, technology advances, and entrepreneurial initiatives have been the real cause of most

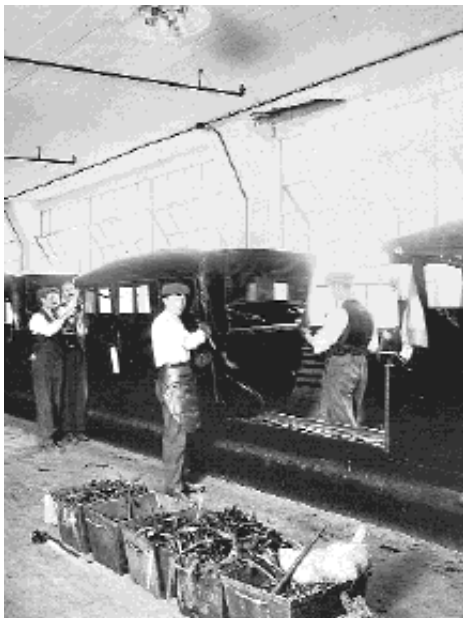
improvements in working conditions and better wages and benefits. This is because the greater profits have, over time, enabled businesses to afford these luxuries.

Raising Real Wages

Some economists believe that an artificial increase of workers' wages (such as an increase in the minimum wage beyond the equilibrium price, or union wage demands beyond what productivity increases warrant) is not the answer to the economic problems of low-income earners. They state that these artificial increases merely increase nominal wages, but not real wages.

How then can we achieve higher *real* wages?

Answer: By increasing productivity.



How can we increase productivity?

Answer: By providing a competitive economic system that rewards work and innovation and by providing an economic system in which businesses and entrepreneurs have maximum incentive to innovate and increase theirs and, therefore, everyone's wealth. And by providing a proper reward system in which taxes are reasonably low, regulations not excessive, businesses are competitive, and subsidies and handouts small enough to retain people's incentives to be productive.

So one of the keys to improving a country's standard of living is to increase *real* wages. Real wages increase with increases in a firm's productivity. Productivity is in great part a function of technological advances. Technological advances are encouraged by a reward system that provides incentives for competitive entrepreneurs and other workers to earn sufficient profits and incomes. This means that taxes and other costs of working and doing business (for example, regulations) must not be excessive.

Section 5: Determination of Interest Rates and Present Value

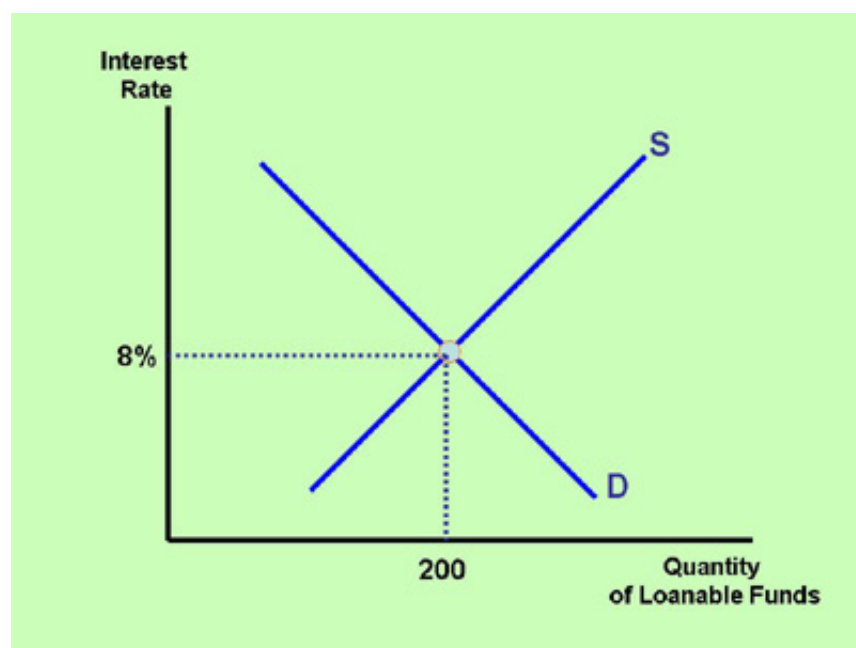
Nominal and Real Interest Rates

The interest rate is the price that people pay for borrowing money. It is also the price that businesses or people receive for lending money.

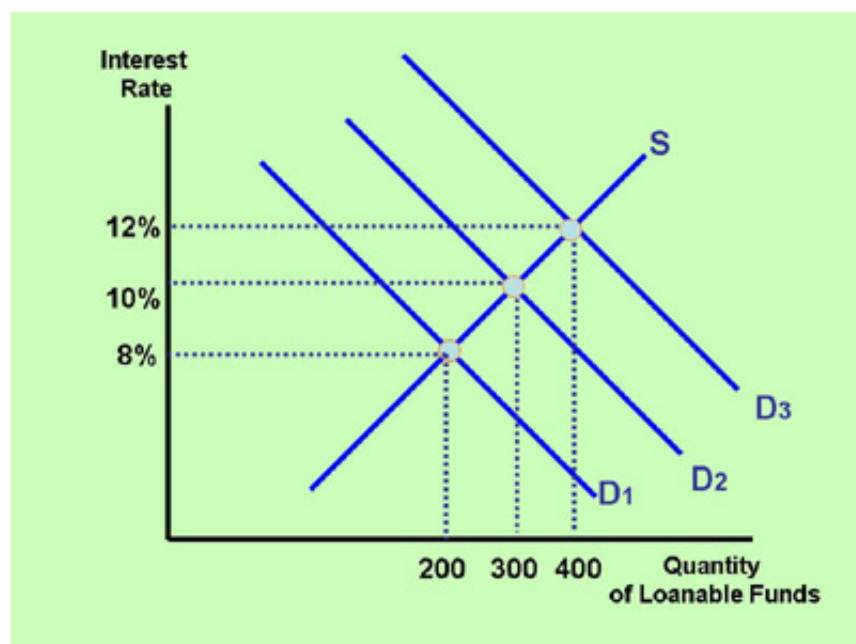
The nominal interest rate is the interest rate that banks list as their lending rate. The real interest rate is the nominal rate minus the inflation rate. If a bank charges an interest rate of 10%, and the inflation rate is 6%, then the bank generates interest of 4% in real terms.

Interest Rate Determination

In a free market, interest rates are determined the same way as prices of goods and services. In the graph below, the demand and supply of loanable funds (loans) intersect at an equilibrium interest rate of 8% and an equilibrium quantity of loanable funds of 200.



If the demand for loanable funds increases, interest rates increase, and vice versa. If the supply of loanable funds increases, interest rates decrease, and vice versa. The graph below illustrates the effect of an increase in loanable funds demand on the equilibrium interest rate.



In free market economies, general interest rates vary with changes in supply and demand. The interest rate on a specific loan also varies based on the risk and the cost of making the loan. If a lender has evidence that the borrower is very likely to pay back the loan, then the interest rate will be lower. If the lender does not find the borrower credit-worthy, the interest rate will be higher. The length of the loan also affects the risk. The longer the loan term, the more risky it is and, therefore, the higher the interest will be. The cost of making the loan affects the interest rate. A small loan is more expensive relative to the interest earned, and the lender will charge a higher interest rate.

Present Value

Would you rather have \$1,000 now, or \$1,000 one year from now? Most people prefer \$1,000 now. Would you rather have \$1,000 or \$1,050 one year from now? This is a little more difficult to decide. How much is \$1,000 worth in one year? If you were to invest \$1,000 at an interest rate of 6%, then you would have $\$1,000 + (\$1,000 \times .06) = \$1,000 + \$60 = \$1,060$. From a purely financial perspective, if the interest rate is 6%, \$1,000 now is the same as \$1,060 one year from now. We say that the present value of \$1,060 received in one year is \$1,000.

The formula for the present value (PV) of any future amount (F) is

$$PV = F / (1 + i)^n \text{ (Present Value equals Future Value divided by 1 plus the interest rate to the power of n)}$$

Where i is the market interest rate per period of time, and the exponent n is the number of periods we have to wait to receive the future amount.

Example 1

Problem: Let's say that someone promises to pay you \$2,000 one year from today. Assume a yearly market interest rate of 6%. What is the present value of this amount?

Solution: $PV = \$2,000 / (1 + .06)^1 = \$2,000 / 1.06 = \$1,886.79$.

Example 2

Problem: Let's say that someone promises to pay you \$2,000 **two** years from today. Assume a yearly market interest rate of 6%. What is the present value of this amount?

Solution: $PV = \$2,000 / (1 + .06)^2 = \$2,000 / 1.1236 = \$1779.99$.

What was the Price of a Gallon of Milk 80 Years Ago?

Example 3

Problem: Let's say that the price of a gallon of milk is \$3 this year. Assume that the price of a gallon of milk has increased by 3.5% each year since 80 years ago. What must the price have been 80 years ago?



Solution: The present value formula can be used with price increases instead of interest, as well. Using the present value formula from the previous paragraph, \$3 today equates to the following 80 years ago: $\$3 / (1 + .035)^{80} = \$3 / 15.68 = \$.19$

Another way of saying this is that if the price of a gallon of milk increased by 3.5% each year (this is relatively accurate for the inflation rate in the United States of the past 80 years) a gallon of milk that is \$3 now, was 19 cents 80 years ago.

For a video explanation of how to calculate the present value of a future sum of money, please watch:

[YouTube Video](#)

The United States Bureau of Labor Statistics has a handy calculator to equate the buying power of any dollar amount in a previous year, using the consumer price index as a measure of the yearly inflation rate. Click [HERE](#) to use this BLS inflation calculator.

Introduction

What's in This Chapter?

One of a firm's objectives is to be cost efficient in order to increase its profits. This unit analyzes a firm's costs of production. A firm's fixed costs include its expenses on fixed inputs, such as land and machinery. Variable costs include expenses on variable inputs, such as labor and materials. Total costs equals total fixed costs plus total variable costs.

Cost can also be expressed per unit: average fixed cost, average variable cost, average total cost, and marginal cost. As quantity produced increases, average variable, average total, and marginal cost eventually increase in the short run, because of diminishing returns. Long-run average cost for a typical firm decreases as output increases, due to economies of scale. It then increases as output continues to increase, due to diseconomies of scale.

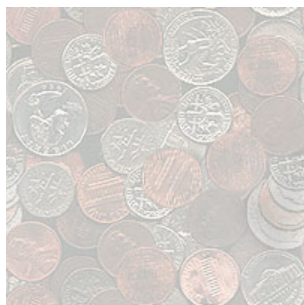
We also distinguish between explicit costs and implicit costs. The calculations of all these costs are explained in this unit.



Section 1: Explicit Costs and Implicit Costs

The Difference Between Explicit and Implicit Costs

Economists distinguish between explicit and implicit costs. Explicit costs, also called accounting costs, are out-of-pocket costs, such as expenses on labor, raw materials, and rent. Implicit costs are costs a business incurs without actually spending money. They are estimates of the value of alternative activities you have sacrificed. A person who invests \$100,000 of her/his own money in a business does not have to pay any finance charges to a bank for using this money. Thus, there is no explicit cost for using this money. However, the implicit cost is the earnings the owner sacrifices by not using the \$100,000 in an alternate activity, such as investing in stocks or bonds.



What are the Explicit Costs and Implicit Costs of Attending College?

Explicit costs of attending college include tuition, lodging, fees, books, and transportation. Implicit costs include sacrificed job earnings, the value of other time sacrificed, and sacrificed interest earnings.

Let's say that your annual costs on tuition and fees, lodging, books, and transportation are \$25,000.



In addition, you estimate that your annual implicit costs are \$30,000 because this is the additional income you could have earned had you not attended college. Your total annual cost of attending college is now \$55,000 (\$25,000 plus \$30,000). Thus, your total cost of attending four years of college equals 4 times \$55,000, or \$220,000.

What are the Explicit and Implicit Costs of Operating a Business?

Problem: Let's say that you are running a business and incur the following monthly expenses: labor costs are \$80,000; raw materials and business supplies are 30,000; equipment leasing expenses are \$7,000; finance charges on loans are \$3,000. You are not paying rent, because you own the building in which you

operate the business. If you had rented it out, however, you would have received \$12,000 in rent income. You also estimate the value of your own time to equal \$40,000. What are your implicit, explicit, and economic costs?

Solution: Explicit costs are $\$80,000 + \$30,000 + \$3,000 + \$7,000 = \$120,000$.

Implicit costs are $\$12,000 + \$40,000 = \$52,000$. Your total economic costs are your explicit plus your implicit costs, or $\$120,000 + \$52,000$, or \$172,000.

Video Explanation

For a video explanation of explicit and implicit cost calculations, please watch:

[YouTube Video](#)

Section 2: Accounting versus Economic Profits

Economic Costs and Accounting Costs

Below are definitions of economic costs and accounting costs.

Economic costs = implicit costs + explicit costs Accounting costs = explicit costs

Economic Profit and Accounting Profit

Below are definitions of economic profit and accounting profit.

Economic profit = total revenue - economic costs. Accounting profit = total revenue - explicit costs.
--

Examples of Economic and Accounting Profit Calculations

Example 1

Problem: Let's say that a firm's total revenue is \$180,000. Using the explicit and implicit costs from the business example at the bottom of section 1, what are the firm's accounting and economic profits?

Solution: Economic profits equal total revenue minus economic costs. Total revenue is \$180,000. Economic costs are \$172,000. Thus, economic profits equal $\$180,000 - \$172,000 = \$8,000$.

Accounting profits equal total revenue minus explicit costs. Thus, accounting profits equal $\$180,000 - \$120,000 = \$60,000$.



Example 2

Problem: Let's say that a firm's total revenue is \$80,000 and its explicit costs and implicit costs are

\$50,000 and \$25,000, respectively. What are the firm's economic and accounting profits?

Solution: Economic Profits are: $\$80,000 - \$75,000 = \$5,000$. Accounting Profits are: $\$80,000 - \$50,000 = \$30,000$

Example 3

Problem: Let's say that a firm's total revenue is \$80,000 and its explicit costs and implicit costs are \$70,000 and \$25,000, respectively. What are the firm's economic and accounting profits?

Solution: Economic Profits are: $\$80,000 - \$95,000 = -\$15,000$ (a loss of \$15,000). Accounting Profits are: $\$80,000 - \$70,000 = \$10,000$

From a financial point of view, assuming no changes in costs and revenue, should the firm in the last example continue to operate? The firm reaps a positive accounting profit of \$10,000. Thus, the firm has a positive cash flow. However, the negative economic profit indicates that if the owner had put her/his time and capital in the alternative activity, (s)he would have earned \$15,000 more. Therefore, from a financial point of view, assuming no change in the future costs and revenue, it is better for the owner to discontinue the business and pursue the alternate activity.

Video Explanation

For a video explanation of economic and accounting profit calculations, please watch:

[YouTube Video](#)

Section 3: Total and Per Unit Costs

Economic Costs

There are seven important economic costs:

1. **Total Variable Cost (TVC).**

This is the cost of all variable inputs. Examples include the cost of temporary workers and hourly labor, the cost of materials, office supplies, energy, and taxes.

2. **Total Fixed Cost (TFC).**

This is the cost of all fixed inputs. Examples include the cost of the building, large pieces of machinery, certain fixed taxes (property tax), and salaried employees on long-term contracts.

3. **Total Cost (TC).**

This is the sum of TVC and TFC.

4. **Average Variable Cost (AVC).**

This is variable cost per product, or total variable cost divided by output.

5. **Average Fixed Cost (AFC).**

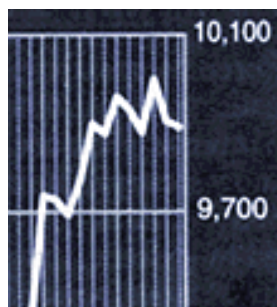
This is fixed cost per product, or total fixed cost divided by output.

6. **Average Total Cost (ATC).**

This is cost per product, or total cost divided by output.

7. **Marginal Cost (MC).**

This is the per product cost of producing an additional unit of the product, or the change in total cost divided by the change in output.



All of the above costs are economic costs. Thus, they include both implicit and explicit expenses. From now on when we refer to total cost, we mean total economic cost. For example, if explicit costs are \$8,000 and implicit costs are \$2,000, then total cost equals \$10,000.

Section 4: Cost Calculations

What are the Relationships Between the Various Costs?

Section 3 provides definitions of the important economic costs. Below is a list of the relationships between these costs. Using the abbreviations from the previous section, and using Q as the number of goods or services produced, we have

1. $TVC + TFC = TC$
2. $AVC = TVC/Q$
3. $AFC = TFC/Q$
4. $ATC = TC/Q$
5. $MC = \text{change in } TC / \text{change in } Q$

Examples

Example 1

Problem: Let's suppose that fixed costs are \$300 and variable costs are \$900. What is total cost?

Solution: Total cost = $\$300 + \$900 = \$1,200$

Example 2

Problem: Let's suppose that you produce 50 bushels of apples, and you use the costs from Example 1. What are average variable costs and average fixed costs?

Solution: $AVC = \$900/50 = \18 , and $AFC = \$300/50 = \6



Example 3

Problem: In the above example, what is average total cost?

Solution: $ATC = \$1,200/50 = \24

Example 4

Problem: If you increase your production by 5 bushels, and your total cost increases by \$60, what is your marginal cost?

Solution : $MC = \$60/5 = \12

Example 5

Problem: In the following table, a firm has a choice of producing from zero to 4 products. We know some of the costs. Can you calculate the missing values?

Q	TC	TFC	TVC	ATC	AFC	AVC	MC
0	80						
1			80				
2				110			
3						70	
4							90

The following table is a copy of the above table with the missing values filled in. The dashes indicate that the values cannot be calculated (undefined) because the quantity is zero.

Solution:

Q	TC	TFC	TVC	ATC	AFC	AVC	MC
0	80	80	0	-	-	-	-
1	160	80	80	160	80	80	80
2	220	80	140	110	40	70	60
3	290	80	210	96.7	26.7	70	70
4	380	80	300	95	20	75	90

Video Explanation

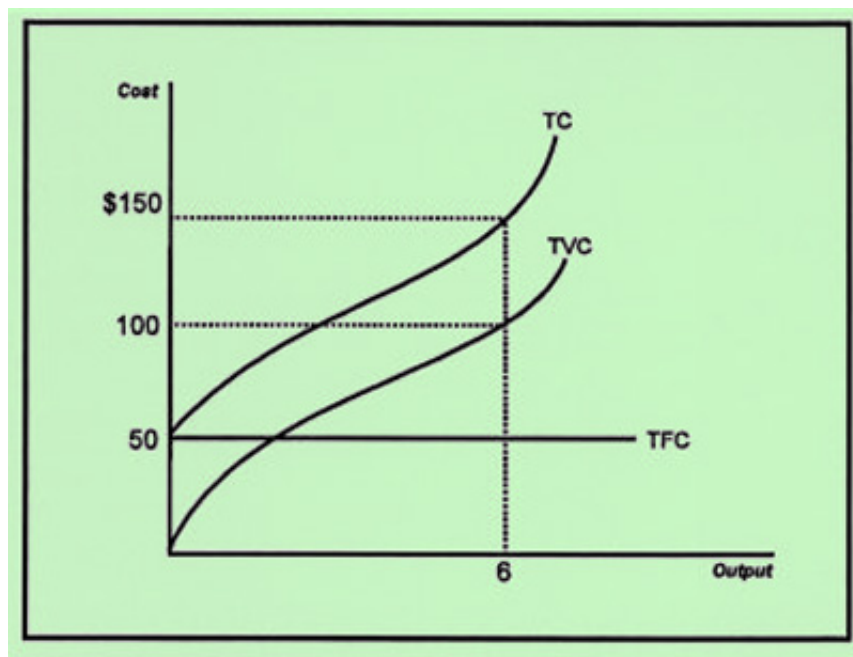
For a video explanation of cost calculations, please watch:

[YouTube Video](#)

Section 5: Cost Curves

Graphing Cost Data from a Table

In the previous section, we learned how to calculate cost data. Below we will plot the data in a graph. The next diagram shows a hypothetical firm's total cost, total variable cost, and total fixed cost curves. The shape of the curves represent typical shapes of real world firms' cost curves.



Note that in the above diagram, total fixed cost is constant at \$50 for all levels of production, whereas total cost and total variable cost increase with higher levels of output. Total fixed cost plus total variable cost always equals total cost. For example, at output 6, total fixed cost equals \$50 and total variable cost equals \$100. Thus, total cost equals \$150.

The diagram below shows typical average and marginal cost curves of a firm. Note that the marginal cost curve starts at a relatively high value, then decreases steeply. At output 4, it reaches a minimum, and then it increases steeply. The average variable cost and average total cost curves also decrease first, then increase, but they do so more gradually.

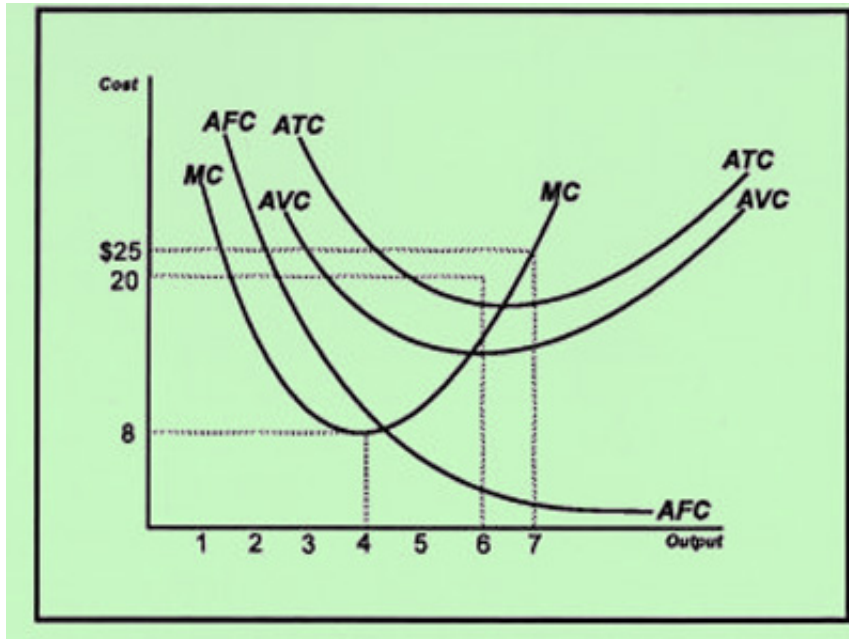
Spreading the Overhead

The average fixed cost curve decreases continuously. This is because average fixed cost is total fixed cost divided by output. Dividing a fixed number by increasingly large numbers of output results in smaller and smaller numbers. When firms produce larger and larger quantities of output, they are said to "spread the overhead" (divide fixed costs over a larger output).

The Relationship Between Marginal and Average Costs

Mathematically, it can be proven that the marginal cost curve intersects the average variable and average

total cost curves at their minimum point. In the diagram below, the average variable cost and average total cost are at their minimum at respective outputs of 5.8 and 6.4. Thus, the marginal cost curve intersects the average variable cost curve at a quantity of 5.8, and it intersects the average total cost curve at a quantity of 6.4.

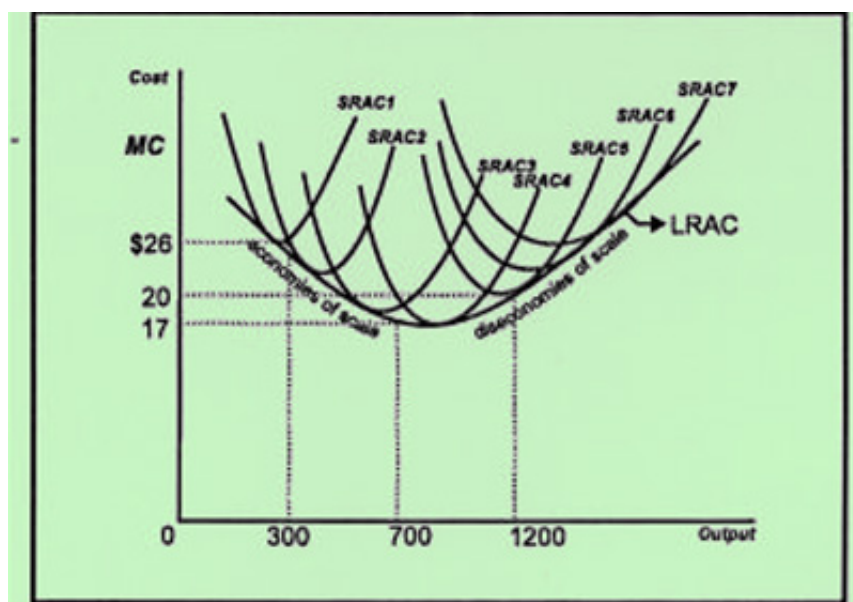


Section 6: The Long-Run Average Cost Curve

Derivation of the Long-Run Average Cost Curve

A firm's long-run average cost curve is derived from its short-run average cost curves. For each short-run fixed plant size, we take the lowest or near-lowest costs for that size plant. These bottom portions of the different short-run cost curves make up the long-run average cost curve. Thus, a firm's long-run average cost curve is the "envelope" of the bottom points of the firm's short-run average cost curves.

In the long run, all inputs are variable, and the firm has the choice of operating at a variety of plant or facility sizes. A small operation (SRAC1) that produces 300 units faces average costs of \$26. A larger one, which produces 700 units (SRAC3), can lower its average costs to \$17. When the firm gets too large (SRAC6), average costs rise to \$20.



Economies and Diseconomies of Scale

When a firm increases its output and observes decreasing average total costs (in the downward portion of the long-run average cost curve), it experiences economies of scale. When a firm increases its output and observes increasing average total costs (in the upward portion of the long-run average cost curve), it experiences diseconomies of scale. Economies and diseconomies of scale are related to increasing and decreasing returns to scale. We elaborate on this in the next section.

Video Explanation

For a video explanation of the long-run average total cost curve, please watch:

[YouTube Video](#)

Section 7: Increasing, Decreasing, and Constant Returns to Scale

Increasing Returns to Scale

Increasing returns to scale is closely associated with economies of scale (the downward sloping part of the long-run average total cost curve in the previous section).

Increasing returns to scale occurs when a firm increases its inputs, and a more-than-proportionate increase in production results. For example, in year one a firm employs 200 workers, uses 50 machines, and produces 1,000 products. In year two it employs 400 workers, uses 100 machines (inputs doubled), and produces 2,500 products (output more than doubled).



When input prices remain constant, increasing returns to scale results in decreasing long-run average costs (economies of scale). A firm that gets bigger experiences lower costs because of increased specialization, more efficient use of large pieces of machinery (for example, use of assembly lines), volume discounts, and other advantages of producing in large quantities.

Decreasing Returns to Scale

Decreasing returns to scale is closely associated with diseconomies of scale (the upward part of the long-run average total curve). Decreasing returns to scale happens when the firm's output rises proportionately less than its inputs rise. For example, in year one, a firm employs 200 workers, uses 50 machines, and produces 1,000 products. In year two it employs 400 workers, uses 100 machines (inputs doubled), and produces 1,500 products (output less than doubled).

When input prices remain constant, decreasing returns to scale results in increasing long-run average costs (diseconomies of scale). An organization may become too big, thus creating too many layers of management, too many departments, and too much red tape. This leads to a lack of communications, inefficiency, delays in decision-making, and inefficient production.

Constant Returns to Scale

Constant returns to scale occurs when the firm's output rises proportionate to the increase in inputs.

Problem: In the example above, after doubling the inputs in year one, what would output have to be in year two for the firm to experience constant returns to scale?

Solution: 2,000 products. At 2,000 products, the output doubles. Because the inputs double, the increase in production is proportionate. By definition, this equates to constant returns to scale.

Introduction

What's in This Chapter?

In this chapter we discuss four types of industries, each with varying degrees of competition. A **purely competitive** industry is most competitive. A **monopolistically competitive** industry is very competitive, but each firm has a small degree of monopoly power. An **oligopoly** industry is an industry in which only a small number of firms dominate the market. A **monopoly** is an industry with only one seller.

We also learn about the characteristics and profit maximizing behaviors of purely competitive industries. In the next unit (7), we look at characteristics and behaviors of monopolies. In Unit 8 we study monopolistically competitive and oligopoly industries. Economists use these industry models to explain behaviors of industries with varying degrees of competition and to draw important conclusions for policy-making purposes.

We discover that competition is essential in a well-functioning economy. It prevents prices from becoming exorbitant. In a competitive market, businesses will fail if they charge prices that are much higher than the competition. The Internet, despite some of its drawbacks, has helped increase competition in many industries. Buyers can more easily shop for millions of products, and immediately know most of their qualities and prices. Many businesses use the Internet at a relatively low cost. This increases competition and promotes efficiency and lower prices.



Section 1: The Four Industry Types and the Four Characteristics of Pure Competition

The Four Industry Types

An industry can be classified in one of four market types:



1. Pure competition.

Pure competition is a market structure in which there are many competing firms selling identical products or services. Very few, if any, industries in the real world are purely competitive, because it is believed that each company is unique and has at least a very small amount of monopoly power. Economists still find it useful to analyze this market structure, because it allows us to better understand the other three more-realistic market structures. We learn about pure competition in this unit. The farming industry is one of the closest examples of pure competition in the United States, and is highlighted in Section 7.

2. Monopoly.

A monopoly is an industry with only one seller. The product that the firm sells has no close substitutes. Monopolies can be firms that are granted exclusive production rights by a government. They can also be firms that have attained monopoly powers through efficient free market production methods and economies of scale. We analyze monopolies in Unit 7.

3. Monopolistic competition.

Monopolistic competition is a market structure in which there are many small firms selling slightly differentiated products or services. Monopolistic competition is different from monopoly. The emphasis in monopolistic competition is on "*competition*." In a monopoly industry, there exists no or very little competition. In a monopolistically competitive industry, there are many competing firms. We study monopolistic competition in Unit 8.

4. Oligopoly.

In an oligopoly industry, a small number of firms is responsible for the majority of the sales. Because firms in this industry are usually big, actions of one firm (for example, a price cut or an aggressive advertising campaign) significantly affect actions of rival firms. Sometimes oligopoly firms collude (work together) in order to make larger profits. We look at oligopolies in Unit 8.

The Four Characteristics of Pure Competition

Pure competition, the market structure discussed in this unit, has the following characteristics:

1. Many sellers.

There are many sellers and many buyers. Companies are small, and hundreds of companies compete.

2. Easy entrance.

It does not require much know-how and capital to start a purely competitive business.

3. Identical products.

One firm's product is identical to a competitor's product (homogeneity). Gasoline sold by gas station A is identical to gasoline sold by gas station B.

4. Perfect information.

Buyers have complete knowledge of the price, the quality, and the nature of the product. The more knowledge buyers have of the competitors' prices and product qualities, the more competitive the market is. The opposite is true as well. If there are 100 or more firms in the industry, but if buyers are only aware of one firm, then this one firm can act like a monopoly and charge high prices.

Because of the extreme nature of characteristics 3 and 4, no industry is purely competitive. The farming industry, the stock market industry, and the retail gas station industry are very competitive, but they are technically monopolistically competitive (see Unit 8). However, they come close to resembling purely competitive markets.

In the following sections, we will discuss revenue curves of purely competitive firms. We will then compare these revenue curves to cost curves of firms, as discussed in the previous unit. A firm's total revenue minus its total costs equals its total profit. Therefore, we will be able to derive the purely competitive firm's profit, and calculate at which output the firm maximizes profits.

Section 2: Revenue, Costs, and Profit

Total Revenue

A firm's total revenue is equal to the price of the product times the number of products sold. For example, if you own a publishing company and you sell 100 books at \$14 per book, then your total revenue is $100 \times \$14 = \$1,400$.



Total Costs

Total costs equal the firm's total variable costs (labor, supplies, raw materials, etc.) plus the firm's total fixed costs (machinery, office space, etc.). For example, if your firm's total variable costs equal \$500, and your total fixed costs equal \$300, then your total costs equal $\$500 + \$300 = \$800$.

Total Profit

Total profit is total revenue minus total costs. In the above example, your firm's profits equal $\$1,400 - \$800 = \$600$.

Abbreviations

We will use the following abbreviations:

Total Revenue = TR
Total Cost = TC
Total Profit = TP
The Price of the Product = P
The Quantity of the Product Sold = Q

Calculations

We will use the following equations to calculate TR and TP:

$$\mathbf{TR = P \times Q}$$

$$\mathbf{TP = TR - TC}$$

In the example at the top of this page:

$$\mathbf{TR = P \times Q = 100 \times \$14 = \$1,400}$$

$$\mathbf{TC = \$800}$$

$$\mathbf{\text{so } TP = TR - TC = \$1,400 - \$800 = \$600}$$

Section 3: Average Revenue and Marginal Revenue

Average Revenue

Average revenue is revenue per product. For example, if your firm's total revenue is \$200, and you are selling 100 products, then your average revenue is \$200 divided by 100, or \$2.

Marginal Revenue

Marginal revenue is the additional revenue from selling one more product. Let's say that your firm's total revenue is \$200 when you sell 100 products, and your total revenue is \$220 when you sell 110 products. Then your marginal revenue is \$20 (the additional revenue) divided by 10 (the additional production), or \$2.

Abbreviations

We use the following abbreviations:

Average Revenue = AR Marginal Revenue = MR

Total, Average, and Marginal Revenue Curves

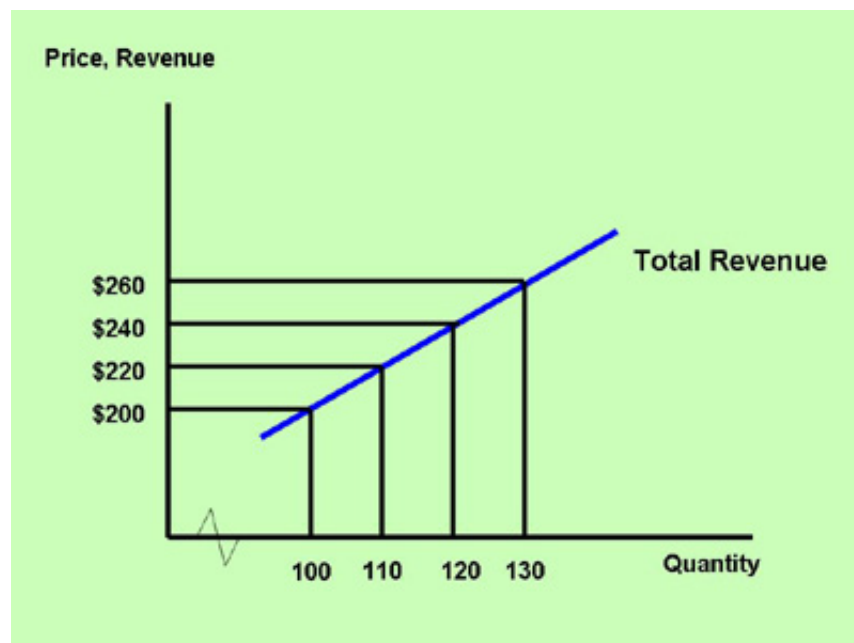
In Unit 2, we learned that if the supply of a product increases, its equilibrium price decreases. However, one firm in pure competition makes up a very small part of the entire industry. Therefore, if this one firm's quantity sold increases, it will have an insignificant effect on the price. In the above example, the purely competitive firm increases its quantity sold from 100 to 110. If the other firms in the industry do not increase their quantity supplied, then the market supply does not increase significantly, and we can assume that the price remains constant at \$2. Note that if the price is constant, then the average revenue and marginal revenues equal the price.



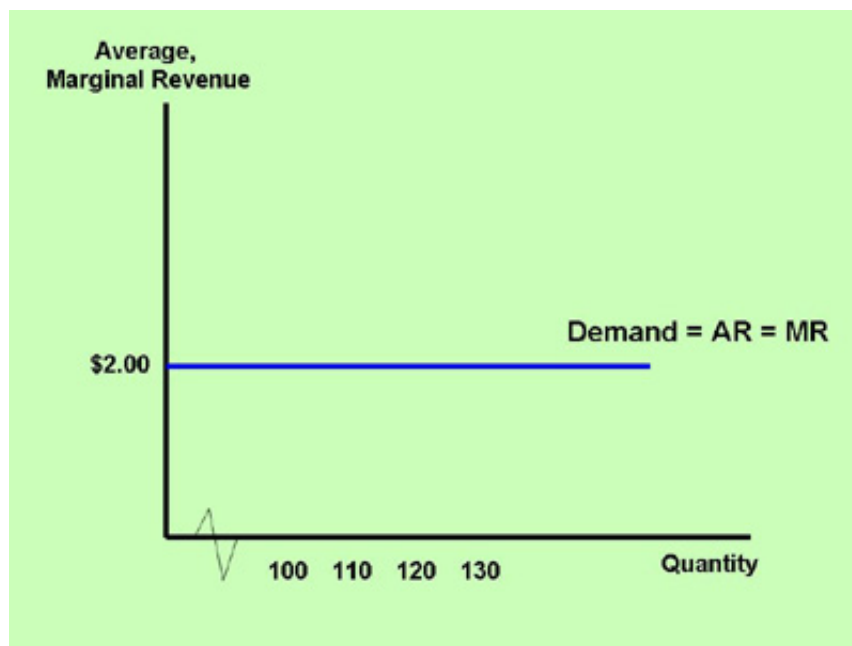
Below is a table of a hypothetical firm, which has a choice of selling quantities ranging from 0 to 130. The product's price is constant at \$2. Therefore, average and marginal revenue are \$2, as well. For example, at a quantity of 110 units, the total revenue is 110 times \$2, or \$220. The marginal revenue is the change in total revenue divided by the change in quantity. At a quantity of 110, the change in total revenue is \$20 (relative to the previous quantity of 100), and the change in the quantity is 10 (110 minus 100), so the marginal revenue is \$20 divided by 10, or \$2. The average revenue is the total revenue divided by the quantity produced. For example, at a quantity of 120, the total revenue is \$240. Therefore, the average revenue at this quantity is \$240 divided by 120, or \$2.

Quantity	Price	TR	MR	AR
0	\$2	\$0	\$2	\$2
100	\$2	\$200	\$2	\$2
110	\$2	\$220	\$2	\$2
120	\$2	\$240	\$2	\$2
130	\$2	\$260	\$2	\$2

Plotting the points for the quantities and total revenue from the table above, we can draw the following total revenue curve:



Plotting the points for the quantities and marginal and average revenue from the table above, we can draw the following marginal and average revenue curve. Because the price is constant, the marginal and average revenue curves are the same. The demand curve (D) of a purely competitive firm is also the same as the MR and AR curves.

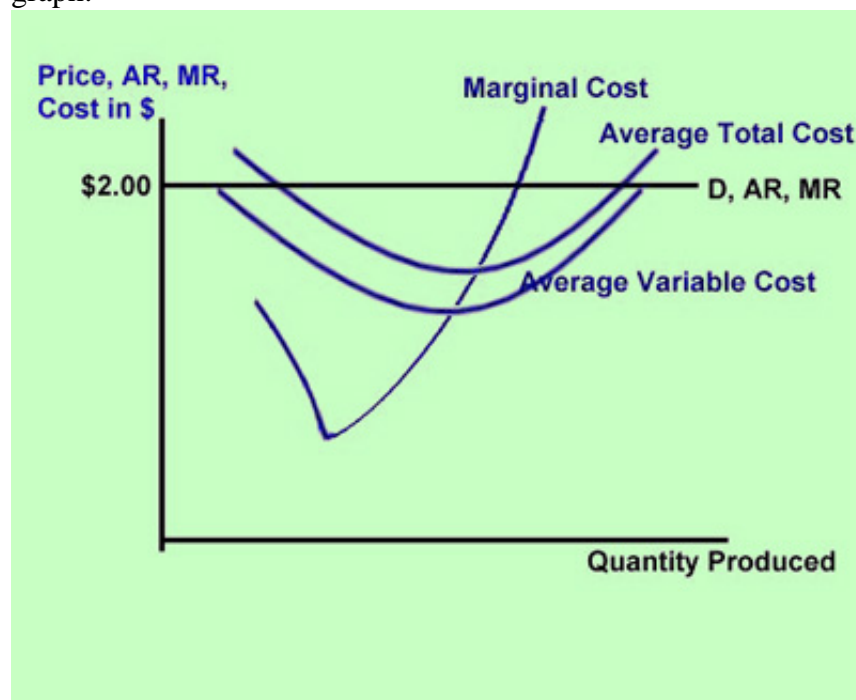


In the next section, we will combine the firm's marginal and average revenue curves with its cost curves, and arrive at the profit maximizing output and total profit value.

Section 4: Profit Maximization Using a Purely Competitive Firm's Cost and Revenue Curves

Combining Revenue and Costs

In the previous sections in this unit, we analyzed revenue curves. In order to calculate profit, we also need to know the firm's costs. Using the revenue data and graphs from the previous section and adding typical marginal, average, and average variable cost curves for our magazine firm, we can draw the following graph:



The Profit Maximizing Rule

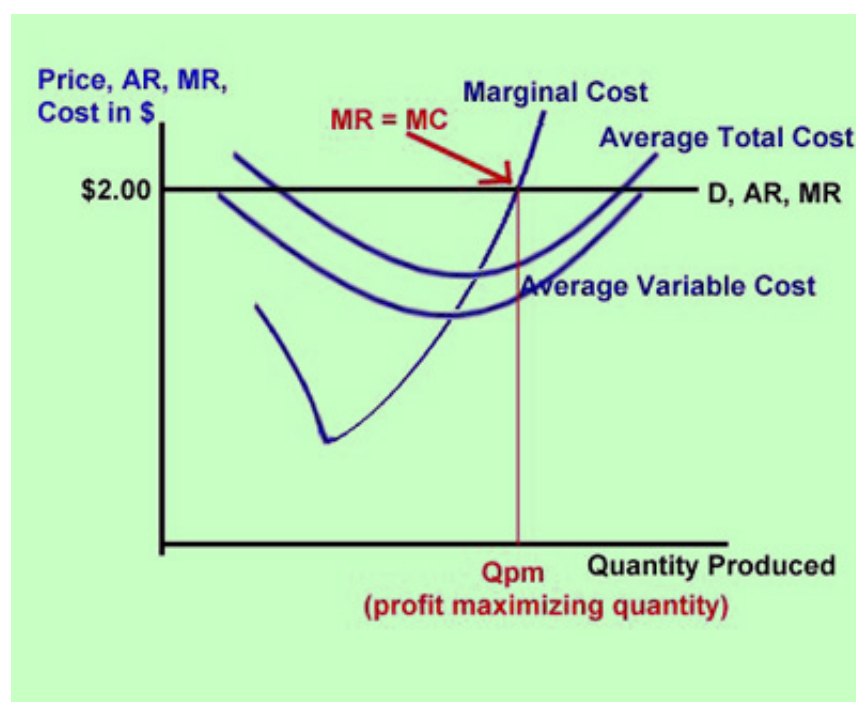
In any industry, a firm maximizes profits at the point where its marginal cost equals its marginal revenue. Mathematicians use calculus and derivatives to prove this. For an explanation of this proof, see the footnote at the bottom of this page.

Understanding the Profit Maximizing Rule

We can also understand the profit maximizing rule intuitively. In the graph below, Q_{pm} is the profit maximizing quantity. If the firm produces at a point to the left of Q_{pm} (for example, the point at which marginal cost is at its minimum), then we notice that marginal cost is less than marginal revenue. The marginal revenue is \$2. The marginal cost at the minimum MC point is at approximately \$0.50. By producing this quantity, the firm will add \$1.50 to its profit compared to producing the quantity before. Moving a little bit to the right of this quantity, we notice that marginal cost rises to, for example, \$1. Shall we produce this quantity over the quantity where MC was \$0.50? The answer is yes, because at this higher quantity, we can add an additional \$1 to our profit (MR is \$2 and MC = \$1). Let's make one more

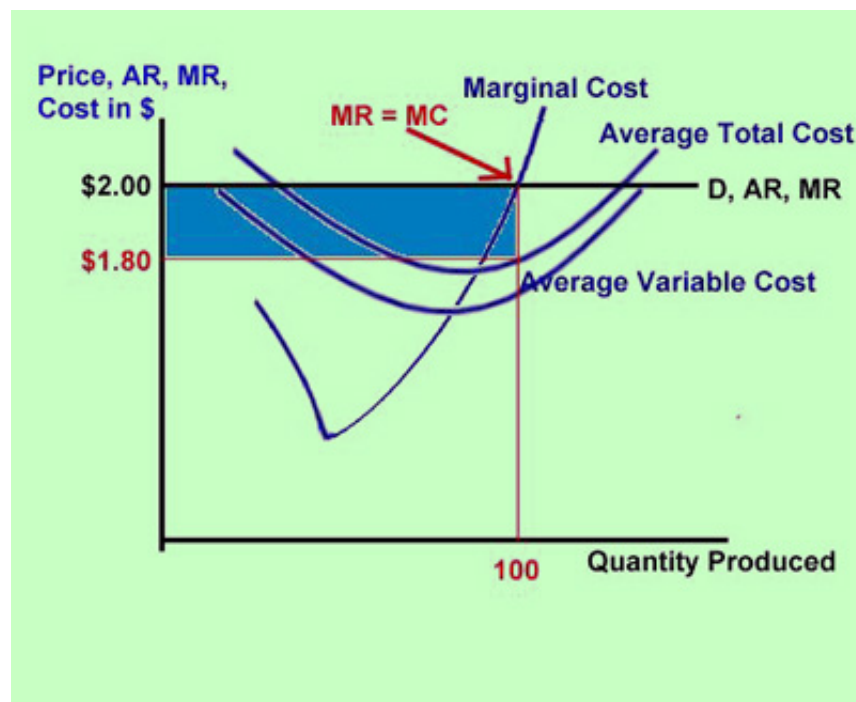
product. The MC rises to, for example, \$1.50. Is it profitable to make this additional product? Again, the answer is yes, because we are adding \$.50 to our already existing profit (MR is \$2 and MC = \$1.50). The **additional** profit is not as high as before, but we are still **adding** to our **total** profit. Let's say that we now produce at Qpm. Here we notice that the marginal revenue of \$2 is equal to the marginal cost of \$2. Is it profitable to produce this product? Officially, we are indifferent at this point, because we are not gaining or losing any profit. Economists agree that the firm should produce up to or exactly at this quantity.

A quantity point to the right of Qpm shows that the marginal cost exceeds the marginal revenue. For example, if we were to produce at a quantity where the marginal cost is \$3, we would lose \$1 compared to the profit we had before (MR is \$2 and MC = \$3). Therefore, we do not want to produce at any point to the right of Qpm. Only at Qpm do we have maximum profits.



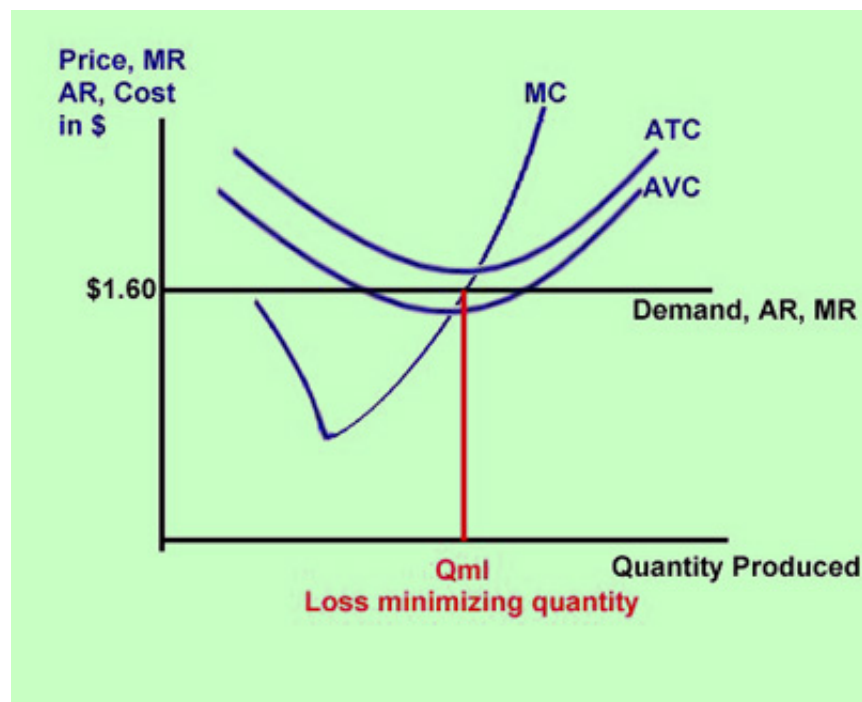
The Firm's Profit and Average Profit

In the graph above, the firm maximizes profits at the quantity where marginal revenue and marginal cost intersect. What is the firm's profit at this quantity? The graph below illustrates the firm's profit area. At the profit maximizing quantity, the average revenue is \$2. At this quantity, the average total cost equals \$1.80. This means that the firm's average profit is \$.20 (\$2 minus \$1.80). The firm's total profit is its average profit times the quantity sold. Therefore, total profit equals \$.20 times the profit maximizing quantity sold of 100. This equals \$20. Total profit is represented by the blue shaded area (length times width of the area).



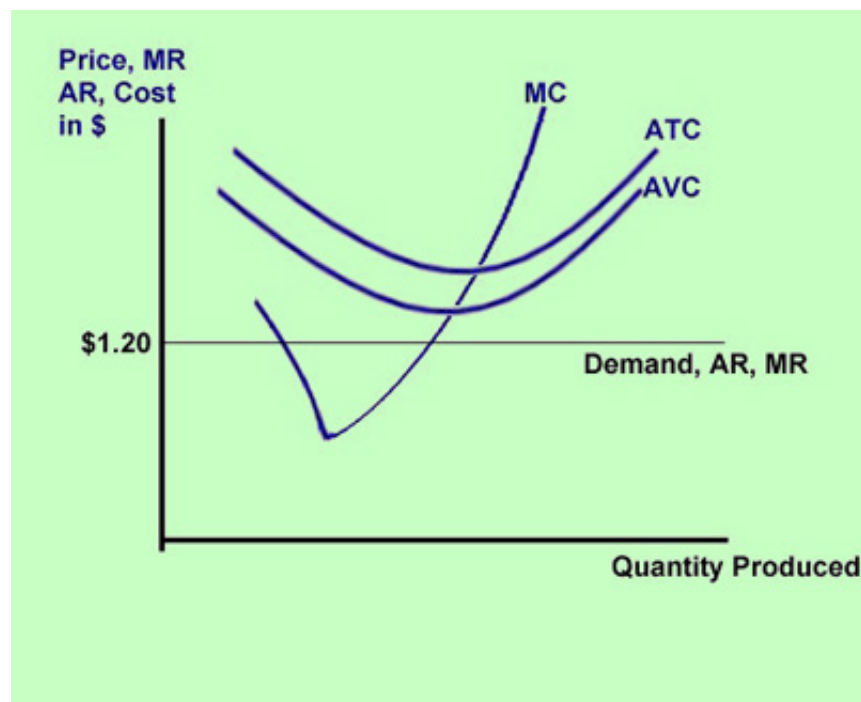
In the Case of a Loss, but No Shutdown

If the market price decreases (when market demand decreases), then the firm's demand, average revenue, and marginal revenue curves drop to a lower level. The firm still maximizes its profits at the quantity where MR and MC intersect. However, as average total cost is now above the average revenue curve, it is clear that the firm incurs a loss. Rather than maximizing its profits, the firm is now minimizing its losses. You may ask yourself why the firm will not shut down and produce zero products. In the long run, if the firm continues to incur losses, this will indeed be the case. The firm will go bankrupt. However, in the short run, a firm can incur losses and continue to operate. It will continue to operate as long as the average **variable** cost is below the price. If the average variable cost is below the price, then the firm's loss will be less than what it is when it shuts down. When a firm shuts down in the short run, the firm's loss will be its total fixed costs. As long as the average variable cost is below the firm's price, then the firm's loss will be less than its total fixed cost, because the firm makes a profit relative to its variable costs.



In the Case of a Loss and a Shutdown

In the graph below, the price has dropped even further. Now, both average variable and average total costs are above the price. Because the average total cost is above the price, you know that the firm is incurring a loss. Because the average variable cost is above the price, it is now better for the firm to shut down. If the firm does not shut down, its loss will be greater than its fixed cost, because the firm will be losing money on its variable costs. If the firm shuts down, its loss will be its fixed costs. The shutdown may be temporary. If market conditions improve (market demand increases, and therefore, the market price increases), or the firm can manage to lower its costs, then it may become profitable enough for the firm to produce again.



Profit maximizing footnote: In math, a function reaches its maximum (or minimum) when the first derivative of the function equals zero. The profit function is: $TP = TR - TC$ (total profit equals total revenue minus total cost).

The first derivative of the profit function is:

$TP' = (TR - TC)'$, which can be rewritten as $TP' = TR' - TC'$.

TR' is the first derivative of TR . The first derivative deals with changes in its function, so we note that TR' equals MR .

Similarly, TC' equals MC .

$TP' = 0$ (zero) at the maximum (and minimum) profit level. Thus, $MR - MC = 0$. This means that $MR = MC$ at maximum and minimum profit levels. In a graph, if the MC curve intersects the MR curve at two different quantities, the lower quantity is the profit minimizing quantity and the higher quantity is the profit maximizing quantity.

Video Explanation

For a video explanation of how to determine the profit maximizing quantity and profit for a firm in pure competition (by looking at a graph), please watch:

[YouTube Video](#)

Section 5: Profit Maximization Using Data from a Table

Combining Revenue and Costs in a Table

In the previous section, we analyzed profit maximization by studying graphs. In this section, we will analyze a purely competitive firm's profit maximizing quantity based on data from a table.

The Firm's Costs

Let's look at the following hypothetical firm's cost data.

Quantity	Total Fixed Cost	Total Variable Cost	Total Cost	Marginal Cost	Average Variable Cost	Average Total Cost
0	\$50	\$0	\$50	-	-	-
1	50	30	80	\$30	\$30	\$80
2	50	50	100	20	25	50
3	50	60	110	10	20	36.67
4	50	68	118	8	17	29.50
5	50	80	130	12	16	26
6	50	100	150	20	16.67	25
7	50	130	180	30	18.57	25.71
8	50	165	215	35	20.63	26.88
9	50	220	270	55	24.44	30

The Firm's Revenue

Case A: The Market Price is above the Firm's Average Total Cost

Let's assume that the market price is \$31. Because this firm is a purely competitive firm, marginal revenue and average revenue are also \$31. Looking at the table above, we can see that at various quantities, the price exceeds the average total cost. This means that at these quantities, the firm will make a profit.

The Firm's Profit Maximizing Quantity

In the previous section, we concluded that a firm maximizes its profits where marginal revenue equals marginal cost. Because we have discrete data from a table rather than a continuous curve, we notice that at no quantity does the marginal revenue equal the marginal cost. In this case, we need to identify the quantity at which the marginal cost comes closest to the marginal revenue, without exceeding it. If there are values for marginal cost early on in the table, which also approach marginal revenue, do not select these. Only the marginal cost values in or approaching the increasing part of the marginal cost column are relevant. We also have to make sure that the price is above the firm's lowest average variable cost; otherwise, it is better to shut down. The lowest variable cost in the table above is \$16, so we can see that the price of \$31 is, indeed, above the firm's average variable cost. We do not have to shut down. At a quantity of 7, the marginal cost is \$30, is closest to our marginal revenue of \$31, and the marginal cost

values are increasing. This satisfies our profit maximizing rule. Therefore, the firm maximizes profits at quantity 7. If the firm produces 7 products, it will have the most profit compared to any other quantity produced.

The Golden Rule of Profit Maximizing or Loss Minimizing

Let's summarize the above information.

A firm maximizes its profits or minimizes its losses at a quantity where MC equals MR, or where a non-falling MC comes as close as possible to (without exceeding) MR. The price must be above the firm's lowest average variable cost for the firm to produce this quantity. If the price is less than the firm's lowest AVC, then it should shut down (produce a quantity of zero) for a while (until conditions improve).

Case B: The Market Price is below the Firm's Average Total Cost, but above the Firm's Average Variable Cost

Let's assume that market price drops to \$21. This means that the firm's average revenue and marginal revenue are \$21, as well.

Looking at the table above and using the profit maximization/loss minimization rule, we see that at quantity 6, the marginal cost comes closest to the marginal revenue. The marginal cost is in the upward sloping portion of the curve. The price is above the lowest average variable cost, so we do not have to shut down. At quantity 6, the firm's total profit equals $\$126 - \$150 = -\$24$. (\$126 is the total revenue: $P \times Q = \$21 \text{ times } 6$; \$150 is the cost at quantity 6). Thus, the firm is operating at a loss. However, producing 6 units is better than shutting down. If we shut down, our loss would be \$50 (the firm's fixed cost). A firm can incur losses during some years. However, if losses persist, it will go out of business in the long run.

Case C: The Market Price is below the Firm's Average Total Cost and below the Firm's Average Variable Cost

Let's assume that the market price decreases to \$15. How many products should the firm produce in order to maximize profits or minimize losses?

In this case, we notice that the price is below the firm's lowest average variable cost. Therefore, it is best to shut down and produce a quantity of zero. The marginal cost comes closest to the marginal revenue at quantity 5. However, when you calculate total revenue minus total costs, you arrive at a loss of \$55 ($\$75 - \130). When the firm produces at a quantity of zero, its loss is only \$50 (its fixed costs).

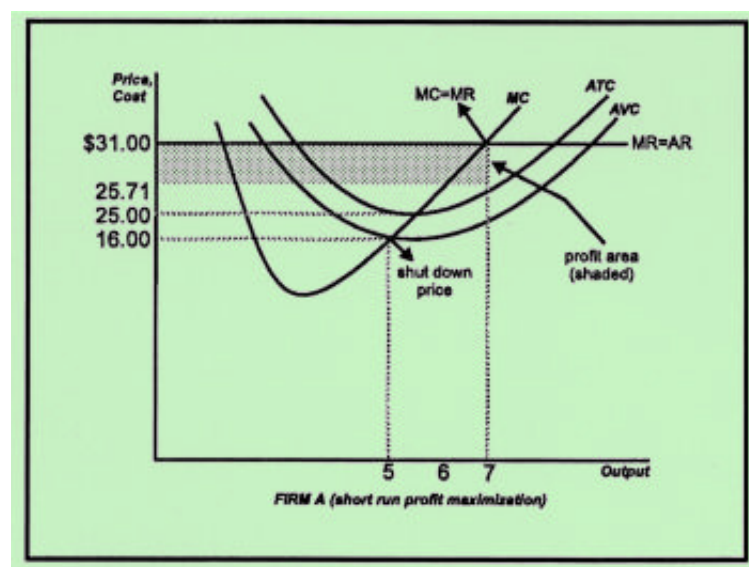
Profit Maximizing Using Total Revenue and Total Cost Data

Instead of using the golden rule of profit maximization discussed above, you can also find a firm's maximum profit (or minimum loss) by looking at total revenue and total cost data. Simply calculate the firm's total revenue (price times quantity) at each quantity. Then subtract the firm's total cost (given in the table) at each quantity. At a market price of \$31, the firm's total revenue equals \$217 at a quantity of 7 ($\$31 \text{ times } 7$), and its total cost is given at \$180. Therefore, the firm's total profit at this quantity is \$37. If

you do the same for the other quantities, you will find that producing 7 products results in the highest profit for the firm.

Drawing Cost and Revenue Data in a Graph

If we use a market price of \$31 and the cost data from the table above, and plot this data, we get



In the above example, the firm maximizes its profits when it produces 7 units, because it is where MC equals MR; ATC at this quantity is \$25.71.

The vertical distance from the demand curve to the average total cost curve represents the firm's average profit (price minus average total cost). Average profit times the number of products sold equals total profit. Thus, the profit area is the rectangle from the price (\$31) down to the ATC (\$25.71) and across to the vertical axis. At the profit maximizing quantity of 7 products, this is equal to the shaded area (length x width).

The Shutdown Point

The firm's shutdown point is where its average variable cost is at its lowest value. The firm should shut down temporarily if the price drops below the shutdown price of \$16. At a price below \$16 the firm not only loses money on its fixed costs, but also on its variable costs. If it did operate at a price below \$16, its loss would be greater than if it produced a quantity of zero (shutdown).

Video Explanation

For a video explanation of how to calculate the profit maximizing quantity and profit for a firm in pure competition, please watch:

[YouTube Video](#)

Section 6: Long-Run Output and Profit Determination

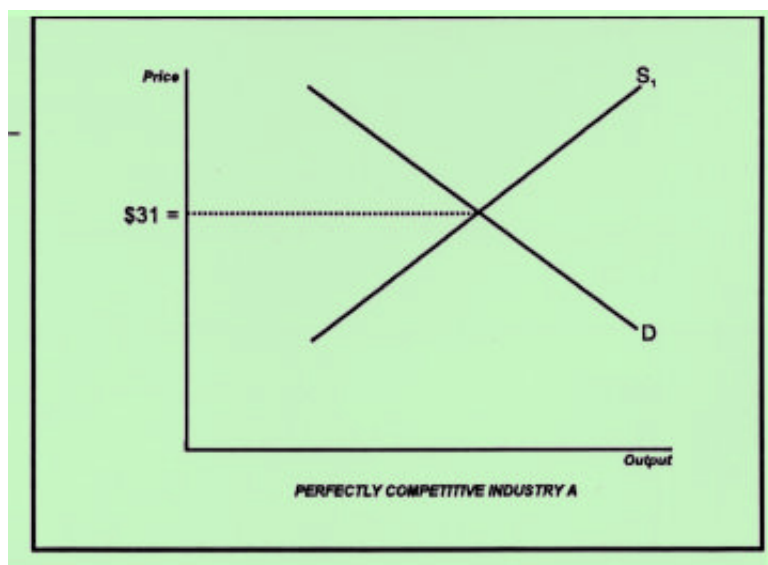
Profits in Pure Competition

Because of the relative ease with which new firms can enter a purely competitive industry, it is unlikely that economic profits will be unreasonably high in the long run. In fact, economists say that for firms in perfect competition economic profits are zero in the long run. This means that there are normal or average accounting profits, but no economic profits. If in the short run economic profits are above zero (above normal accounting profits), then existing firms have an incentive to increase production. Also, venture capitalists (investors) from outside the industry will become attracted to the profit potential, and enter the industry. This increases the supply of the product and lowers the price in the market. The lower price will decrease profits until in the long run economic profits are zero again.

The reverse is also true. If firms in the industry are incurring losses, then some (the weaker ones) will go out of business. The lower supply will raise the price and increase the profits for the surviving businesses. If there is not enough demand for even one business to survive (producers of typewriters; black-and-white televisions), then the industry will cease to exist, and resources will be allocated to other, more-profitable industries (producers of personal computers; color and large-screen televisions).

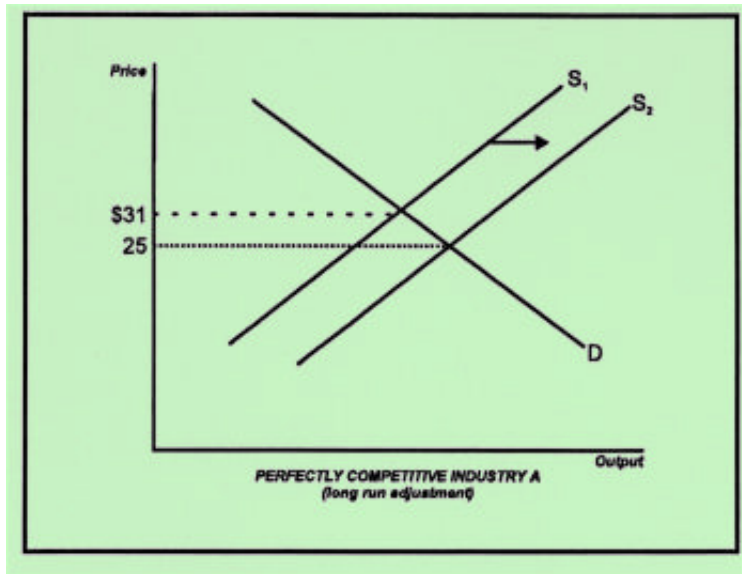
Long-Run Equilibrium

Let's analyze the long-run equilibrium for the perfectly competitive industry in the graph below. The market equilibrium price is \$31. Let's assume that at this price firms are making positive economic (above-normal) profits.

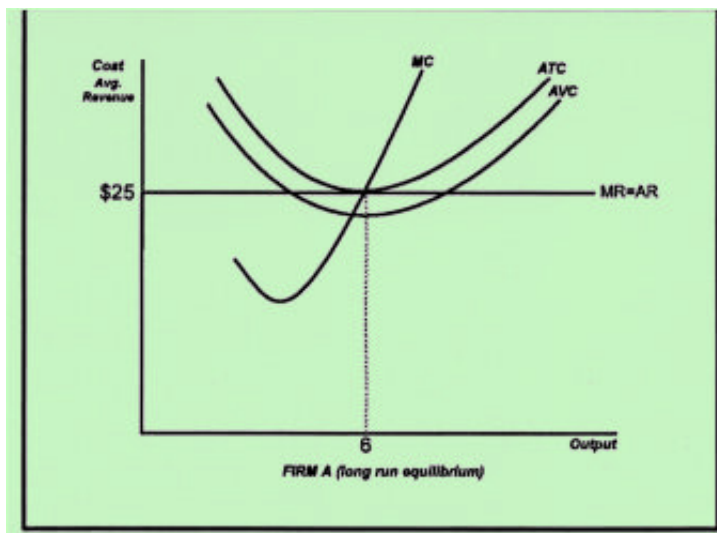


Because the profits are above normal, existing firms will increase their output, and other firms will enter this market. This shifts the market supply curve to the right (see graph below). As long as firms continue to make above-normal profits, the supply curve continues to shift to the right. Let's assume that the supply curve shifts to S_2 , and that at the new equilibrium price of \$25 economic profits are zero. This is the long-run equilibrium price in this market (assuming no other changes), because there are no longer above-

normal profits. Economic profits are zero, which means that each firm makes a normal (average) profit.

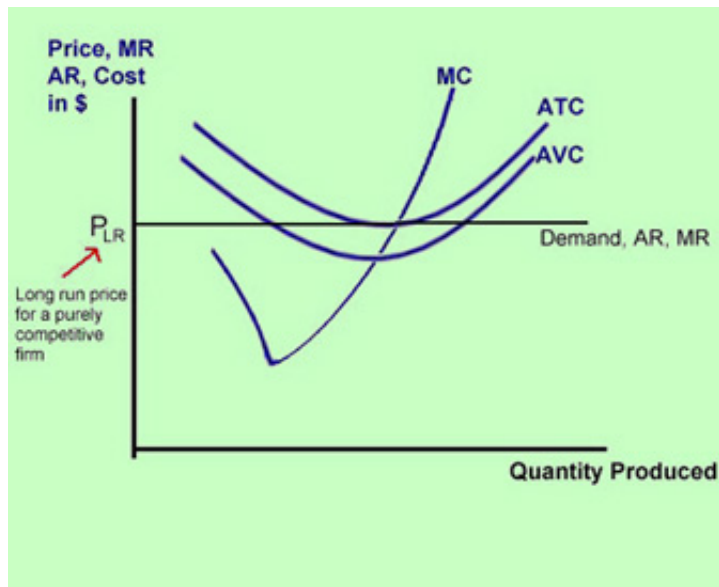


The graphs above illustrate market demand and supply curves. The graph below illustrates a market demand and cost curves for one typical firm (firm A) in this industry. At a price of \$25, the firm is making zero economic profits. The profit maximizing quantity is 6, because this is where MC equals MR. At this quantity, the ATC curve touches the demand (AR) curve. When price (AR) and ATC are equal, the firm makes zero economic profits.



Purely Competitive Firms Operate at the Lowest Point of the Average Total Cost Curve

In the graph below, the long-run price is P_{LR} , because at this price, the firm's average cost equals the price, and the firm makes zero economic profits. Thus, the firm is making a normal, and not an above-normal, profit. At this long-run equilibrium price, the purely competitive firm operates at the lowest point on its average total cost curve. This means that a purely competitive firm operates at maximum efficiency and charges the lowest possible price (without firms going bankrupt).



Video Explanation

For a video explanation of the long run equilibrium situation for a purely competitive firm, please watch:

[YouTube Video](#)

Section 7: The Farming Industry

Characteristics of the Farming Industry

The farming industry in the United States and other industrialized countries is very competitive. It is an example of an industry that is nearly purely competitive.

Characteristics of the farming industry include the following:

1. There are many farmers.
2. There are relatively low barriers to enter the farming industry.
3. Farmers competing in the same market sell identical or nearly identical products.
4. Buyers of agricultural products have significant information about the product.

Farm Production and Elasticity

We have observed the following about production in the farming industry in most industrialized countries:

1. Productivity has increased considerably.
2. Demand for farm products is income inelastic.
3. Demand for farm products is price inelastic.

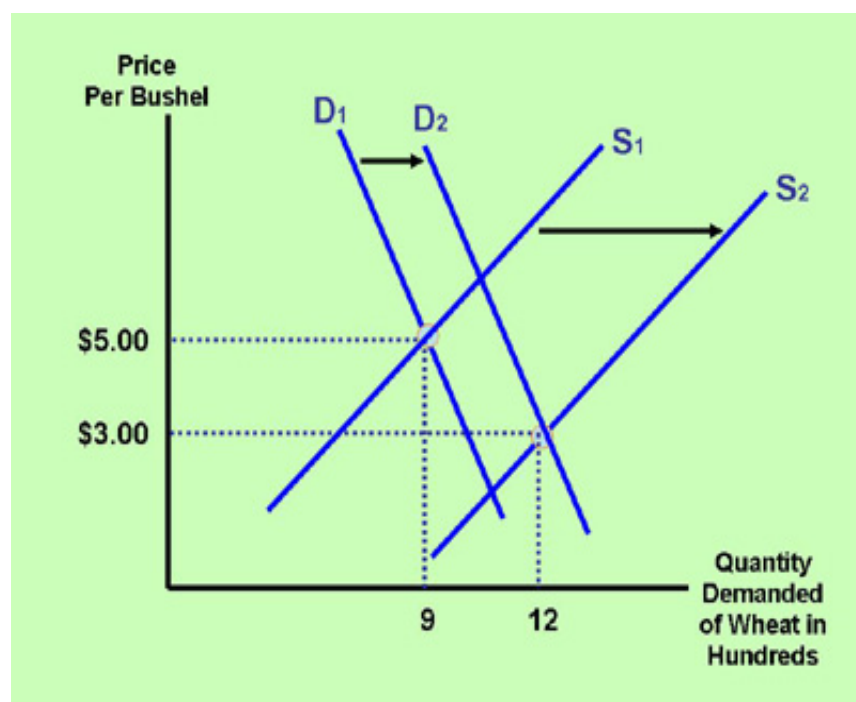
Productivity has increased considerably because of tremendous advances in technology, automation, fertilizer techniques, and genetic engineering.

Due to these the advances, the supply curves of farm products, such as wheat, grain, oats, peanuts, meat, fruits, and dairy products, have experienced significant shifts to the right (see graph below). The demand for food has increased also, but not as much. This is because **income** elasticity of demand is relatively low.



Buyers' income elasticity is relatively low because there is a limit to how much most people can and want to eat. Therefore, the demand has increased only a fraction of how much supply has increased. Some people have shifted to more expensive types of food but the total demand for **all** food products has not increased as much as the supply has increased. The result is that the equilibrium price has decreased, and the equilibrium quantity has increased.

As a percentage, the price has decreased more than the quantity has increased. This is because the **price** elasticity of demand for food is also inelastic. If, for example, food prices decrease by 100%, people may only consume 30% more food (for the same reason that income elasticity of demand is low).



Farm Revenue

In the graph above, farmers' revenue at the old price and quantity of \$5 and 900 products, respectively (the intersection of D1 and S1), is \$5 times 900, or \$4,500. At the new price of \$3 and the new quantity of 1200 (the intersection of D2 and S2), revenue is \$3 times 1,200, or \$3,600. Revenue has decreased. Decreases in revenue have caused many farmers financial hardship, and a significant number of farmers in industrialized countries have been forced to exit the industry.

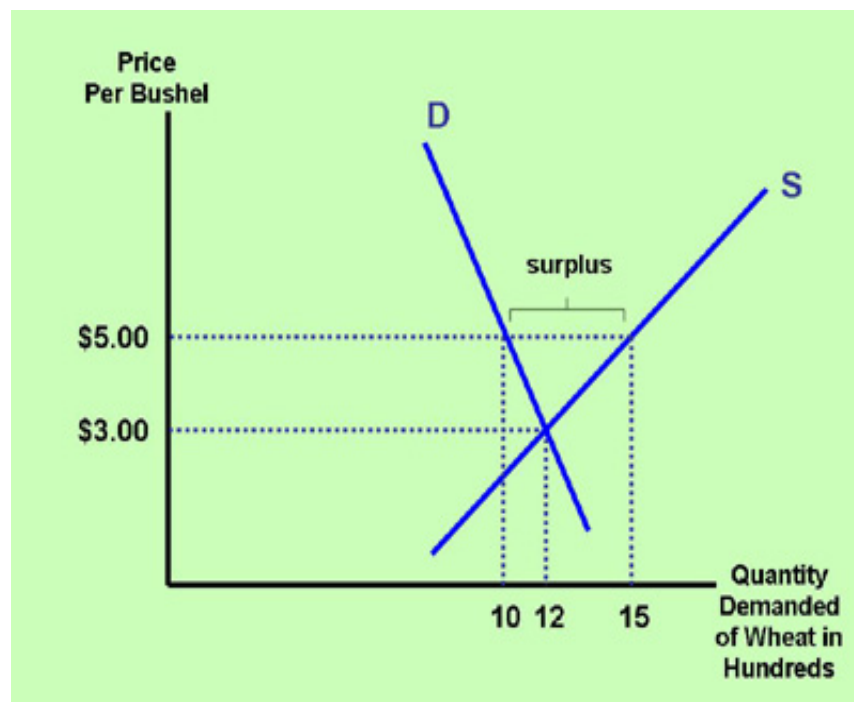
Government Farm Programs

Governments have attempted to stem the outflow of farm businesses by financially supporting farmers. The following programs were started in the 1930s:

1. Price Supports
2. Acreage Restrictions
3. Target Prices
4. Direct Subsidies and Loan Programs
5. Foreign Import Restrictions

Price Supports

Price supports are price floors (minimum prices) established by a government in order to increase revenue of suppliers. In the graph below, let's say that the free market equilibrium price of wheat is \$3, and the free market equilibrium quantity is 1,200. As part of the price support program, the government requires farmers to sell their product for a price of a minimum of \$5 (the price floor). The higher-than-equilibrium price increases the quantity supplied to 1,500, but decreases the quantity demanded to 1,000. Therefore, a surplus results in the amount of 500 (1,500 minus 1,000) products. Farmers' revenue increases from \$3,600 (\$3 times 1,200) to \$7,500 (\$5 times 1,500). The government promises to purchase the surplus of 500 products, which it stores and sells later, donates to poor countries or poor groups in our population, or simply throws away. The advantage of this program is that farmers benefit financially. The disadvantages are that food prices increase, and taxes increase because of government expenses related to the purchasing and storing of the surplus.



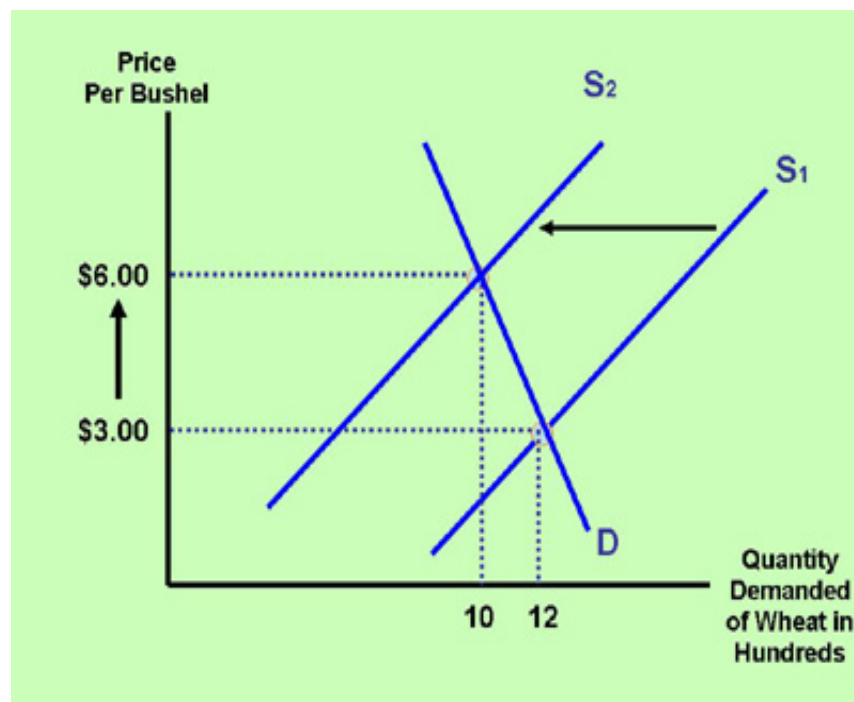
For a video explanation of government price supports, please watch:

[YouTube Video](#)

Acreage Restrictions

Acreage restrictions encourage farmers to decrease their production. Farmers agree to not use a certain number of acres of their previously farmed land. In return, the government pays farmers a certain amount for each idle acre. In the graph below, supply decreases from S_1 to S_2 . Equilibrium price increases from \$3 to \$6, and equilibrium quantity decreases from 1,200 to 1,000. This increases farmers' revenue from \$3,600 (\$3 times 1,200) to \$6,000 (\$6 times 1,000).

The advantage of this program is that farmers benefit financially. The disadvantage is that food prices and taxes increase. A further problem with this program is that when farmers are encouraged to leave a number of acres of their land idle, they leave their least-productive land idle. The land they do cultivate, they use more efficiently (for example, by applying more fertilizers). The overall effect is that supply doesn't decrease much at all, and, therefore, the equilibrium price doesn't increase much. Thus, in practice, acreage restriction programs are merely direct subsidy programs in disguise.

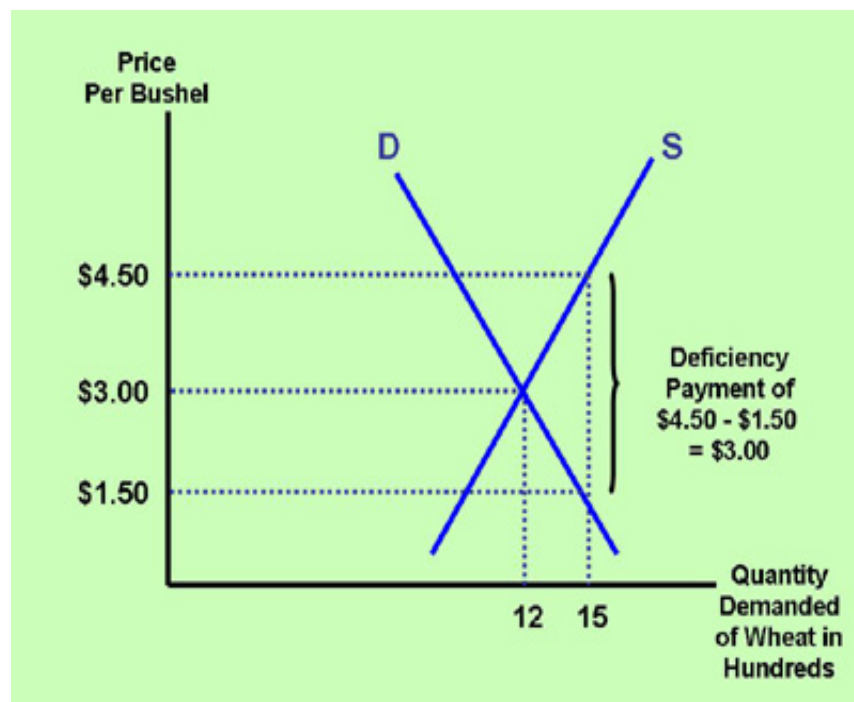


For a video explanation of government acreage restrictions, please watch:

[YouTube Video](#)

Target Prices

Target prices are similar to price supports. The government promises farmers a higher price compared to the free market equilibrium price. The difference is that farmers are encouraged to sell all of their production, so that there is no surplus. In the graph below, the free market equilibrium price is \$3. The target price is \$4.50. At this price, farmers **produce** 1,500 products. In order to **sell** 1,500 products, however, farmers need to lower the price to \$1.50. At this price, consumers are willing to purchase all 1,500 products. The government promises to make up the difference in the two prices: \$4.50 minus \$1.50, or \$3. This is called the deficiency payment. The advantage of this program is that it benefits farmers financially. Furthermore, consumer prices decrease. The disadvantage is that taxes increase considerably due to the sizeable deficiency payments.



For a video explanation of government deficiency payments (target prices), please watch:

[YouTube Video](#)

Direct Subsidies, Loan Programs, and Import Restrictions

Direct subsidies are direct payments by the government to farmers. Financial assistance frequently takes the form of guaranteed loans. Direct subsidies and loan programs help farmers financially, but raise taxes.

Import restrictions are usually import tariffs (import taxes) or quotas (limitations on the amount) on foreign farm products. Import restrictions help domestic farmers, but raise consumer prices, and reduce economic efficiency.

In the United States, the Federal Agricultural Improvements and Reform (FAIR) Act of 1996 eliminated acreage restrictions and target prices. Assistance to farmers shifted to direct subsidies, loan guarantees, and import restrictions.

The Farm Security Act of 2002 replaced the FAIR Act of 1996. Direct subsidies and loans increased, and some programs included a combination of price supports and acreage restrictions. Currently, the yearly cost to the United States government (and its tax payers) exceeds \$20 billion per year. One of the main criticisms of today's farm programs is that most of the financial assistance goes to large, relatively well-off (corporate) farmers.

Introduction

What's in This Chapter?

A monopoly is an industry in which one seller dominates or controls the industry. There are two kinds of monopolies: government granted monopolies, and free market monopolies. The delivery of first class letters by the U.S. Postal Service is government granted; no other company is allowed to deliver first class letters. In the Internet search industry, mostly dominated by Google, other companies are allowed to compete.

The U.S. Postal Service does not have to fear potential competitors (in the area of delivering first class letters, providing passports, and a few other services). It does not have to operate at maximum efficiency, and does not have to keep its prices as low as it would if there had been more competition. Google does have to fear competitors, because of the threat of potential competitors (it already has some competitors, including Microsoft's Bing, and Yahoo Search). If Google does not operate efficiently and if it does not keep delivering a quality product, then it will lose market share and lose advertising revenue. Google also has to make sure it doesn't abuse its monopoly power (even though it does appear it has done this in some ways) if it wants to avoid a public backlash. Google may be considered a near monopoly in the Internet search industry, but, unlike a government granted monopoly, it must behave as if there is substantial competition if it wants to survive.

This unit discusses these two types of monopolies, barriers to entry, profit maximization, and anti-trust laws.



Section 1: Barriers to Entry and Types of Monopolies

What is a Monopoly?

A pure monopoly industry is an industry with only one seller, A near monopoly is an industry in which one seller dominates the industry. Typically a monopoly firm is a large company that sells a product for which there are no close substitutes.

Reasons for Monopoly Forming

Monopolies or near monopolies typically develop because of one of more of the following:

1. Legal barriers.

The government prohibits competitors from entering the market. For example, gas and electric suppliers, cable television providers, the United States Postal Service, and Amtrak are given exclusive rights to supply their products in the market.

2. Patents and copyrights.

The government provides a company the sole rights to supply a product or a component of a product, which is patented or copyrighted. Patents and copyrights protect companies' innovations that have been expensive to research, develop, and market. For example, many medical devices and medicines are patented.

3. Licenses.

Governments require licenses by, for example, lawyers, doctors, accountants, and taxi drivers in order to protect consumers, as well as suppliers.

4. Trade restrictions.

Governments impose tariffs, quotas, and other import restrictions to protect domestic producers.

5. Exclusive ownership of resources.

Some companies, such as the De Beers diamond company, owned most of the resources to supply the product until recently. This serves as a barrier to entering the industry. The OPEC countries owned the vast majority of the known oil reserves a few decades ago.

6. Economies of scale.

In some industries, large firms can produce at a lower average cost than smaller firms. The lower average cost allows the larger firm to be more profitable and expand at a faster rate than smaller firms. Frequently, the larger firm acquires smaller firms and eventually takes control of the market.

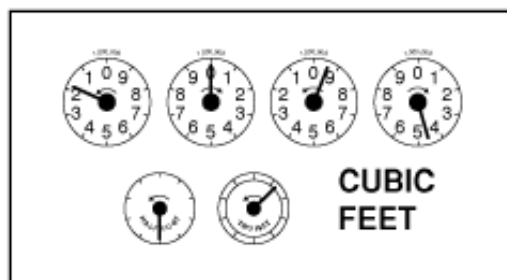
The Two Types of Monopolies

Reasons 1 through 4 above are government-imposed barriers to entering an industry. Reasons 5 and 6 are market forces that encourage monopoly forming. Therefore, we distinguish between these two types of monopolies:

1. Government-granted monopolies

2. Free market monopolies

Government-granted monopolies include utility companies, such as large electricity companies. These companies are often the sole providers of natural gas and electricity within a certain region.



Another example of a government-granted monopoly is the United States Postal Service, which has a monopoly in delivering first class letters and issuing passports. Local telephone companies, cable service providers, Amtrak, and several major professional sports leagues are also government-granted monopolies. In general, government-granted monopolies have less incentive to innovate. They usually do not provide the best and most-efficient service to their customers, because they face no competition and have no incentive to cut costs. If they incur a loss, the government often provides financial assistance.

Professionals, such as doctors, dentists, and lawyers, are officially part of the free market. However, they have received support from government legislation to restrict entry into their profession by making it more difficult for newly aspiring doctors, dentists, or lawyers to obtain licenses. This gives existing professionals a considerable amount of monopoly power.

Another government granted-monopoly is the government itself. The government provides many services (issuing driver's licenses and car registrations, operating parks, administering a retirement system (Social Security) and health care system (Medicaid and Medicare), creating laws and controlling facilities usage for which there is no competition. The political party system in the United States, practically speaking, consists of only two parties (called a duopoly). This does not provide voters much choice, and results in a tendency for the two political parties to be inefficient and ineffective. Many other countries around the world have a multiple party system (10 or more). Parties in this system face much stiffer competition and are encouraged to operate more effectively. In addition, citizens can vote for a party that is much closer to their actual beliefs.

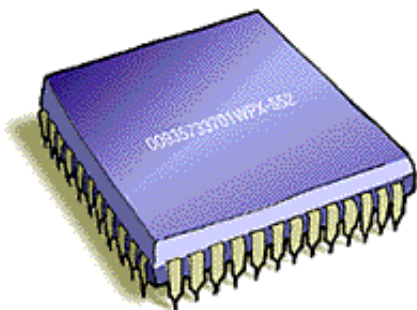
The United States public school system is a near monopoly. There are private schools, but because of the high price, this option is not available for most families. If families cannot afford a private school, parents are told by their local government that their children are required to attend the public school in their district. The public school is essentially a monopoly for these families. Some households move to another district if they don't like the school in their old district. However, the school board can redraw the school district lines at will. This lack of choice and lack of competition is one of the main contributors to the relatively low quality of education in most public school districts. If you are shopping for a computer, and the only store you can go to is the Best Buy on Main Street (because that is the only computer store allowed by the local government in your area), how would you feel and what kind of service do you think

you would receive?

Free market monopolies include private sector companies that have a significant share of their industry, not by government law, but by earning superior sales numbers. The De Beers company has dominated the wholesale diamond industry for years. Some newspapers (Washington Post, Chicago Tribune, LA Times) have obtained a local monopoly or near monopoly position in their regional areas. Google dominates the Internet search industry (92%), and also has a significant share of the smart phone operating systems (Android) in the world (75%). In addition, Google continues to grow its monopoly power in online maps (70%), online videos (YouTube - 73%) and Internet browsers (Google Chrome - 66%). Amazon has a significant share of the Ecommerce market with just over 50% of all online retail deliveries.



Free market monopolies have earned their dominant status through efficient economic practices and economies of scale. They have grown large mostly because of innovation and cost-cutting. Because there is still the threat of competition, a free market monopoly has to remain efficient, continue to innovate, and keep prices low. If it does not, it will lose its status as the dominant power in the industry.



Despite these firms' value to the economy, they often come under attack. Many people criticize Google, Microsoft, Amazon, and Walmart for being too big and too dominant and for abusing their monopoly position by imposing anti-competitive rules. Microsoft has been taken to court multiple times, and Google has come under fire for exploiting its monopoly position in the Internet search market. If these firms apply rules that unethically or illegally stifle competition or hurt workers or consumers, then the legal system must intervene. But if they have not violated legal or ethical rules, one can argue that they have worked hard to achieve success in the market, are employing large amounts of workers at competitive wages, and are providing a service that satisfies consumers' needs, so why break them up or take them to court?

Section 2: The Monopolist's Revenue Curves

Average and Marginal Revenue

Average revenue is equal to the price of the product, if there is no price discrimination (price discrimination occurs when a firm charges different prices to different economic groups, such as students and senior citizens). In this case, the average revenue curve is the same as the demand curve.

Unlike the purely competitive firm's marginal revenue curve, the monopolist's marginal revenue curve is different from its demand curve. Because the firm lowers its price when it wants to sell more products (and vice versa), marginal revenue decreases as output increases. Therefore, the marginal revenue curve lies below the demand curve. At any output, except for the first output value, marginal revenue is less than price and the average revenue.

The following example illustrates this.

Quantity	Price	Total Revenue	Average Revenue	Marginal Revenue
100	\$0.50	\$50	\$0.50	-
120	\$0.45	\$54	\$0.45	\$0.20
140	\$0.40	\$56	\$0.40	\$0.10

The monopolist sells 100 newspapers at a price of \$.50. It sells 120 newspapers at \$.45, and 140 newspapers at \$.40 per paper. When the price changes to \$.45, marginal revenue decreases to \$.20 (marginal revenue is the increase in revenue divided by the increase in quantity, or $\$4/20$). When the price changes to \$.40, marginal revenue decreases to \$.10 ($\$2/20$).

Another Example

Below is another example of marginal and average revenue calculations for a monopolist.

Consider the following monopolist's demand curve. In order for the monopolist to increase its sales, it must lower its price.

Quantity per Month	Price
0	\$40
1,000	\$35
2,000	\$30
3,000	\$25

Copying the demand data above, and calculating the monopolist's total, average, and marginal revenue for the first three rows, we get:

Quantity per Month	Price	Total Revenue	Average Revenue	Marginal Revenue

0	\$40	\$0	-	-
1,000	\$35	\$35,000	\$35	\$35
2,000	\$30	\$60,000	\$30	\$25
3,000	\$25	?	?	?

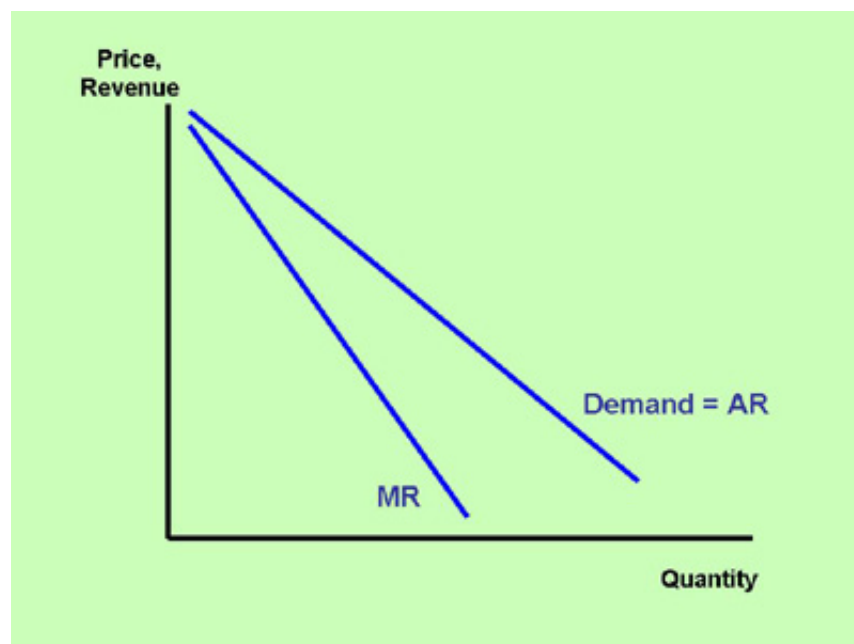
Problem: In the table above, can you complete the row in which the quantity is 3,000?

Solution:

Quantity per Month	Price	Total Revenue	Average Revenue	Marginal Revenue
0	\$40	\$0	-	-
1,000	\$35	\$35,000	\$35	\$35
2,000	\$30	\$60,000	\$30	\$25
3,000	\$25	\$75,000 (Q times P, or 3,000 times \$25)	\$25 (TR divided by Q, or \$75,000 divided by 3,000)	\$15 (Change in TR divided by change in Q, or \$15,000 divided by 1,000)

Graphing the Monopolist's Demand and Marginal Revenue Curves

If we graph the quantities from the above table against the prices and the marginal revenue values, we get a graph that looks like the one in the diagram below. Because the monopolist is the industry, the monopolist's demand curve is the industry demand curve. An industry demand curve, as we saw in the chapter on [supply and demand](#), is downward sloping. Because there are no close substitutes for this product, the demand curve is relatively steep, or inelastic.



The marginal revenue curve is below the demand curve, because the monopolist lowers its price as it sells

more products.

In the next section, we add cost curves to the tables and graph above in order to identify the monopolist's profit-maximizing output and price.

Section 3: Profit-Maximization (or Loss-Minimization) for a Monopolist

Monopoly Profit-Maximization by Analyzing a Table

Consider the following table with cost and revenue data for a hypothetical monopolist:

Quantity	TFC	TVC	TC	AVC	ATC	MC	Price	Total Revenue	Marginal Revenue
0	5,000	0	5,000	-	-	-	38	0	-
100	5,000	3,000	8,000	30	80	30	37	3,700	37
200	5,000	5,000	10,000	25	50	20	36	7,200	35
300	5,000	6,000	11,000	20	36.67	10	35	10,500	33
400	5,000	6,800	11,800	17	29.50	8	34	13,600	31
500	5,000	8,000	13,000	16	26	12	33	16,500	29
600	5,000	10,000	15,000	16.67	25	20	32	19,200	27
700	5,000	13,000	18,000	18.57	25.71	30	31	21,700	25
800	5,000	16,500	21,500	20.63	26.88	35	30	24,000	23
900	5,000	22,000	27,000	24.44	30	55	29	26,100	21

Problem: What are the profit-maximizing output and price for the above monopolist? What is the profit at this output? What is the average profit at this output?

Solution: Like the purely competitive firm, a monopolist maximizes profits at the quantity where marginal cost and marginal revenue are equal, or where marginal cost comes closest to marginal revenue, as long as marginal cost does not exceed marginal revenue, marginal cost is not falling, and price exceeds average variable cost.

Applying the profit-maximizing rule, we conclude that the firm maximizes profits at

Quantity	= 600 units
Price	= \$32
Profit (TR-TC)	= \$19,200-\$15,000 = \$4,200
Average Profit (TP / Q)	= \$7 (\$4,200 / 600)

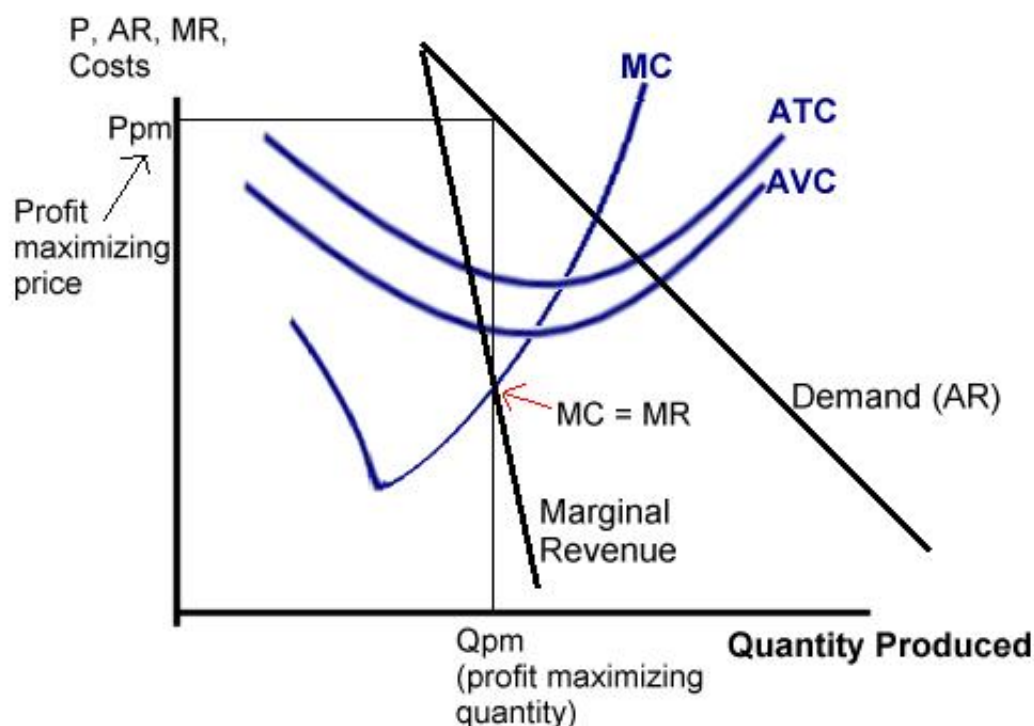
Video Explanation

For a video explanation of a monopoly firm's profit maximization using a table, please watch:

[YouTube Video](#)**Monopoly Profit-Maximization by Analyzing a Graph**

In a table, we find the profit-maximizing output by identifying the point at which marginal cost and marginal revenue are equal, as long as marginal cost does not exceed marginal revenue, marginal cost is not falling, and price exceeds average variable cost.

The graph below indicates that at output Q_{pm} , marginal cost equals marginal revenue in the upward sloping portion of the marginal cost curve. At this output, the price is P_{pm} . For a monopolist, the marginal revenue curve and the demand (price) curve are different. Therefore, marginal revenue and price at the profit-maximizing output are different. From the $MC=MR$ point, go straight up to the demand curve in order to identify the profit-maximizing price. This price is greater than the firm's average variable cost, so the company will **not** need to shut down. The price is also greater than the firm's average total cost, so the company is making an economic (above-normal) profit. Because there are barriers to entry into this industry, it is possible that the firm can continue to make economic profits in the long run, as well.

**Video Explanation**

For a video explanation of a monopolist's profit-maximizing quantity and price using a graph, please watch:

[YouTube Video](#)

Section 4: Anti-trust legislation in the United States

The History of Anti-trust Legislation

Anti-trust laws are meant to promote competition and limit monopoly forming. Listed below are the main anti-trust legislation acts passed in the United States. Other industrialized countries have similar laws.

1. The Sherman Act of 1890.

The Sherman Act was the first important anti-trust (anti-monopoly) law passed in the United States. This act outlaws all contracts, combinations, and conspiracies that unreasonably restrain interstate and foreign trade. If two or more companies sign a contract to fix prices, rig bids, or allocate consumers, they are in violation of the Sherman Act. Individuals can be fined up to \$350,000 (and up to ten years in prison) and corporations can be fined up to \$10 million for each offense.

2. The Clayton Act of 1914.

The Clayton Act expanded on the Sherman Act and more clearly defined anti-competitive practices. Specifically, the Clayton Act prohibits the following:

1. Price discrimination, local price cutting and price fixing, if it leads to monopoly-forming. Price discrimination is when a firm charges different prices to different buyers. Some price discrimination is legal; for example, when a movie theater sells tickets at a discount to senior citizens. It is not legal to price discriminate on the basis of race, gender, ethnicity, etc. It is also not legal if a firm charges a different price to different companies unless justified by different costs (transportation, volume discounts). Local price cutting is done by a large firm in a local market to drive out small, local competitors. Price fixing is when two or more companies agree on a price (usually a higher price) in order to increase their profits.
2. Mergers and acquisitions that lead to monopoly-forming. Mergers occur when two or more companies combine their resources to form one company. Acquisitions are purchases of companies or parts of companies by usually a larger company.
3. A person from being a director of two or more competing corporations.
4. Exclusives dealing arrangements, if these arrangements lead to monopoly-forming. Microsoft was accused of an exclusive dealing arrangement when it required purchasers of its Windows operating systems also to include its Internet Explorer browser. Microsoft was also accused of including code in its Windows system, which made it difficult for competing software providers to run software inside of Windows.

In addition, as part of the Clayton Act, labor unions were declared legal, as were strikes, picketing, boycotts, and agricultural cooperatives.

3. The Federal Trade Commission Act of 1914.

The Federal Trade Commission Act established the Federal Trade Commission, which is a bipartisan body of five members appointed by the President of the United States to serve seven-year terms. This commission, along with the Anti-trust Division of the Department of Justice, enforces anti-trust laws. The main purpose of the Federal Trade Commission is to preserve competition and protect consumers.

Critiques of Anti-trust Laws

The mere size of a monopoly makes some people suspicious that the company obtained its position in an illegal and unethical way, or that the company will use its size to harm consumers. This does occasionally happen. However, it is not always the case and it is questionable whether we should criticize firms because of size alone. Economists, such as former Fed chairman, Alan Greenspan, and the late Milton Friedman, question the value of anti-trust laws. Milton Friedman initially agreed with the intent of the anti-trust laws, but eventually came to the conclusion that they do more harm than good.



Many anti-trust cases are often based on the mere fact that a company dominates a certain market. However, if a company achieves its status through efficiency and innovation, then its services, low cost, and low prices can be beneficial for society and our economy. Alan Greenspan supports monopolies, as long as they are not coercive monopolies.

If monopolies are indeed coercive or take advantage of their size by behaving in unethical, illegal, or economically harmful ways, it is, of course, proper to take them to court and fine them if proven guilty. One can argue that even without courts, if consumers find out that a monopoly company is abusing its powers, many consumers will stop purchasing its products and the monopoly will lose its powers.

Large companies in the financial services industry have come under attack recently because several are considered "too big to fail" and the government felt compelled to bail them out in order to avoid a panic in the domestic and world economy. If the failure of a large company causes a panic, then should we not allow these firms to grow to this size? Or should we let them fail, even at the expense of a temporary panic, and find comfort in the idea that once a company fails, surviving companies will grow stronger and new firms will emerge?

Introduction

What's in This Chapter?

Monopolistically competitive industries and oligopoly industries are common market structures. This unit gives examples of each market structure, and explains that in most of these industries, there is a significant amount of competition. In each industry structure, it is unlikely that a firm will charge exorbitant prices and make excessive profits in the long run. Even in oligopoly industries, there is a significant degree of actual and potential competition (unless the companies collude).

Game theory is a relatively new branch of economics, which sheds light on firms' behavior under various competitive circumstances. It has useful applications, especially in oligopoly markets.



Section 1: Characteristics of a Monopolistically Competitive Industry

Monopolistic Competition and Oligopoly

So far, we have discussed two market structures, pure competition and monopoly. These are the two extremes. Pure competition is the most competitive, and monopoly the least competitive. The two market structures discussed in this unit are in between these two extremes. We will first discuss monopolistic competition. Then we will discuss oligopoly in a later section.

Characteristics of Monopolistic Competition

Four characteristics of a monopolistically competitive industry are:

1. Many sellers.

There are many sellers in this industry. Thus, there is a lot of competition.

2. Easy entrance.

Firms in monopolistic competition are small. It's relatively easy for new firms to enter this industry and for existing firms to exit. Barriers to entry and exit are low.

3. Differentiated products.

Firms in this industry sell differentiated products. Unlike in perfect competition, products are not identical.

4. Local Advertising.

Firms in this industry frequently advertise. Because the firms are small, this is usually done on a local level.

Characteristics 1 and 2 are the same as in perfect competition. Characteristic 3 means that firms in this industry sell products that are similar but slightly different. The difference may be in the packaging of the product, the ingredients, the service associated with the product, the name of the product, etc. It is also possible that there may not be real differences, but only **perceived** differences by consumers.

Advertising (characteristic 4) helps to emphasize these differences to consumers.

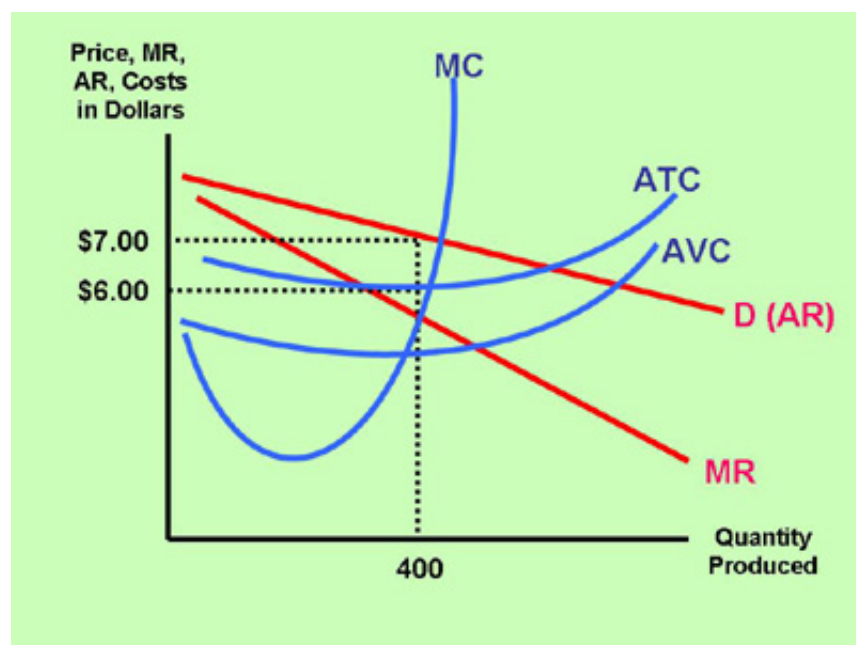
Characteristics 3 and 4 usually result in competitors charging slightly different prices for their products. Competitor A may charge \$5.49, while competitor B charges \$5.29. Firms have some control over the price, and the demand curve is, therefore, downward sloping for each firm.

Examples of Monopolistically Competitive Industries

Section 2: Short-Run and Long-Run Profit Maximization for a Firm in Monopolistic Competition

The Profit Maximizing Price and Quantity in the Short Run

Firms in monopolistic competition face a downward sloping demand curve. The demand curve is flatter (closer to horizontal, or more elastic) compared to the demand curve of the pure monopolist. The graph below illustrates the profit-maximizing price and quantity for a monopolistically competitive firm in the short run. The firm maximizes profits at the quantity where marginal cost equals marginal revenue (at a quantity of 400). The price is found by going straight up to the demand curve, so the profit-maximizing price is \$7. At the profit maximizing quantity of 400, average total cost is \$6. This means that the firm is making an economic (above-normal) profit. Average profit is \$7 minus \$6, or \$1. This means that total profit is \$400 (400 times \$1).



Because there are low barriers to entry into monopolistic competition, a firm is not expected to make economic (above-normal) profits in the long run. If a firm is making above-normal profits, then in the long run, existing firms will increase supply, and new firms will enter this industry to take advantage of the lucrative conditions. The increase in the supply will lower the price. This will lower the original firm's profits back to a normal level (normal accounting profits, but zero economic profits). The opposite occurs when firms lose money. The weaker firms that lose money in the long run will exit the industry. This lowers the supply, which raises the price and increases profits for the remaining firms.

Long-Run Equilibrium

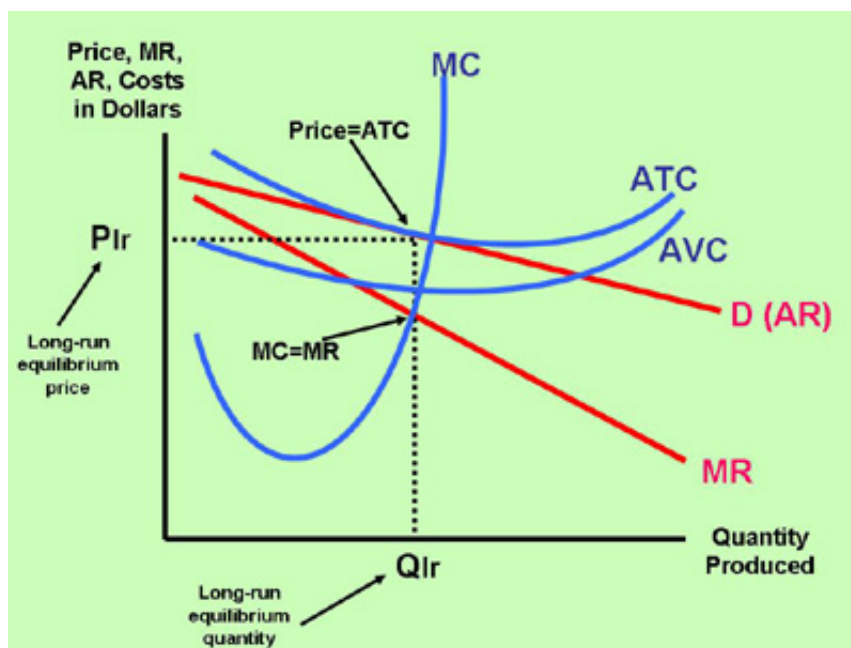
In the long run, a monopolistically competitive firm earns zero economic profits. A firm looks at its cost of production and then marks up its price to obtain a reasonable profit. If firm A marks up its price too much, competing firm B will take advantage of it by charging a lower price. This will cause firm A to lose market share, and it will have to respond by lowering its price. This process occurs in any industry,

as long as there is free and unrestricted competition. Because of the relative ease of entry into the industry, it is rare for a firm in a competitive market to charge excessively high prices and experience above-normal profits in the long run.



The graph below illustrates a monopolistically competitive firm's long-run equilibrium. The firm makes zero economic profits, so the average total cost curve just touches the demand curve. This is where price (P_{lr}) equals average total cost. The owner of this firm still earns a positive (but average) accounting profit, but economic profits are zero.

Unlike the perfectly competitive firm, the monopolistically competitive firm's price is **not** at the **lowest** point on the average total cost curve. The profit-maximizing price and average cost are to the left of the minimum average total cost. This means that in terms of average costs the monopolistically competitive firm is not producing at its most efficient (lowest cost) point.



Monopolistic Competition as a More-Realistic Model

Monopolistically competitive industries are more common than purely competitive ones. It is rare that two competitive firms sell identical products. Just about all firms, small or large, differentiate. They may include slightly different ingredients or parts in their products, or they differentiate in the way that they package, name, distribute, or provide service to the customer. In order to accentuate these differences, monopolistically competitive firms frequently advertise. Advertising usually occurs on a local scale,

because monopolistically competitive firms are small. Advertising benefits the firm by emphasizing the unique aspects of its product. This allows the firm to control its price and reap higher profits in the short run. Advertising can also benefit people by informing the consumer of the choices available. The Internet has been an effective advertising tool for many businesses, and has helped consumers in comparing product quality and prices.

Video Explanation

For a video explanation of profit-maximization for a firm in monopolistic competition, please watch:

[YouTube Video](#)

Section 3: Characteristics of an Oligopoly Industry

Oligopoly Characteristics

Four characteristics of an oligopoly industry are:

1. Few sellers.

There are just several sellers who control all or most of the sales in the industry.

2. Barriers to entry.

It is difficult to enter an oligopoly industry and compete as a small start-up company. Oligopoly firms are large and benefit from economies of scale. It takes considerable know-how and capital to compete in this industry.

3. Interdependence.

Oligopoly firms are large relative to the market in which they operate. If one oligopoly firm changes its price or its marketing strategy, it will significantly impact the rival firm(s). For instance, if Pepsi lowers its price by 20 cents per bottle, Coke will be affected. If Coke does not respond, it will lose significant market share. Therefore, Coke will most likely lower its price, too.

4. Prevalent advertising.

Oligopoly firms frequently advertise on a national scale. Many Super Bowl, World Series, Wimbledon finals, World Cup finals, NBA finals, and NCAA March Madness advertisements are sponsored by oligopoly firms.

Examples of Oligopoly Industries

Section 4: Oligopoly and Game Theory

Game Theory History

Game theory has become increasingly important in microeconomics, as it has in other disciplines, such as biology, psychology, sociology, and computer science. In economics, John Neumann and Oskar



Morgenstern's 1944 *Theory of Games and Economic Behavior* laid the foundation. In 1994, John Nash (pictured) won the Nobel Prize for his revolutionary game theory models. He was also the subject of the 1998 biography by Sylvia Nasar and the 2001 film *A Beautiful Mind*, starring Russell Crowe.

A Game Theory Simulation

Game theory uses the same setup as regular games, including players, moves, strategies, and rewards. Below is an example of a simple game simulation, which helps to explain some oligopoly behavior.

Let's say that an oligopoly industry consists mainly of two rival competitors (for example, Pepsi and Coca Cola). The table below illustrates strategies and rewards, depending on whether the firms cooperate in price setting or not. After playing the game simulation, we notice the following outcomes:

	Firm B sets a high price	Firm B sets a lower price
Firm A sets a high price	Firm A's profit = \$40 million Firm B's profit = \$40 million	Firm A's profit = \$10 million Firm B's profit = \$60 million
Firm A sets a lower price	Firm A's profit = \$60 million Firm B's profit = \$10 million	Firm A's profit = \$15 million Firm B's profit = \$15 million

When firm A sets a high price, but firm B sets a lower price (the blue option in the table), then most consumers will purchase firm's B's products, and firm B will make a much higher profit than firm A. The opposite happens when firm B sets a high price, and firm A sets a lower price (the green option).

If both firms set a high price, then neither firm will have a market share advantage, but the high price will generate a moderately high profit for each firm (the black option). This option often occurs when firms choose to cooperate (collude) and form a cartel. In most industrialized countries, anti-trust laws prohibit explicit cooperation. OPEC (Organization of the Petroleum Exporting Countries) is a cartel and operates outside of countries' boundaries. Therefore, OPEC is not illegal. OPEC's profits, until fracking lowered world prices, were high for decades because of cooperation and members' determination to keep prices high. For more information about OPEC, please click [HERE](#).

If both firms set a low price (the red option), then neither firm will have a market share advantage.

However, the low price reduces each firm's profits. This is beneficial for consumers, but not for firms. This non-cooperation situation occurs when firms engage in a price war. An outcome that stems from non-cooperation is called a Nash equilibrium. The Nash equilibrium in the above table is that both firms end up with a profit of \$15 million.

Barriers to Collusion (Cartels)

Fortunately for consumers, cartels often experience problems when it comes to keeping agreements and maintaining high prices.

Incentives to Cheat

Let's say that both firms cooperate and agree to a high price (the black option in the table above). We can see that both firms will make a profit of \$40 million. But what if one firm, say firm A, chooses to cheat on firm B, and secretly charges a slightly lower price to some of its customers. This will increase firm A's profits to \$60 million, and lower firm B's profits to \$10 million (the green option). It pays for firm A to cheat, because it will increase its profits. This incentive to cheat causes problems for cartels.

Below are additional reasons why cartels sometimes experience problems.

Different Goals

Cartel members' interests and goals differ. This makes it very hard to reach an agreement between members, especially if there are a lot of members. OPEC countries Saudi Arabia, Iran, Iraq, Kuwait, and Venezuela have had many disagreements about how much to produce and what price to charge. The fierce disagreement between Iraq and Kuwait in July of 1990 contributed to the war that began in August of 1990. Saudi Arabia has an interest to supply a large amount of oil to the world market, because its holdings of oil are large. Venezuela's interest is to offer less, because it wants to preserve its smaller holdings of oil over a longer time, and, therefore, restrict output and maintain a higher price.

Potential of New Competitors

At the high cartel price, it is attractive for new producers to enter the market. In addition, buyers respond to the high price by making adjustments to their consumption. This increase in supply and decrease in demand lowers the price in the long run. In the oil market, this has indeed occurred. After the price of a barrel of oil reached \$34 in the 1970s, countries that previously found it too costly to produce oil entered the market. England, Mexico, Norway, the United States, and Russia increased their supply and drove down the price of oil. During the 1980s and early 1990s, the average price of a barrel of oil decreased and it has made OPEC's life difficult. When the price of a barrel of oil exceeded \$70 in 2005 and early 2006, other (Non-OPEC) countries increased their production, and consumers began to limit their consumption of fuel by purchasing more fuel-efficient cars and driving less. In late 2006, the price of a barrel of oil had decreased to around \$60 again. Recently we have seen technological developments in hydraulic fracking that have increased the supply of oil and brought down world oil prices and retail prices at the pump. The pandemic is also keeping oil prices relatively low because of lower demand for gasoline and other oil products.

Prices and Profits in the Free Market

As mentioned in the previous unit, it is difficult for a non-monopoly firm to earn excessively high profits

even in the long run. This is often the case, even when firms attempt to collude and form cartels. Usually, in the long run, competitive market forces prevail and keep prices in check for consumers.

Introduction

What's in This Chapter?

Is there more or less poverty in countries that have higher income inequality? Consider the following hypothetical example.

Country A: The poorest income group earns an average of \$4,000 per year. The richest income group earns an average of \$10,000 per year. Incomes are relatively equal.

Country B: The poorest income group earns an average of \$10,000 per year. The richest income group earns an average of \$10,000,000 per year. There is a high degree of income inequality.

Assuming prices of goods and services are the same in both countries, which country do you prefer to live in?

If comparisons bother you and you mostly want people to have relatively equal incomes, you will answer country A.

If you care about absolute living conditions and purchasing power, you will answer country B. The standard of living is higher in country B, and the opportunities for advancement are greater.

People in countries with high degrees of income inequality typically do not stay poor. One of the links in this unit points to an article that explains that nearly 60% of people who are poor in the United States, are no longer poor ten years later and 85% are no longer poor by the end of their career.

A substantial percentage of the people in the group that remains poor (the ones remaining poor after 10 years) are in welfare programs. Do welfare programs encourage households to remain dependent on government help? How much incentive is there for people to transition from welfare to work? The welfare reforms of 1996, which introduced stricter eligibility requirements, encouraged a larger percentage of people to find work. Should we go further, and perhaps take welfare programs out of the hands of large bureaucratic governments and leave caring for the needy up to smaller governments (counties, cities) or local organizations, churches, private charities, neighbors, and friends? Should donations to help the poor be an individual choice, as Ayn Rand recommended? Or should donations be mandatory (taxes) and be in the hands of government administrators? This unit discusses these and other questions related to income inequality and poverty.



Section 1: United States Income Distribution

Income Inequality

How much income inequality is appropriate? This is a hotly debated topic among economists and politicians. Nearly everyone in industrialized countries agrees that some degree of income inequality is welcome. The debate is about **how much** inequality is fair. The current degree of inequality in the United States is shown in the table below.

Inequality has remained relatively constant in the United States recently. It has widened since a few decades ago though. For example, in 1979 the top 20% earned 44% of the total income. In 2020, the highest income earners (top quintile) earned 52.2% of the country's total earnings (these percentages don't take into account welfare transfer payments and tax payments).

Based on this table, the highest income earners are earning more as a percentage of total earnings in the country compared to decades ago. The lowest quintile of income earners' share has decreased since a few decades ago. Is this a bad thing? Not necessarily. While the **relative** share of the lower income groups has declined, the **absolute** amount (absolute standard of living, or purchasing power) of all income groups has increased. It is true that the highest income groups gain the most, but looking at any average 10 year period of time, even the real (inflation adjusted) income of the poorest 20% rises by about 6%. The total income pie (see pie chart below) gets bigger because of economic growth.

Percentage Distribution of Households, by Income Group

Income Amount in Current Dollars (for 2019 data), appr. 26 million households in each quintile	Percent of All Income Received (2020)*	Percent of All Income Received (2017)*	Percent of All Income Received (2013)*	Percent of All Income Received (2011)*	Percent of All Income Received (2009)*	Percent of All Income Received (2007)*
Lowest quintile; under appr. \$27,000	3.0	3.0	3.2	3.2	3.4	3.4
Second quintile; upper limit is appr. \$52,000	8.1	8.1	8.4	8.4	8.6	8.7
Third quintile; upper limit is appr. \$85,000	14.0	14.0	14.2	14.3	14.6	14.8
Fourth quintile; upper limit is appr. \$141,000	22.6	22.6	22.9	23.0	23.2	23.4
Top quintile; over \$141,000	52.2	52.3	51.1	51.1	50.3	49.7
Top 5% of all income earners; over appr. \$274,000	23.0	23.2	22.2	22.3	21.7	21.2

*Quintile percentages may not add to 100% due to rounding.

Source: United States Census Bureau (www.census.gov and <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-households.html>)

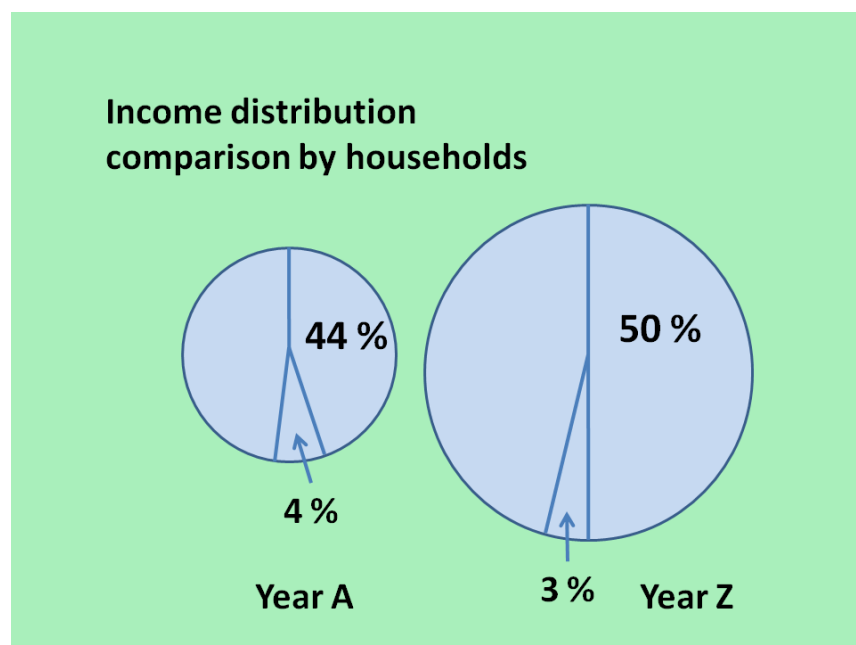
For the latest statistics on income distribution in the United States, please click [here](#).

Are the Rich Getting Richer and the Poor Getting Poorer?

Even though the income inequality between the top and the bottom earners in the United States has been widening since 1979, the overall standard of living (even after adjusting for inflation) for the large majority of people during most (with the exception of recessionary) years in this country is rising. In great part, this is **because** of income inequality. A free market economy leads to income inequalities. However, a free market economy also encourages hard work, innovation and increased productivity, and an increased standard of living for many. Some people might **feel** worse off in comparison, but in an absolute sense, most people can afford to buy more and enjoy more purchasing power and higher quality products in comparison to years ago.

Economists who claim that the poor are getting poorer and the rich are getting richer are only partly correct. They are correct about the rich getting richer, both in absolute and relative terms. But the poor are getting poorer only in relative terms, not in absolute terms. Thus, they are incorrect about the poor getting poorer, if they are referring to the absolute standard of living and purchasing power (the size of the slice) of the poor.

The pie charts below illustrate this trend. Let's study the income shares of the poorest quintile in year A (for example, 30 years ago) and year Z (today). Let's say that in year A, the poorest quintile earned 4 % of all income. Let's say that in year Z, the poorest quintile earned approximately 3 % of all income. The year A share is a bigger percentage of that year's total pie. However, the year Z share is a bigger absolute slice. Would you prefer 4 % of a small pizza, or 3 % of a large pizza?



Income Mobility

Another consideration of the "Are the poor getting poorer?" debate is whether the poor people in year A are the same poor people in year Z. The Census Bureau has conducted studies of people, and tracked them over ten-year periods of time. It found that during a recent decade, nearly 60% of people who are in the lowest income quintile (20%) moved to a higher quintile within ten years

(<https://www.stlouisfed.org/publications/itv/articles/?id=1920>). Countries with income inequality and free market opportunities tend to be dynamic and mobile, and most people have significant opportunities to improve their economic situation over time. Conversely, high income earners may experience downward mobility; 57% of the richest 1% moved out of this category ten years later (possible explanations include: lower job earnings; retirement; family break-ups (keep in mind that the statistics measure *household* incomes)).

Should we have more mobility? In other words, should people at the bottom of the income scale when they are born, have more opportunities to climb the social and economic ladder? Most people agree that the answer should be yes. The million dollar question is how to accomplish this.

Education is important. In the United States, it leaves much to be desired, in great part due to its public school near monopoly (little school choice). The judicial system also leaves much room for improvement. Are we robbing too many disadvantaged young people from opportunities by arresting them for relatively harmless crimes such as possession of small amounts of drugs?

Are minimum wage laws harmful to minority youth? Inner city teenagers are not getting the proper education in the United States. Then, when looking for a job, they are faced with businesses who are required to pay them a high minimum wage. The high wage means that a larger pool of people will apply for jobs; businesses then will opt to hire people with better education and more experience. This, in great part, explains the very high unemployment rate among minority teenagers in the United States.

Poor education and unemployment robs these young people of opportunities to advance. Some economists have suggested for the United States to adopt an elaborate apprenticeship program similar to one that exists in Germany.

Transfer Payments and Taxes

Other factors to consider in the discussion about income inequality are non-cash transfer payments (food stamps, housing subsidies, government medical insurance assistance programs, etc.) to mostly the poorest 20%, and tax payments made by mostly the highest 50% of all income earners. These two components are not included in the income distribution numbers. If non-cash payments were included, the Census Bureau estimates that income of the poorest 20% would increase by roughly 50%. If tax payments were included the income of the wealthiest 20% would decrease by 7%

(<https://www.stlouisfed.org/publications/itv/articles/?id=1920>).

The Lorenz Curve

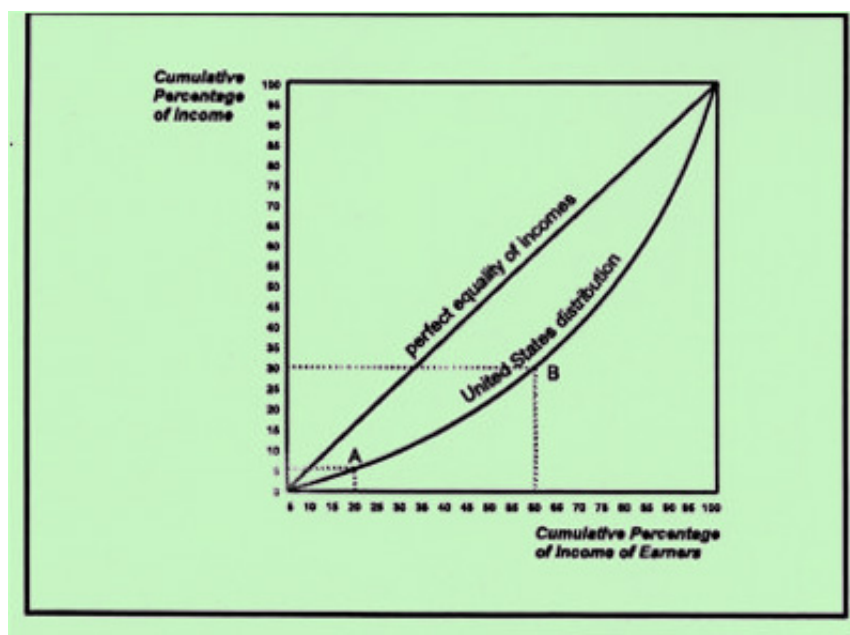
A diagram illustrating the extent of income inequality in the United States is drawn below. This so-called "Lorenz Curve" indicates that the further the curve bows outward, the greater the country's income inequality. The Lorenz curve illustrates the extent of a country's income inequality based on the cumulative earnings of the different quintiles. Using the figures from the table above, the cumulative earnings are as follows:

Percent of All Families	Cumulative Percent of All Income Received	Cumulative Percent of All Income Received (2007)

	(2020)		
Lowest (poorest) 20%	3.0	3.4	
Lowest 40%	11.1	12.1	
Lowest 60%	25.1	26.9	
Lowest 80%	47.7	50.3	
All Households (100%)	100	100	

The United States distribution shows the Lorenz curve traveling through Point A, at which the poorest 20% earn 3.0% of all income. At point B, 60% of the poorest income earners receive 25.1%.

The hypothetical straight line indicates perfect income equality. This means that each quintile earns 20% of the country's total income.



The Gini Coefficient

The Gini **coefficient** is a ratio between 0 and 1. It represents the amount of income inequality in a country or area. If a country has a Gini coefficient of zero, then it has perfect income equality. This is when everyone has the same amount of income. If the coefficient is 1, then there is perfect income inequality. This is when one person has all the income, and the rest of the country has nothing. The closer the Lorenz curve is to perfect equality (the 45 degree line), the closer the Gini coefficient is to zero.

The Gini Index

The Gini **index** is simply the Gini coefficient expressed as a percentage. For instance, if the Gini coefficient is .3, then the Gini index is 30%. In 2021, according to the United States Census Bureau, the United States Gini coefficient was .484, so the Gini index was 48.4%. By comparison, Japan, Canada, and most industrialized Northern European nations have Gini indices ranging from 25 - 40% (less income inequality). Many third-world countries have Gini indices ranging from 50 - 75% (significant income inequality).

Video Explanation

For a video explanation of income distribution and income inequality, please watch:

[YouTube Video](#)

Section 2: Arguments For and Against Income Inequality

Advantages of Income Equality

Advantages of a system of income equality are

1. Less use of natural resources.

There is generally less use of natural resources and less conspicuous consumption as incomes and the standard of living in countries with equal incomes is lower.

2. More consumer satisfaction among the poor.

Redistribution of incomes or wealth increases consumer satisfaction among the poor. A dollar to a poor person provides more satisfaction than it does to a rich person. Thus, taking a dollar from the rich and giving it to the poor increases satisfaction. The only caveat with this statement is that if equality leads to a low standard of living among all groups, there will be no money to distribute from the rich to the poor (there will be no rich).

3. More political equality.

In a system of **inequality**, poor people generally have less political influence, because they have less opportunity to contribute to lobby groups, political fundraisers, and campaigns. When there is equality, the argument is that everyone has the same economic influence.

4. Fewer incentives for corruption and illegal activities for financial gain

In an economic system in which incomes are low and more equally distributed (typically in a non-free market system), temptations to break the law for financial gain are less prevalent. In economies with higher levels of income inequality, the financial rewards for cheating and breaking the law (if the person or business is not caught) are greater. For example, if a person in a country with a high average standard of living knows that by breaking the law it can earn an additional \$10 million, the temptation for this person to engage in this kind of behavior is great. With the ease of international cyber crimes these crimes can now be committed by persons from any country (even persons who live in countries with non-free markets and/or a more equal distribution of incomes).

Advantages of Income Inequality

Advantages of a system of unequal incomes in a free market economy are:

1. Greater incentive to work hard.

Inequality as a result of a free market economy provides incentives to work harder and more efficiently, as the rewards are generally greater. This leads to more economic growth, increases a nation's wealth, and raises a country's overall standard of living (including for the lower income households).

2. Greater savings and investments.

Inequality permits greater savings, because there are more wealthy income earners. Higher-income earners save more than lower-income earners. Greater savings frees up capital for businesses to borrow funds for more investments into technology and capital expansion.

3. More high-quality and innovative products.

A nation with a higher standard of living has more opportunity to stimulate the production of new, high-quality, innovative products. These new products initially are usually sold at high prices, but eventually come down in price as technology improves and mass production leads to cost of production decreases. This means that eventually lower income households can also afford to buy these products (for example, televisions, smart phones, computers, and soon, electric vehicles).

4. More resources.

A higher standard of living allows a country to better help needy persons. There are more jobs, and average earnings are higher. There are also more people who can afford to and will give to charities. In addition, government tax revenue is higher, so there are more resources for a country's essential spending, such as defense, providing for a legal system, infrastructure, education, health care, and curbing pollution.

The Incentive to Work and Innovate

The ability to earn more than others helps inspire people to work harder and strive to innovate and produce more and better products. Without greater incentives for successful work, there will be dramatically less production, innovation, and wealth. If people who do not work, or do not work hard,



receive the same or similar rewards as people who work hard, research, and invest significant time and resources to produce, the latter loses motivation to be productive. The result will be that everyone works considerably less, and few people are inspired to innovate. This is what happened in the former Soviet Union, and is currently contributing to the economic stagnation in communist countries such as Venezuela, Cuba and North Korea.

In industrially developed countries, entrepreneurs such as Henry Ford, JP Morgan, Andrew Carnegie, Thomas Edison, John D. Rockefeller, and more recently, Apple's Steve Jobs, Microsoft's Bill Gates, Facebook and Instagram's Mark Zuckerberg, Blog guru Ariana Huffington, television entrepreneur Oprah Winfrey, music legends Jay Z and Beyonce, Amazon's Jeff Bezos, Google's Larry Page and Sergey Brin, and many others have helped to advance our economy and standard of living through their inventions in various industries. In large part, they were motivated to do this because of the rewards associated with their efforts. This may seem selfish, but they have also helped many others live more comfortably and obtain jobs. Ayn Rand wrote about the virtues of this selfishness in her bestseller "Atlas Shrugged". Adam Smith's invisible hand concept describes that the selfish efforts of each entrepreneur and each worker not only contributes to this person's own well-being, but also to the well-being of the

economy as a whole. In order to keep taxes reasonably low and optimize the incentive to work and innovate, both Ayn Rand and Adam Smith strongly opposed extensive government welfare programs. Instead, they supported the idea of voluntary charity donations to help those in need.

Section 3: Poverty

The Definition of Poverty

The poverty thresholds, as determined by the United States Census Bureau, vary by the size of a household and typically increase from year to year. In 2021 it was \$12,880 for a household of one person (thresholds in Hawaii and Alaska are higher). A family of three persons was considered poor if it earned less than \$21,960 in 2021 (this amount may vary a little bit depending on the make-up of the family). It was \$26,500 in 2021 for a family of four. For larger families, the thresholds are higher. The Bureau looks at the amount an average family spends on necessary food expenses and multiplies this by three to arrive at the **poverty line**. The U.S. Census Bureau does not distinguish between the different areas of the country, even though the cost of living varies widely within the United States.

When measuring a household's income, the U.S. Census Bureau includes all forms of monetary income, such as earnings, unemployment compensation, cash welfare payments, Social Security benefits, pensions, interest, rent, alimony, and child support. The official poverty rate does **not** include non-cash benefits, such as food stamps, housing subsidies, and health care assistance. However, since 2014, the Census Bureau began to publish an unofficial poverty rate which includes the above mentioned forms of income plus income from earned-income tax credits, housing subsidies, school lunch and home heating subsidies. It also adjusts income for taxes, child care, health insurance and out-of-pocket medical costs. In addition, it reflects regional cost of living differences.

According to the official definition and based on a Census Bureau survey of approximately 100,000 United States households, 11.4% of the population was considered poor in 2020. In 2019, 10.5% of the population lived in poverty. It was 11.8% in 2018. The poverty rate has mostly declined in the last decade. In 2011 and 2012 it was 15%, in 2016 it was 12.7%, and in 2017 12.3%. The 2020 pandemic caused large parts of the economy to significantly stagnate and the poverty rate was slightly higher than in 2019. However, the expectation is that after the pandemic is managed better, the rate will decrease again. For more detailed information about the United States poverty rate, including rates among varying demographic groups, visit <http://www.census.gov/econ/> (then select "Income and Poverty").

How the Government Uses the Poverty Line

The government uses the poverty line to determine who receives financial handouts and in-kind assistance. Many poor qualify for programs such as TANF (Temporary Assistance to Needy Families), housing subsidies, food stamps, Medicare or Medicaid, Social Security and disability benefits, school lunch vouchers, child care assistance, and a host of other state or federal programs. Households are eligible for certain programs if they fall below the poverty line, or within a factor of the poverty line (for example, below 150% of the poverty line).

Median Household Income

Real (adjusted for inflation) median United States household income was to \$67,521 in 2020 (this amount does not include government welfare benefits and tax distributions). In 2019 it was \$69,560, in 2018 it was \$63,324, and \$61,400 in 2017. In 2016 it was \$59,039, \$57,230 in 2015, \$53,046 in 2013, \$50,502 in

2011, and \$49,777 in 2009. In 1965, real median income in the United States was \$36,847. As you can see, real median household incomes in the U.S. have steadily risen during most years.

Incomes vary significantly across different racial and other demographic groups. For more information about median and mean incomes in the United States, including distributions among racial groups, please visit <http://www.census.gov/econ/> (then select "Income and Poverty").

Median incomes also vary quite a bit across geographic areas. Median household income was lowest in Puerto Rico, West Virginia and Mississippi (approximately 30%, 60%, and 60% of the U.S. median, respectively), and highest in Washington D.C., Maryland, and New Jersey (approximately 126%, 122% and 120%, respectively). Across the world, highest poverty rates were observed in various African countries, as well as Syria, Haiti, and Venezuela. Comparisons of poverty rates across different countries may be tricky because not all countries use the same definition for what they consider poverty and not all countries measure accurately.

In general, real (adjusted for inflation) median incomes in most industrialized countries increase and poverty decreases during non-recessionary, peaceful years.

How to Avoid Poverty

While some causes of poverty relate to factors beyond a household's immediate control (economic conditions in a certain area, family emergencies), much of today's poverty can be prevented by better individual decision-making. Individuals who make sound personal decisions in their private, academic, and professional lives fare significantly better than individuals who don't. The following are keys to sound economic decision-making, which has helped many households avoid poverty:

1. Live a healthy lifestyle.

People who live healthy life styles (those who exercise, eat well, avoid harmful addictions, allow reflective time for themselves, have a positive outlook on life, and are interested in learning and improving themselves) usually do better in their careers and generally have incomes higher than those who fall short in several of the above areas.

2. Learn a trade.

People who invest in themselves by learning a marketable trade or skill (by teaching yourself, or by going to school, or through on-the-job training), experience higher earnings than people who don't.



3. Invest wisely.

People who save and make sound financial decisions experience a greater degree of financial success. Examples include investing in diverse and financially sound assets, not going into excessive debt, building a sound credit rating, and purchasing health, disability, and life insurance. Many individuals and households who borrowed an irresponsibly large amount of money in order to buy a house during the housing boom and the sub-prime mortgage years found themselves in financial difficulty and sometimes without their house and without a place to live. When you borrow money to purchase a house or any other asset, be sure that you can afford to make payments in the future, even when asset prices decrease and/or interest rates increase (if you negotiated a variable rate).

4. Make sound relationship decisions.

People who choose a responsible partner and have children at a financially appropriate time (or do not have children) experience better financial and emotional health.

People who have made unwise decisions, or who have fallen victim to poverty for reasons beyond their control (the economy, natural disasters, disabilities) often find themselves applying for government assistance. Many programs provide temporary relief; however, many of the government anti-poverty programs also discourage many people from working. Welfare recipients are often financially better off continuing to receive the government benefits as compared to having a job. Some welfare programs (see the next section for a description of welfare programs) encourage family break-ups by awarding more generous benefits, such as housing, food stamps, and child care assistance, to single mothers. The Welfare Reform Act of 1996, which implemented stricter eligibility requirements and limits on the number of years someone can be on welfare, has been a step in the right direction, and has provided more families with the incentive to get off welfare and work. But has it done enough?

Section 4: Government Anti-Poverty Programs

The Old Age Survivors and Disability Insurance (Social Security) program

The [Social Security Program](#) is mostly a retirement program, but it has welfare elements, as well. In addition to providing retirement income for many citizens, it pays for widows, orphans, and disabled persons. Including the employer's contribution, \$12.40 of every \$100 earned is paid to the government for the Social Security trust fund. A person is eligible for Social Security income starting at the age of 62. Benefits depend on how many years one has worked, the amount of the total contribution, and the age at which a person retires (retiring earlier will decrease monthly benefits, and retiring later will increase monthly benefits).

Many people feel that the system provides a false sense of security. Workers are led to believe that they will be secure in their retirement days because there is social "security." Because contributions are not saved for future benefits (the system is pay-as-you-go, i.e. current workers are contributing to current retirees' benefits), and past administration have used surplus Social Security funds to help pay for the overall budget deficit, and with many Baby Boomers recently retired or ready to retire soon, Social Security may only serve to provide minimal benefits to those reaching the "golden years."



Currently, the program still enjoys a small surplus in its trust fund. However, in several years, as all Baby Boomers will be enjoying full retirement, the surplus will run dry, and Social Security will experience a deficit.

So far, the Social Security program has helped many elderly avoid poverty. The real question is: at what cost? Is there an alternative that is more effective? Can we improve the system?

Privatizing Social Security

Some politicians and economists favor phasing in a privatized retirement program. This allows people to choose their retirement options, and provides potentially higher long-term returns. A privatized system will have to be phased in slowly in order to not financially harm people who currently or soon will receive Social Security income. Most likely, a privatized system will still require people to contribute a certain percentage of their income. However, each individual will have a choice in how to invest these savings. Most likely, the rate of return will be higher than the rate that the government has paid to Social Security recipients. People will need to be better educated though (perhaps through mandatory programs in middle and high schools, or public service announcements in the media) in order to avoid common

investing pitfalls.

Medicare, Medicaid, and Unemployment Insurance

The following five programs are the main anti-poverty programs in the United States:

1. Medicare.

Medicare is a federal government financed medical insurance assistance for eligible people 65 years and older.

2. Medicaid.

Medicaid is a joint federal and state government financed medical insurance assistance for families and individuals who have low incomes.

Medicare and Medicaid have benefited many poor and elderly people by assisting them with their health costs. The programs also have cost taxpayers trillions of dollars during the past decades. The inefficiency with which these programs are run, as well as the increasing fraud (the Office of Management and Budget estimated \$58 billion in improper payments in 2019), make some economists question whether government programs of this magnitude should continue to exist. They recommend a larger role for local governments that are closer to the people and the problems, and/or a larger role for private charities (once programs are scaled back, the federal government will be able to lower taxes which will allow individuals to help contribute more to private charity causes, and it will also allow more people to pay for private insurance).

3. Unemployment insurance.

Unemployment insurance includes benefits to eligible people who have lost their jobs. Employers bear the brunt of the tax for this fund (employers with a history of laying off more workers pay more). Benefits vary per state and individual (depending upon previous salary). The average compensation is approximately \$300 per week (though it increased considerably during the 2020 pandemic).

Unemployment Insurance income is taxable. The average duration of benefits is 26 weeks, but Congress frequently passes bills (especially during recessions) allowing extension of benefits. For more information about the Unemployment Insurance program, please click [HERE](#).

4. Supplemental Nutrition Assistance Program (Food Stamps).

The food stamp program SNAP (Supplemental Nutrition Assistance Program) provides coupons or electronic payments (debit cards) to needy families. This allows them to purchase basic grocery store items. The average benefit per individual is approximately \$126 per month. The program costs the federal government roughly \$86 billion per year.

5. Temporary Assistance to Needy Families (TANF).

TANF (Temporary Assistance to Needy Families) is what people most often refer to when they discuss welfare. It provides cash payments to families with children, especially those in which one parent (usually the father) has left the house.

As is true for other government welfare programs, economists accuse TANF of being poorly managed and subject to much fraud. Despite benefits to well-deserving recipients, the program may also add to our

country's poverty because of the disincentives it creates for people to work.

Other Government Anti-Poverty Programs

Housing Subsidies

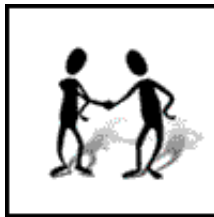
Households below a certain income are eligible for government assistance, which helps pay for their housing expenses. The U.S. Department of Housing and Urban Development (HUD) operates three major federally-funded programs that provide housing assistance to low-income families: public housing, Section 8 certificates and vouchers, and Section 8 project-based programs. Some states also run small programs providing housing assistance. For an article about housing subsidies, click [HERE](#).

Head Start

Low-income households receive assistance for children between the ages of 0 - 5 in the areas of education and early childhood development, medical, dental, mental health, and nutrition. For more information about Head Start, click [HERE](#).

Earned Income Tax Credit

The Earned Income Tax Credit (EITC) provides a tax refund or subsidy to eligible individuals and



families who work and have earned income under a certain amount.

Job Training Programs

A variety of job training programs exist. For examples of articles about job training programs, click [HERE](#).

Alternative Courses of Action to Fight Poverty

In order to avoid the main disadvantage of current government welfare programs (that people are better off financially on welfare compared to having a job), economists have suggested the following alternative courses of action.

Privatizing Welfare

Some economists suggest that we may be able to help the truly needy more efficiently through private efforts, such as aid from churches, local charities, neighborhood task forces, friends, and families. If a family is truly in need, these groups will be in a better position to know and will provide help. Many private charities already work effectively to reduce poverty.

Supporters of significantly increased private charity giving argue that if government welfare programs are eliminated, it will free up hundreds of billions of dollars in taxes. This will raise after-tax incomes and will allow income-earning households to better afford to help. They will also feel more responsible to help, instead of relying on the government. Government welfare programs are generally bureaucratic.

Government workers typically cannot distinguish whether an individual is truly in need, or whether a



person is abusing the system. The welfare programs have also become an industry in itself. Government welfare workers may have a conflict of interest in that they have a vested interest in keeping individuals on welfare in order to preserve their own jobs. Private charity programs, such as local soup kitchens, church initiatives, and Habitat for Humanity, may not be the solution to all poverty problems in a country, but the question we have to ask ourselves is: will it **improve** the situation compared to the current one?

The Negative Income Tax Program

Some economists, most notably the late Milton Friedman, have suggested replacing all current welfare programs with a **negative income tax program**.

The negative income tax program proposes to establish an income level (for instance \$40,000) **above** which an individual will pay **taxes**, but **below** which an individual would receive a government **subsidy** (a negative tax).

Below is a table with examples of subsidies at various income levels. The table assumes that the government pays income earners 50% of the difference between their income and \$40,000.

Job Earnings	Government Subsidy	Total Income
\$0	\$20,000 (50% of \$40,000)	\$20,000
\$10,000	\$15,000 (50% of \$30,000)	\$25,000
\$20,000	\$10,000 (50% of \$20,000)	\$30,000
\$40,000	\$0	\$40,000

Advantages of this program are that this system is much simpler and easier to administrate, and that workers always take in more money as their work effort increases. This is in contrast to the current welfare system, in which many welfare people find themselves worse off if they were to start a job. A disadvantage of the negative income program remains that it is a government-administered program, and it enables people to receive financial help without having to work a lot for it. But is it a better alternative

to what we currently have?

Section 5: Progressive, Regressive, and Proportional Taxes

The Difference Between Average and Marginal Tax Rates

The United States individual income tax system is a progressive tax system. This means that households with higher incomes pay a higher percentage in tax. Because of the recently passed tax reform, the tax brackets for individuals and married couples have changed (see tables below).

For persons filing "single", the marginal tax rates are as follows:

2020 Rate	2020 Income Bracket	Old 2017 Rate (before tax reform)	Old 2017 Income Bracket
10%	Up to \$9,875	10%	Up to \$9,525
12%	\$9,876-\$40,125	15%	\$9,525-\$38,700
22%	\$40,126-\$85,525	25%	\$38,700-\$93,700
24%	\$85,526 – \$163,300	28%	\$93,700-\$195,450
32%	\$163,301-\$207,350	33%	\$195,450-\$424,950
35%	\$207,351 - \$515,400	35%	\$424,950-\$426,700
37%	\$518,401+	39.6%	\$426,700+

In the new system, an individual who earns, for example, \$100,000 is in the 24% marginal tax bracket. This means that for every additional dollar earned over \$100,000 (and up to \$157,500), this person pays \$24 in federal income tax for every \$100 dollars earned. Note that this person still only pays 10% over the first \$9,875 earned; 12% of the amount in the next bracket, 22% of the amount in the next bracket, etc. Therefore the average tax paid for this person will be less than 24% (see video at the bottom of this page for a sample calculation).

For married couples filing jointly, the marginal tax rates are as follows:

2020 Rate	2020 Income Bracket	Old 2017 Rate (before tax reform)	Old 2017 Income Bracket
10%	Up to \$19,750	10%	Up to \$19,050
12%	\$19,751-\$80,250	15%	\$19,050-\$77,400
22%	\$80,251-\$171,050	25%	\$77,400-\$156,150
24%	\$171,051-\$326,600	28%	\$156,150-\$237,950
32%	\$326,601-\$414,700	33%	\$237,950-\$424,950
35%	\$414,701-\$622,050	35%	\$424,950-\$480,050
37%	\$622,051+	39.6%	\$480,050+

Source: Internal Revenue Service (www.irs.gov)

For most tax payers the marginal tax rate is lower in the new tax system. In addition, there is a higher standard deduction (\$12,400 for single filers and \$24,800 for joint filers). However, there are fewer

deductions for persons who itemize. For example, the limit on deducting state and local taxes is \$10,000 (these include state and local income, sales, real estate, or property taxes). Mortgage interest deductions are limited to the interest on the first \$750,000 of mortgage debt. In addition, interest on home equity loans will not be deductible (even those taken out before December 31, 2017). The marginal tax rate on long-term capital gains (earnings from selling stocks, bonds and other financial assets) continues to range from 0% to 20% (0, 15, or 20%, depending on your income). High-income tax payers pay an additional 3.8% net investment tax. Short-term (one year or shorter) capital gains are taxed at regular individual income tax rates. For a summary of all of the 2018 tax reform changes, see <https://turbotax.intuit.com/tax-tips/irs-tax-return/tax-reform-changes-that-impact-your-2017-taxes/L9kree612>.

Tax Calculations

An individual who earns, for example, \$100,000 is in the 24% marginal tax bracket. However, this person still only pays 10% over the first \$9,525 earned; 12% over the amount in the next bracket, etc.

To illustrate the total amount of tax paid and the difference between average and marginal tax rates, consider the following three individuals filing as a single person:

Individual 1

This person has taxable income of \$6,000. Her marginal tax rate is 10%, and the total amount of tax paid equals \$6,000 times 10%, or \$600. The average tax is the total amount of tax paid divided by the total income. This equals \$600 divided by \$6,000, or .10, or 10%. This person's average and marginal tax rates are the same.

Individual 2

This person has a taxable income of \$25,000. His marginal tax rate is 12%. However, he pays only 10% over the first \$9,875. Then he pays 12% over the remaining \$15,125. The total tax equals:
 $(.10 \times \$9,875) + (.12 \times \$15,125) = \$987.50 + \$1,815 = \$2,802.50$. So his average tax rate is \$2,802.50 divided by \$25,000, or .1121, or 11.21%. Thus, his average tax rate (11.21%) is lower than his marginal tax rate (12%).

Individual 3

Let's say that this person has a taxable income of \$100,000. Her marginal tax rate is 24%. She pays 10% over the first \$9,875. Then she pays 12% over the amount in the next bracket (\$30,250), 22% over the amount in the following bracket (45,400), plus 24% over the remaining amount in the following bracket (\$14,475). This person's total tax equals:
 $(.10 \times \$9,875) + (.12 \times \$30,250) + (.22 \times \$45,400) + (.24 \times \$14,475) = \$987.50 + \$3,630 + \$9,988 + \$3,474 = \$18,079.50$. So her average tax rate is \$18,079.50 divided by \$100,000, which equals .180795, or 18.08%. Thus, her average tax rate (18.08%) is lower than her marginal tax rate (24%).

In general, for every person in the 12% or higher marginal tax bracket, the marginal tax rate is higher than the average tax rate (in a progressive tax system).

Tax Deductions

Our current federal, state and local income tax systems allow households to deduct a variety of expenses

from their gross income. Gross income minus tax deductions equals taxable income. For example, the mortgage interest a person pays each year on her/his house is deductible (up to a \$750,000 mortgage). Other deductions include (up to a \$10,000 limit) state and local taxes, real estate taxes and loan points, certain retirement contributions, capital gains losses, health care expenses, dependent care expenses, self-employment expenses, and charitable expenses. If the person's income is \$100,000, and has \$40,000 in deductible expenses, then her/his taxable income (adjusted gross income, or AGI) is \$60,000. Because of deductions, this person will only have to pay taxes on \$60,000, instead of on \$100,000.

Tax Systems

The Federal individual income tax system described above is an example of a progressive tax. Taxes can also be proportional or regressive. These systems are explained below.

1. Progressive tax.



In a progressive tax system, higher income earners pay a higher marginal tax rate than lower income earners. In the table at the top of this page, federal marginal tax rates range from 10% to 37%. For example, a single individual who earns \$20,000 in taxable income is in the 12% tax bracket. This means that each additional dollar earned by this person (until he reaches the next higher bracket) is subject to a 12% federal tax.

From the examples above we can see that it does **not** mean that (s)he pays 12% of her/his total income in taxes. The first \$9,875 is subject to only 10%. The remaining amount up to \$20,000 is subject to 12%.



2. Proportional tax.

In a proportional tax system, high- and low-income earners pay the same tax rate. Most United States state and local individual income tax systems are proportional. For example, a person who earns \$10,000 pays 5% in **state** income taxes, and a person who earns \$500,000 also pays 5%. Some economists support a proportional, or **flat** tax for our **federal** income tax system. Most flat tax proposals do not allow many deductions, except for an exemption to pay any tax for lower income households. Therefore, it is very simple.

In the United States, everyone pays the same percentage of Social Security tax up to a certain threshold

level (\$137,700 in 2020). Up to this threshold, the Social Security tax is proportional. After the threshold, it becomes regressive, because an income earner pays 0% in Social Security tax on income of more than \$137,700. The Social Security tax is 6.2% of your income and is matched by your employer (so the government receives 12.4%). The Medicare tax applies to all income and is 1.45% and matched by your employer (so the government receives 2.9%).

3. Regressive tax

In a regressive tax system, low-income earners pay a higher rate than higher-income earners. For example, a person who earns \$10,000 pays 20% in tax, and a person who earns \$100,000 pays 10%. Most state sales tax systems are regressive. Lower income households usually spend their entire income on consumer products. Therefore, if all products are subject to a sales tax of 5%, then they pay 5% of their income on sales tax. Higher income households usually spend only a portion of their income on consumer products. Therefore, as a percentage of their income, they pay less than 5%. Some states try to avoid the regressive nature of the sales tax by exempting **essential** consumer products such as food and clothing.

The Alternative Minimum Tax

If a person applies a large number of deductions, so that the total amount of taxes falls below a certain level, then (s)he may be subject to the alternative minimum tax. The alternative minimum tax was passed in the United States to ensure that everyone pays at least some minimum amount of tax.

Other Common Taxes

In addition to the various taxes mentioned in the examples above, there are numerous other taxes. Earlier we discussed the FICA (Social Security and Medicare) tax. Corporations pay income taxes (maximum rate of 21%). Most local governments collect property taxes and income taxes. Most states collect sales taxes and income taxes. There are also various other federal taxes, including excise taxes, capital gains taxes, and estate taxes. An excise tax is similar to a sales tax, but it is usually levied by the federal government on products such as tobacco, cigarettes, spray cans, and gasoline. A capital gains tax is a tax paid over an asset, which has gained value. For example, if someone purchases stock worth \$10,000 on January 1, and then sells the same stock for \$14,000 two years later, the \$4,000 in gained income is subject to a capital gains tax. Estate taxes are paid when someone dies and leaves a valuable estate. The heirs will have to pay an estate tax if the value of the estate exceeds a certain amount.

Introduction

What's in This Chapter?

Imagine a country that discourages international trade because it believes that trading with other countries leads to a loss of domestic jobs. Similarly, imagine that within this country there are states or provinces that do not want to trade with other states or provinces, because they want to protect jobs within their region. Then imagine villages and towns that do not want to trade with each other for the same reason. And then imagine that people believe that it is best for them not to trade with other people because they are afraid that others will take away their employment.

What remains is an economy in which people live like cavemen and women did, and one in which there is no trade, no specialization, little opportunity for advancement, limited economic growth, and a much lower standard of living and life expectancy.

For the same reasons that it is beneficial to trade with individuals or other villages, it is beneficial, economically, to trade with other countries.

Countries with the freest international trade policies have the highest economic standards of living. Conversely, countries with the greatest degree of protectionist policies have the lowest standards of living.

This chapter discusses the advantages of free trade. It also looks at protectionist arguments and analyzes the strengths and weaknesses of these arguments.



Section 1: The Case for Free Trade: The Law of Absolute Advantages

Adam Smith

According to the famous eighteenth century economist and "father" of economics, Adam Smith, the most



important reason why nations trade is that it allows each country to specialize in making those products that it can most efficiently produce. Please click [HERE](#) for information about Adam Smith (pictured) and a content description of his most famous book, *The Wealth of Nations* (official title: *An Inquiry into the Nature and Causes of the Wealth of Nations*). In addition, www.econlib.org has free content of Adam Smith's *Wealth of Nations*, as well as his other famous book, *The Theory of Moral Sentiments*.

The Law of Absolute Advantages

When a country produces a product more efficiently than another country, it has an absolute advantage in producing that good. It is economically beneficial for this country to specialize in the




production of this product and trade with another country.

A country has an absolute advantage in producing a product if it can make a product more efficiently (at lower cost) than another country. Countries should specialize in producing products in which they have an absolute advantage. They should sell these products in exchange for products in which other countries have an absolute advantage.

A Numerical Example of Absolute Advantage Trade

The following numbers represent hours of production needed to manufacture 1 barrel of oil and 1 watch, respectively.

	China	Ni	
Oil	30	10	



Watch	12	20
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For Nigeria, producing 100 barrels of oil uses the same number of hours (100 times 10) as producing 50 watches (50 times 20). Therefore, if Nigeria specializes in and produces 100 additional barrels of oil in exchange for producing 50 fewer watches, it will employ the same resources.

For China, producing 100 watches uses the same number of hours (100 times 12) as producing 40 barrels of oil (40 times 30). Therefore, if China specializes in and produces 100 additional watches in exchange for producing 40 fewer barrels of oil, it will employ the same resources.

Problem: If both countries specialize in the manner described above, by how much will total world production increase?

Solution: Total world production of oil increases by 60, and total world production of watches increases by 50 (see table below).

Nigerian oil	+ 100	Nigerian watches	- 50
Chinese oil	- 40	Chinese watches	+ 100
Additional oil production	+ 60	Additional watch production	+ 50

Specialization and Trade Lead to an Increase in Standard of Living

The countries will have to decide on the terms of the trade. Feasibly, each country can split the additional production and end up with 30 additional barrels of oil and 25 additional watches.



Without each country having to use any additional resources, and after trading the surplus production, each country is able to increase its standard of living.

Video Explanation

For a video explanation of the law of absolute advantages and the law of comparative advantages (next

section), please watch:

[YouTube Video](#)

Section 2: The Case for Free Trade: The Law of Comparative Advantages

David Ricardo

The well-known classical economist, David Ricardo (1772 - 1823; pictured), demonstrated that it is



beneficial for each country to specialize, even if one country produces all products more efficiently. He suggested that each country produces the goods at which it is comparatively best. He called this the "law of comparative advantages."

The Law of Comparative Advantages

If one country is better at making all products, should it make all products and not trade with anyone? Or is there still an advantage for each country to specialize and trade? To examine this, let's understand the concept of **comparative advantage**.

A country has a comparative advantage in producing a good when it produces a good most efficiently relative to the production ratios of the same goods produced by another country.

A Numerical Example of Comparative Advantage Trade

The following numbers represent hours of production needed to manufacture 1 barrel of oil and 1 watch, respectively.



	Chi na	Nigeria
Oil	30	10
Wat ch	40	20

Section 3: Tariffs, Quotas and Other Trade Restrictions

International Trade Restrictions

Tariffs, quotas, and other trade restrictions discourage imports of foreign products into a country. Tariffs are taxes on imported products. Quotas are limits on the amount of imported products. The ultimate quota is an embargo, which is a complete stop on the import or export of a certain product. Other measures that restrict international trade include standards and licenses. For example, some governments impose health and safety standards for imported products that are higher than for products made domestically.

Governments can also require import and export licenses. This makes it more expensive and sometimes impossible for firms to engage in international trade. Some countries manipulate their currency values as a form of protectionism. If a country's currency decreases in value (relative to foreign countries' currencies), its exports become cheaper and its imports become more expensive. The Chinese government has been accused of artificially lowering its currency in order to encourage its exports and discourage foreign imports.

Price and Quality Effects

Trade restrictions generally raise the price of imported products and lower the quantity purchased. Consequently, buyers are more attracted to competing domestic products. In the short run, domestic firms benefit from trade restrictions.

However, the decrease in foreign competition provides the domestic producer with less incentive to produce a high-quality and low-cost product. The domestic firm typically raises its price, albeit less than the price increase of the foreign good. In the long run, the lower quality and the higher price of the domestic firm's products harms the domestic firm. Consumers purchasing the product suffer, as well, because they pay a higher price and face a more-limited variety of competing products.



Tariffs and quotas are alike in that they both lower the quantity sold and raise the price of the foreign good sold in this country. The difference is that in the case of a tariff, the imposing government generates revenue, whereas in the case of a quota, the higher price can benefit the foreign manufacturer (revenue and profit can increase depending on the elasticity of the product). Japanese automakers were not entirely

unhappy with the quotas on their car sales to the United States. They sold fewer cars, but they received higher prices for them. Thus, their revenue decreased very little (depending on the elasticity of cars, revenue might have even increased).

Retaliation

Foreign countries often retaliate against countries imposing trade restrictions. Thus, export industries in all countries suffer. While trade restrictions may benefit domestic industries competing with foreign industries, they hurt export industries affected by retaliation. The economy as a whole suffers, because, on balance, no jobs are gained, and prices are higher due to the lost opportunities to specialize and benefit from absolute and comparative advantages.

In 2010, the United States imposed tariffs on tires manufactured in China and imported into the United States. As retaliation, China imposed tariffs on chickens and auto parts purchased from the United States. In the end, taxes (tariffs) increased and therefore, prices increased. On balance, no country gained employment. Competition, consumers, economic efficiency, and the overall standard of living suffered.

The recent trade war between China and the United States is hurting both countries' productivity and economic growth. One of the Trump administration's justification for imposing tariffs on China is to punish China for unfair trade practices and illegally copying of products and intellectual information. China also has very restrictive rules for foreign companies doing business (direct investments) inside China. If these punitive tariffs lead to China liberating its trade practices (implementing unrestricted free trade), the current tariffs may eventually have a positive outcome. However, if higher tariffs imposed by both countries remain, it will hurt economic growth and consumers in both countries.

Section 4: Protectionist Arguments and Rebuttals

Arguments to Support Protectionism

Protectionism occurs when countries discourage imports of foreign goods and services by imposing tariffs, quotas or other trade restrictions. Five common arguments in support of protectionism are:

1. National security.

If a product is used in the manufacturing of military goods or other security sensitive products, it may not be wise to import it from another country. A domestic industry needs to be protected through trade restrictions to make sure that it continues to supply enough of the product and not become dependent on other countries.

2. Counteracting dumping and foreign subsidies.

When a country **.dumps** its products in a foreign country, it sells them at below cost. Dumping is done to eliminate competition in a foreign country and to establish a monopoly position. For example, if a Japanese company sells microchips in the United States at below cost in order to eliminate competition in the U.S. it is considered dumping. Sometimes foreign governments subsidize their domestic firms to encourage dumping. To retaliate against dumping and unfair foreign subsidies, the argument is that tariffs, quotas, and other trade restrictions need to be implemented.

3. The infant industry argument.

Some countries are newly developing and have industries that are just beginning to grow. The argument



is that they need to be protected from other countries whose industries are fully developed, already. After a few years of protection, the industry is expected to be mature and ready to compete. Trade restrictions should be lifted at this point.

4. Protecting domestic jobs.

Domestic industries lose sales and jobs due to foreign competition. Examples of industries affected by foreign competition include the steel, textile, and automobile industries. The argument is that to protect these industries and to prevent layoffs, trade restrictions need to be imposed.

5. Improving the trade deficit.

A country experiences a trade deficit when the value of its merchandise imports exceeds the value of its merchandise exports. The argument is that by restricting imports through tariffs and quotas, a country will improve its trade deficit.

Rebuttals to Protectionist Arguments

Not everyone supports the above-mentioned arguments in favor of trade restrictions.

1. Rebuttal of the national security argument.

Trading defense-related products with other countries serves as a deterrent against war. The more we import from and export to other countries, the more dependent we are upon each other. This makes it highly unlikely that a conflict will ever arise.

Even in the case of a



conflict with a country from which we import defense-sensitive products, it may not be difficult to increase domestic production.

We can also import the national security sensitive product from a variety of countries. It is unlikely that we will be at war with all of them.

2. Rebuttal of the counteracting dumping and foreign subsidies argument.

Dumping and foreign subsidies means lower prices for our consumers. This will leave them more



money to purchase other goods, including American goods. Some economists claim that dumping may hurt some domestic companies but actually helps many of our own consumers.

If dumping leads to a monopoly, it will be challenged once the price is too high. New domestic companies will enter the market. In free markets high prices always attract new entrants into the market in

the long run.

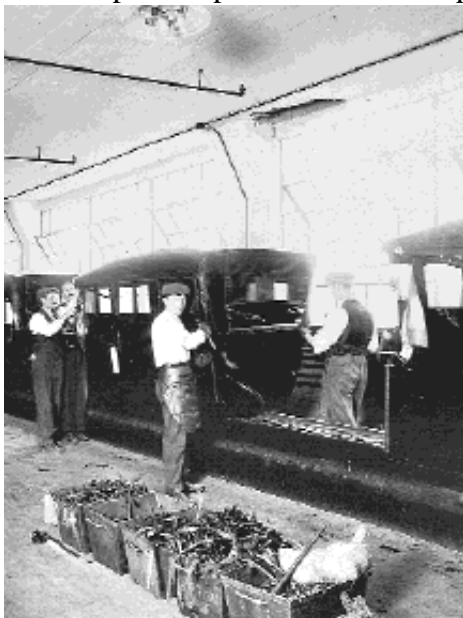
3. Rebuttal of the infant industry argument

Competition, not protectionism, is what strengthens industries. Beginning companies should not ask to be protected, because it is normal for beginning companies, as well as beginning industries, to incur losses during the start-up phase. Once developed, unprotected, it can compete better with mature industries around the world, and it will begin to make profits.

Countries often protect their infant industries longer than necessary. Once tariffs and quotas are in place, they are difficult to do away with because industries grow dependent upon them. It is better not to impose them at all, right from the start.

4. Rebuttal of the protecting domestic jobs argument.

If we impose import restrictions to protect domestic industries, other countries will retaliate.



Jobs will be lost in export-related industries, and there will be no gain in overall employment.

Protectionism means less specialization and no advantages of free trade.

Protectionism means less competition, less efficiency, less production, higher prices, lower-quality products, and less variety of products for consumers.

5. Rebuttal of the improving the trade deficit argument.

Reducing imports through tariffs and quotas leads to reductions in exports (see last argument), so the overall deficit will not improve. Overall productivity and wealth will decrease because of reduced specialization and competition.

Most economists do not support protectionist arguments. Many agree with Adam Smith and David Ricardo that, in the long run, free trade leads to higher standards of living and increased wealth.

Section 5: The United States and its Role in International Trade

Global Competition

In an increasingly international world, the United States benefits from actively participating in trade with other countries. Even though the United States, because of its size, is relatively less dependent upon imports and exports than other (smaller) countries, it needs to remain globally competitive in order to maintain a high standard of living.

Exports, Imports and the Trade Deficit

United States foreign trade in goods and services amounted to a combined \$5.9 trillion in 2021 (\$2.5 trillion in exports and \$3.4 trillion in imports). The United States' strongest export items include capital goods (includes computers and telecommunications equipment), industrial supplies, food, high technology (including military) products, computer software, entertainment products (movies, music), and services (banking, consulting, insurance). The United States' main three export partners are Canada, Mexico, and China.

United States imports of goods and services in 2021 amounted to almost 15% of nominal GDP (\$3.4 trillion divided by \$23 trillion). A significant component is manufactured products, such as industrial machinery and equipment (including oil and petroleum products), televisions, smart phones, computers,



and cars. This is in contrast to several decades ago, when over half of all imports were raw materials. United States exports of services (tourism, intellectual property use, financial services, transport services, etc.) totaled approximately \$760 billion in 2021. Imports of services in this year amounted to approximately \$535 billion. The service and information economy has taken on a more dominant role in the United States. Many services can only be provided domestically, whereas manufacturing can be done in other countries. Manufacturing has declined in the United States compared to several decades ago. This is due to higher labor costs, more expensive benefits (including health insurance costs), high corporate tax rates, and increased regulations. Recent laws that reduced corporate tax rates and eased regulations have reversed this trend somewhat.

Imports of merchandise goods have exceeded exports of merchandise goods each year since the early 1980s. This means that the United States has run a trade deficit since that time. In 2021, the goods (merchandise) deficit was approximately \$1 trillion (\$2.8 trillion in imports of goods and \$1.8 trillion in

exports of goods). This is not necessarily a bad thing though. Trade deficits can be a sign of a country's economic strength. Households in strong economies have more purchasing power than households in poorer economies. The United States economy is usually stronger than most economies and typically has one of the lowest unemployment rates in the world. This means that we have more purchasing power and that we can buy more from other countries than they can buy from us. Consider two productive people, one with earnings of \$10,000 and the other with earnings of \$1,000,000. The higher-income person will likely buy more from the lower-income person than the other way around.

A trade deficit does not necessarily mean that a country is in debt. By definition, it only means that the merchandise parts of the balance of payments is negative. The merchandise component of the balance of payments is only one of various other accounts. The services account, for example, has been positive by several hundreds of billions of dollars the past several years (+\$250 billion in 2019). For more information about the Balance of Payments, see the Principles of Macroeconomics part of our text, Unit 10, section 3.

A trade deficit can be a sign of a healthy economy, but it can be a sign of a struggling economy as well. A poor country with no productive capacities and an inability to export anything is forced to import food and other essentials. Therefore, it experiences a trade deficit out of necessity and not out of choice.

For more information about international trade statistics, please visit: www.census.gov (click on "Foreign Trade". then "Statistics").

Section 6: Less-Developed Countries

Economic Conditions in Less-Developed Countries

Less-Developed Countries (LDCs), or so-called developing countries, are mostly found in the continents of Africa, South and Central America, and parts of Asia. They have experienced significant economic hardships for a variety of reasons. These include:

1. Lack of free market policies.

Many LDCs are governed by dictatorial governments, or governments with an excessive amount of power. These governments are threatened by free market policies and free international trade, for fear that it will upset the political status quo. LDCs also typically support tariffs, quotas, and other trade restrictions.

2. Improper domestic economic policies.

Because many governments in LDCs find it necessary to spend large amounts of money in order to maintain their powerful position and support their lavish lifestyles, they levy high taxes and print large amounts of money. Some LDCs have marginal tax rates of 50%, even on lower incomes. Printing money causes higher prices in the long run (Venezuela's inflation rate recently was more than 10 million percent!). Inflation is, in essence, a tax on consumers. Especially poor consumers are hard hit. Both the high taxes and high inflation discourage production and consumption, and slow down the economy.

3. Government corruption.

Government corruption in some form exists in all countries, but it is more significant in LDCs. Corruption is destructive to an economy. For economies to thrive, citizens need to be able to produce and consume in safe environments. Most LDC governments not only neglect to protect their citizens, but actually participate in the violence, robberies, and assaults. A person in this environment loses the incentive to work hard, invest in a business, and accumulate wealth, because (s)he knows that it can be taken away at any moment. Visit <https://www.transparency.org/> for a corruption ranking of countries around the world.

4. Poor provision of public services.

Capitalism thrives on the existence of essential public services, such as roads, highways, and



transportation systems (trains, airports), sewage systems, a sound judicial system, protection of private property (police, firefighters, military), and education. These services are non-existent or weak in LDCs. Therefore, capitalism struggles to succeed in these countries.

Without a strong, free, and non-corrupt capitalist foundation, LDCs will not experience significant

economic growth.

For LDCs to grow and thrive, all of the above hardship factors need to change. No amount of financial help from developed countries can improve the lot of any LDC if these conditions remain.