

Options and Outcomes:

The Basic Ideas of Macroeconomics

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Introduction

How Do I Use This Thing?

This book has two purposes. Its first purpose is to give students a sense of the **basic ideas of economics**. Its second purpose is to **demonstrate applications of economic ideas** to various situations. It was also written to save students the money they would otherwise have to spend on a really expensive textbook with really nice but uninformative pictures and lots of unimportant details about stuff (OK, that's a third purpose).

Each chapter title is based on a particular question, and presents the methods that economics uses to answer that question. In each chapter, there are other, smaller headings, phrased as questions, which help answer the bigger chapter question. While these questions are mostly for organization of the ideas, you might find it useful to see if you can answer the heading questions before going on in the book.

What's with the boxes?

Economics involves a way of thinking, but it also involves a way of talking. At the bottom of most pages, you will find **term boxes**, like the one at the bottom of this page. See it? These little boxes are your friends. No, really. These little boxes will help you get the basic language of economics as you go through the book. They summarize the main terms (and, sometimes, ideas) that from each page. The term boxes contain two kinds of words; some are terms that you are likely to only find in economics, while others are regular old English words that economists put a little different angle on (so just using the dictionary definition might be misleading). If you find words that you don't understand on a page, but you can't find them in the term box, you are probably safe if you look up the word or phrase in a dictionary.

Most of the words or phrases that are listed in the term boxes are also shown in **bold type** in the text. However, not all words in **bold type** are defined in the term box. The **bold type** is used for emphasis as well as to indicate a vocabulary term. For example, **bold type** isn't in the term box for this page, since I'm betting you can figure out what **bold type** means on your own.

The ideas in economics are like tools; they can't do anything for you until you learn how to use them. So, in most chapters, you will find some **Applications of the ideas**. These are meant to show you how the ideas can be used, since using the ideas of economics is at least as important as learning them. Most students starting out in economics tend to memorize the ideas, which is great. However, students usually don't worry as much as they probably ought to about mastering the skills required to apply the ideas. These application examples are meant to help you get those skills. Boxes surround the applications as well, so you can find them fast. Be sure to look them over; they are important. See the following example.

term box (like this) -contains terms and ideas from the page

Applications -examples that will help you see how to use the ideas explained in the text

Application: What Application Boxes Are Like

This is an application box. In boxes like this one, you will find examples showing how to apply some of the ideas in the text. You can tell them apart from the term boxes because the application boxes are wider than the term boxes. Also, the lines around the application boxes are thinner than the term box lines. Sometimes, the applications boxes will contain diagrams or tables of numbers. Usually they will be longer than this one. You should always look at them.

Why are there more questions at the end?

At the end of each chapter, you will find some **Questions for Review and Practice**. Some of these are questions about the basic ideas, and you can just go back into the chapter to look up the answers. Other questions involve you to think about and apply the ideas of the chapter to various situations. These are the particularly important (and, for some people, hard) questions, and will probably require you to look over the applications presented in the chapter and think about the ideas a bit.

Many of the questions at the ends of the chapters correspond to questions in the study guide, so you may want to look at the study guide for clues to the chapter review questions, if you find yourself stuck.

Questions for Review and Practice -questions about terms and ideas as well as applications

Chapter 1

What is Economics and Why Are They Making Me Take It?

When people start an economics class, they often have an idea that economics is just about money. While money is involved sometimes, economics really deals with things much more important. It deals with almost everything. You name it and economics is about it: time, power, love, food, water, crime, sex, children, TV, and lots more (except maybe continental drift and planetary motion). Almost everything that people do can be explained by economics, unless the people involved are insane. You might be tempted to think that means we can't use economics to understand anything about Washington, D.C., but actually, we can.

Economics is a set of extremely powerful concepts that help us understand and predict human behavior and interaction by understanding choices. The choices explored by economics range from the simple ones each of us make every day, to the complex choices made by governments and nations. Families, businesses, industries, cities, states, courts, politicians, bureaucrats, homeless people, students, and professors all make choices that economics can be used to explain, predict, and describe. Economics is everywhere.



Why is economics everywhere?

Economics is everywhere because people have to make choices all the time. None of us can have everything she or he wants. The world just doesn't allow it. The technical name for this situation is **scarcity**. Unfortunately, since the Garden of Eden fiasco, scarcity is a fact of life. Each of us is limited in the amount of time we have; each of us is limited in the amount of money we have; no one can be in two places at the same time. Some people are more limited in what they have than other people are, but each of us is limited in what we have or what we can get in some way. Even Bill Gates doesn't have enough money to buy a day with more than 24 hours.

Scarcity has two sides; although we are limited in what we can have or do, we are not necessarily limited in what we want to have or do. In fact, our wants and desires are virtually unlimited, since there are a lot of people, and each of us desires or wants something almost all of the time. Even if one person has enough of something, other people somewhere probably still want some more of it. Anything that is available to people in a limited amount, compared to how much of it people want to have, is de-

economics -the study of choices that people make to get outcomes they desire in a world of limits; the goal of economics is to understand and predict people's choices and actions when they are faced with limited options, and to predict the outcomes of those choices.

scarcity -the situation in which things and options are limited relative to wants and desires

scribed as being **scarce**. Time, purebred puppies, clean air, land, closet space, and hugs are scarce, and so is pretty much everything else that people desire. Even spiritual enlightenment and the capacity for self-denial are scarce, since at least some people are trying to get more of them.

Scarce stuff comes in two forms. **Goods** are items and outcomes that directly fulfill some need, want, or desire that people have; goods are desired just because of what they are. Goods don't have to be tangible, physical things. Love, sirloin steaks, "A" grades in college, marriage proposals, children, Britney Spears CDs, haircuts, and Snickers bars are all examples of goods. An item is a good as long as someone wants it, but it doesn't need to be desired by everybody to be a good. A **scarce good** is a good which someone (anyone) wants more of than he or she has.

Goods are not the only things that are scarce in the world of scarcity. In fact, goods are scarce because the things that are used to make goods are also scarce. Things like people's labor (workers' time), land, natural resources, factory space, tools, machines, and other things that are used to make or grow goods are called **resources**. Resources, which are desired because of what they will allow people to do or make, are also scarce.

What kinds of choices does scarcity force upon us?

Even with scarcity, we have many options, but scarcity forces us to make choices between them. One kind of choice we have to make is **which scarce goods we will pursue** and which goods we will not. For example, you might have to choose between buying a pizza and buying a CD with the same money. On another occasion, you might have to choose between talking on the phone to your mother and watching your favorite TV show. At another time, you might have to choose between studying for an exam and partying with your friends. The outcome of every choice between scarce goods is that some desire will be satisfied (at least partially) while another goes unfulfilled.

Another kind of choice occurs when a scarce good can be obtained in more than one way, or can be produced using different combinations of scarce resources. We have to choose **how we are going to obtain or produce the good**. For instance, if you want a haircut, you have (at least) two options. You have to decide whether to use some money to buy a haircut from a salon, or use your time to cut your own hair. It may seem like an easy decision to make, but you still have to choose which way to satisfy the desire for the good. The outcome of your decision will affect how you spend your scarce time and money, and may also determine how well your desire for the good has been satisfied.

Yet another kind of choice resulting from scarcity arises because each scarce good is probably valued or wanted by several different people. This means there has to

scarce -adjective to describe things which are limited in availability relative to wants or desires

goods -things that, in themselves, are wanted or desired

scarce good -a thing that someone wants but that is available in limited quantity; sometimes called an "economic good."

resources -things that are not desired for themselves, but which can be used to make goods

be some way of deciding **who will get each good**. You can't eat the same Snickers bar I am eating (or at least, you probably wouldn't want to anymore). If we each want to eat the Snickers bar, we must have some way to decide which of us will get it. The fancy name for deciding who will end up with each good is sometimes called **rationing**. There are many different options for rationing a good, such as "Let's flip a coin for it," "Who saw it first, gets it" "It belongs to whoever will pay the most for it," and "Whoever is willing and able to beat-up everyone else gets it." Each method of rationing may result in a different outcome, but ultimately one person's desire for the good will be satisfied, while the desires of other people may not be.

What are the other results of scarcity?

Scarcity creates a world in which we are forced to make choices. The world of scarcity and limited options is also characterized by costs, conflict, and competition. **Costs** are part of the picture because something must be given up every time we make a choice. Every decision we make requires us to give up other goods we could have had instead, or other ways in which we could have used our resources to obtain them. **There is no such thing as a free kitten**, since the space, time, and money expenditures that the kitten will require all had other possible uses (they could have been spent on a puppy, for one). No good is literally "**free**."

Another result of scarcity is **conflict**. When a choice involves or affects more than one person, the people associated with the choice are likely to have differing perspectives of what goods should be obtained, how the goods ought to be obtained, or who should get the goods. As a result, other people will be in **competition** with us to make the choices that affect them as well as us. We will be in competition with other people to obtain the goods and resources that are available. Additionally, the people who possess goods and resources are in competition with one another to provide us with the goods we desire, or to provide the means of obtaining them.

It may seem surprising, but the same scarcity that brings conflict and competition to our world is also responsible for a large measure of the collaboration, cooperation, and compromise we enjoy with other people. Because of scarcity, we may desire goods that no one of us can produce or obtain by individual effort alone. For example, building an aqueduct to bring water to a desert or constructing an electric power plant can be accomplished only by enlisting the aid of other people, and collaborating with one another. Our desires for goods like water and electricity, and our limited individual abilities, compel us to cooperate with one another to get the goods we desire. In other

choices in economics -some of the choices that economics deals with are (1) which goods (or outcomes) we will pursue, (2) how will we obtain the goods or outcomes, and (3) who will get each good or benefit from the outcome?

rationing -determining or deciding which people will get a good

costs -what has to be given up when one option is selected over another

free good; there is no such thing as a free lunch (or kitten) - everything has a cost. Free" goods, such as "free" kittens or "free" lunches all have some cost of some kind (to someone).

conflict -when choices involve or affect many people, they will have differing interests and conflicting opinions about what should be done

competition -rivalry to gain control of scarce goods and resources, or to make decisions about their use

instances, if we desire an item that someone else has, we may find that the easiest way to obtain it is to offer its owner a compromise, such as "if you give me the thing that I want, I will give you something that you want even more." Such a trade is a form of compromise, since we are offering to give up something desirable that we possess in order to persuade the other person to give up something that she possesses and would otherwise want to keep. In the effort to obtain the things we desire, we may be compelled to offer other people aid in acquiring the things they desire. Of course, most of us help other people from time to time simply because of our compassion and empathy for their problems and need. However, when scarcity's grip upon us is so strong that our concern for other people weakens, we often find that our own desires force us to help others, for that may be how we best get what we want.

What is the economic way of thinking?

Remember, economics is an attempt to understand and predict people's choices and behaviors. Therefore, it is based on the assumption that people's choices and behaviors are understandable and predictable, at least most of the time. This idea may, at first, sound unrealistically optimistic. But unlike those cleaning products they sell on infomercials, the idea actually seems to do the job!

A big part of the **economic way of thinking** (the way to think when doing economics) is to assume that people are going to choose or act in the way that best gets them what they want, whatever it is, subject to the limits they face. This applies when people are interacting with other, as well as when an individual person is making personal choices. Figure out what a person wants, determine how she can most easily get what she wants (given her circumstances), and you will predict her behavior most of the time.

What does economics assume about people?

Economics assumes that people have things that they want, or outcomes they want, based on their personal preferences and desires, which we sometimes call **values**. Notice, values are individual; each person views the value of things like love, power, disaster relief, diamonds, food, "free" kittens, and everything else differently from other people. Another way to describe this is to say that values are "**subjective**." Some desires may seem vain or selfish to some of us, such as the desire for a one-carat diamond nose stud, or the desire for a nose job to go with it. Other desires may seem less selfish, such as the desire to prevent abuse of cute little puppies, or the desire to help homeless families. Economics isn't concerned about why people have the values they do, or which ones result in selfish or unselfish desires, or even which values are morally superior. Economics merely assumes that each person has desires for certain things or specific outcomes, based on his or her own values.

Economics also assumes that people will choose or behave in ways generally get them the things they want and the outcomes they desire. One way to describe this is

values -personal assessments or feelings about how desirable or important a good or outcome is, or what it is worth

subjective values -the value each person puts on things or outcomes is ultimately based on individual tastes and feelings, and these differ from person to person

to say that people engage in **rational decision-making** when they choose what they will do, or that they **behave rationally**. This doesn't mean that people actually apply some sort of logical rule every time they act, that they ignore their emotions, or that they always make the right choices. We're not talking about Vulcans, here. Rational behavior only assumes that people will try to choose the best way of obtaining what they want, and will often tend to do so. This is what makes their behavior and choices predictable.

Application: Example of Rational Decision Making

Since drinking water or other fluids is necessary to stay alive, we could predict that everyone who wants to stay alive is going to drink fluids, if people behave rationally. However, in practice, most people just drink fluids when they feel thirsty. In fact, unless the source of beverages is far away or requires a high payment, they probably don't even consciously think about it. When they feel thirsty, they head for the water fountain, faucet, soda machine, or cooler. Those few people who have medical problems that keep them from feeling thirst may just discover, by trial and error, that drinking fluids makes them feel less fatigued or dizzy. Other people are Homer Simpson types who may drink fluids due to other urges. Even so, it's a world full of fluid drinkers, and that's what rational behavior would have predicted.

People don't have to go through an actual, logical, rational process to do the rational thing. Even so, the result is the same as if they did. People tend to behave rationally, most of the time. If, for some reason, they don't make rational choices, they will not be around much longer to make other decisions.

Cheers!

Why do we assume that people are rational?

The assumption that people are rational when trying to get what they want, even if it isn't always true, predicts people's choices and behavior for two reasons. First, **even if people are not rational all of the time, their rational behavior can be predicted, but their irrational behavior cannot**. Suppose a particular person makes rational decisions only half of the time. If there is only one way of doing things that will enable him to get what he wants, we can figure out what the person will do half of the time, when he is being rational. On the other hand, since there are many ways of doing things irrationally, none of which will result in the person getting what he wants, we cannot guess which of the many irrational things the person will do. If we assume the person is rational, we can predict his choices half of the time, but if we assume he is irrational, we will almost never correctly predict which of the wacky, irrational things he will choose to do (although it might be entertaining to watch). Second, **people who make irrational choices are often not able to make as many choices in future**; the people who do make most decisions tend to be the more rational decision-makers. For example, if a person who is given lots of credit cards makes irrational choices when deciding how to use them (perhaps ending up in bankruptcy), he will probably not be given more credit cards in the future. So, decisions about using credit and borrowing won't be made by him any longer, but will be made by people who are better at it. Irrational decisions generally lead to fewer options and fewer opportunities to make decisions in the future.

What makes economics a science?

Economics is different from many other ways of studying people and what they

rational (decision-making or behavior) -choosing or behaving in such a way that one gets what he or she wants, even if the choice or behavior is not the result of a logical reasoning process

do, have done, or will do. Like astrology, tarot cards, and psychic hot lines, economics deals with people, their choices, and the outcomes of their choices. What makes economics different is that economics is scientific. That doesn't mean that people who study economics also walk around in white lab coats injecting things into rats (although a few of them do stuff a little like that). Rather, economics is scientific because every idea or theory in economics is put through a three-stage process. Think of it as the economics equivalent of shampooing (you know -- lather, rinse, repeat).

The process, which you may be familiar with from other classes, is called the **scientific method**. Applying the scientific method works like this:

1. A theory is proposed or developed, often as a statement such as "if A occurs, then B will happen."
2. The theory is tested empirically; observations are made and statistical techniques are used to determine if the observations confirm the theory.
3. The theory is modified or discarded if the observations indicate doing so.

What you end up with is, well, not fact exactly, but a really useful theory that you think really describes things and will make accurate predictions. Of course, some joker is likely to come around every now and then and try to disprove the really good theory, and you have to let him try. That's what makes a science.

Every idea that will be presented to you in this book has gone through this process. Some ideas presented here have been tested many times, and we are very sure of them. Others are relatively new and the testing is still going on (if so, this book will say so).

How do we make things simple?

In all scientific investigation, it is often helpful to create a **model**. Not the Claudia Schiffer kind, but a deliberately simplified concept or theory of what is going on.



The simplification doesn't need to look like the real thing, but it should give us an accurate idea of what is going on and enable us to make useful predictions. For example, a paper airplane may not look as much like a real F-15 airplane as a plastic model, but it will fly better than a plastic model of an F-15 will, and thus would be a more accurate model if we want to understand flight. On the other hand, if you wanted to know what an F-15 looked like, how many engines it had, or what kind of tail it had, the plastic model would be more useful.



One kind of model you will see frequently in economics involves examining the decisions of many people involving many scarce goods by focusing on just a few people making decisions about just a few goods. Looking at just a few people with just a few options allows us to understand which factors affect people's decisions, and what the outcomes of the decisions will be.

scientific method -the way of trying to understand things that begins with a theory, makes observations of the real world, and modifies or discards the theory if it does not conform to the observations. Any study that applies the scientific method consistently is a science.

model -a simplification, showing the important aspects of a situation, but not all of the less important details

One useful idea that is used to construct models is *ceteris paribus*, a Latin term which means assuming or pretending that "other things are constant." When we assume *ceteris paribus* we focus on one of the many events that could be happening at one time, and observe or predict the effects of just that one event. We ignore other things that might be going on because they are not important to what we are trying to understand. For example, if I drop a ping-pong ball, I predict that, *ceteris paribus*, the ball will fall straight down. I might do this if I am only interested in making predictions about the effect of gravity on the ball. My prediction will generally be correct if I drop the ball indoors. However, if I am outside on a windy day, the ball will probably not fall straight down, because the wind will affect it. By assuming *ceteris paribus*, I am ignoring the possible effects of other things, such as the wind. Ignoring the wind makes my prediction simpler, and gives me a basis for making a more complex model later on.

What makes a theory useful?

While a science should be built upon the testing of ideas and theories, something more is needed. Theories must enable us to make useful predictions. This means that they must be built to do more than identify that two events merely occur together, and thus have some **association**. Useful theories must be constructed to show **causation**, that is, that one event prompts or causes another event to occur. For example, you may observe that the sun sets when the clock in your house says it is 6:00 pm on a particular day. That is an association. However, it doesn't explain what causes the sun to set. Constructing a theory based only on that association will not be useful, since you can't make the sunset happen by merely setting your clock to 6:00 pm. The time indicated on the clock is not the cause of the sunset. For that matter, your clock will not always say it is 6:00 pm every time the sun sets. A complete theory would have to attempt to explain why the sun sets when it does, not merely report the association.

Does the exact process always matter?

Often in economics, we are not concerned with exactly how a person decides to do one thing rather than another. Rather, we are interested in what the decision will be or how it will turn out. In such instances, we will treat a decision-maker **as-if** she is doing some kind of calculation or going through a decision-making process that she really isn't. For example, consider a person throwing a wadded-up piece of paper into a wastebasket across the room. She probably uses her past experience and gut instincts to judge the force and angle at which to send the wad on its brief flight. If we asked her whether she was actually doing calculations involving the laws of gravitational acceleration, air resistance, and ballistic trajectory that are involved in her action, she might think we were crazy. But, if she makes the basket, the result is the **same as it would have been if** she had made all of the calculations and adjustments that a physicist could come up with. It is as-if she did all of the relevant calculations, even though she didn't even take out her calculator. In economics, we will sometimes do the calcula-

ceteris paribus -assuming that everything else is constant; taking one event of effect into account at a time

association -when events occur together, but one may not be the cause of the other

causation -when one event makes another event occur

as-if -the assumption that a person's choice or actions are the same **as** they would be **if** she had engaged in a calculation or process that she did not, since the calculation or process would have yielded the same decision

tions that a person could go through to make a decision, even if the decision-maker is not actually doing the calculation herself. We then predict that the person acts as-if she had done the calculation, and indeed she usually does (even though she doesn't realize it).

How do we think and talk scientifically?

Being scientific means that our individual personal attitudes, opinions, likes and dislikes will not be useful when we try to understand the choices and behavior of other people. If I can't stand Adam Sandler, but want to scientifically examine someone's decision to see an Adam Sandler movie, I can only do it if I ignore my personal opinions about his films. To guard against taking everything too personally, we distinguish between two kinds of statements. **Normative statements** are statements of opinion about the way things ought to be, what should be done, which thing is the best, etc. **Positive statements** are descriptions of things as they are or statements that can be factually verified somehow.

"My dog is black," "if I pull my dog's tail, she will squeal," and "my dog lives on Mars" are all **positive** statements because they can be verified or tested somehow. The last one is incorrect (research at the Maricopa County Animal Care and Control Department would show my dog lives in Glendale, Arizona) but it is still a positive statement. Generally, statements that predict that one thing will happen when certain other things occur are positive statements.

Examples of **normative** statements are "my dog is beautiful," "the United States is the best country on earth," and the infrequently heard "the government that governs least governs best". Beauty and the best are in the eyes of the beholder. Statements containing words like "should," "ought," "good," and "bad" are generally normative as well.

Making this distinction may not seem important to you at first, but it has helped the study of economics tremendously. By being positive, economists have figured out a lot about how people make choices, what the results of their choices are, and how things work as a result. Surveys of economists show that over 90% of them agree when you ask positive questions involving things that can be tested or checked using facts. Economists agree about the answers to questions such as "will free trade make a country more prosperous?", "will higher taxes reduce economic growth?", or "will higher minimum wages cause unemployment to increase?" Economists disagree with each other only when they are asked normative questions requiring them to insert personal opinions and feelings, such as "should we allow free immigration to the U.S.?" or "should we lower taxes?" or "should we raise the minimum wage?"

This book will attempt to remain positive in its approach and conclusions. (That is a positive statement). In life, normative is important too, since it reflects the beliefs and values that make each of us who we are (that is a normative statement). Remember, economics assumes that each person has values and desires, and that these are the basis for personal choices and behavior. Being positive just means that we don't judge which values are right, wrong, good, or bad.

normative statements -expressions of opinions that cannot be proved or disproved, because they are personal tastes, feelings or beliefs

positive statements - non-normative statements of fact; statements that can be proved or disproved in some way

Why are there two kinds of economics?

While economics is the study of choices, we could also say that economics *are* the study of choices, since there are two kinds of economics.

Microeconomics studies the individual small-scale choices made by individuals, consumers, businesses, and to some degree, government. These choices include really tiny or personal things like deciding when to go to bed, deciding how much to study, deciding whether to buy a DVD of the first season of *The Simpsons*, whether to repair your car, and what route to take when driving to school. Microeconomics also deals with some larger choices, such as how much of a product a business will choose to sell, how high the price will be for a product, how many people will be hired to make a product, whether a new building should be built, and how much effort will a business exert to avoid causing pollution. Notice, government can have a great deal of influence over these decisions, by creating laws that restrict or expand the options people face, but most of the decision-making is done by private individuals or businesses, so microeconomics most often deals with individual choices or **private sector** decisions.

The other kind of economics, **macroeconomics**, deals with big decisions and their big outcomes that often affect lots of people. These are the decisions usually made by countries as a whole, or their governments. Macroeconomic decisions include things like deciding how much money will be in existence, how high tax rates will be, how much the government will spend, what kinds of prices will be controlled by the government, and how much a country will trade with other countries. Such decisions affect just about everyone, and thus are said to have **aggregate** (or all-together) effects on things like unemployment, inflation, interest rates, and the size of the country's economy. Because these big decisions are made by the government on behalf of the general public, or at least will affect the general public, they are sometimes called **public sector** decisions.

microeconomics -the study of the small-scale choices, made by individuals, groups, businesses, and government, that mostly affect individuals or limited portions of society

private sector -persons or groups that are not affiliated with governments

macroeconomics -the study of large-scale choices, made by large portions of a nation or by governments, that affect many people in some way (especially, but not exclusively, with regard to trade, jobs, production, and wealth)

aggregate -taken as a whole or overall. The word aggregate can be used as a noun, an adjective, or a verb.

public sector -government or government agencies

Questions for Review and Practice

1. Is economics the same as business? Explain your answer.
2. In your own words, how would you define scarcity?
3. What scarce goods do you personally desire that generally are not bought or sold with money? Give two examples.
4. What makes a good scarce?
5. What are the results of scarcity? Name as many as you can.
6. In what ways do we see people competing for scarce goods and resources?
7. What does "rationing" mean?
8. How does our society ration chocolate?
9. How are A grades rationed in your economics class?
10. What term do we use to describe the fact that different people place different values on the same items?
11. How do we come by our values? What people or things influence your values?
12. What do we mean, in economics, when we say that people are rational?
13. How would you determine whether a subject, like economics, is studied scientifically? What is needed for a subject to be scientific?
14. Is a globe a good model of the earth? In what ways?
15. What is meant by the term *ceteris paribus*?
16. What is the difference between association and causation?
17. Why does a good theory have to show causation?
18. Give an example of a normative statement. How do you know it is normative?
19. Give an example of a positive statement. How do you know it is positive?
20. If positive statements do not tell us which thing is "better" than another is, or which goals are "good," how do they help us make decisions?
21. Give an example of a decision that would be studied in macroeconomics, but not microeconomics. How do you know?

Chapter 2

What Are the Basic Tools We Use to Understand Choices?

As was mentioned in Chapter 1, economics is not just a collection of facts. Economics uses concepts about how people choose to behave in order to predict what actions people will choose, and what the outcomes of their decisions will be. Just as a mechanic will need wrenches to repair a car, we will need to use certain ideas or "tools" of economics to understand choices and behavior. These ideas are not just stuff we know or think. These ideas are tools we will use repeatedly. They are like those knives they advertise on TV that can slice through beverage cans, tomatoes, *and* the steel heads of hammers (*there's a tasty salad*).

What are the basic elements of every choice?

When a person makes a choice, he or she is getting something and giving up something. In economics, we have simple ways of thinking about what a person gets and what the person gives up. While they are simple, and help us greatly in our efforts to understand choices, they may take some getting used to. However, once you are used to them, they will probably seem obvious.

What does an activity or good give us?

Utility is the name in economics for any benefit, happiness, joy, and satisfaction, that a good or activity gives to a person. Think of the utility as the value a person places on a thing or outcome. Different goods and activities give utility in different forms; a movie might give pleasure, helping someone fix a flat tire might give fulfillment, a hot bath might give comfort, playing with a puppy might give joy, conversation with a loved one might give happiness. Instead of worrying which of these different reasons we have for desiring different goods, we simply consider that all of them have utility, if someone wants them. Remember that different people value things or activities differently, so the utility we each get from having or doing something will be different (values are subjective).

What does an activity or good cost us?

Every choice we make means that something valuable must be given up or some desirable option must be left unselected. For instance, what would you probably be doing right now if you weren't reading this economics stuff? The best thing (the most valuable thing in your opinion) that you could be doing right now, instead of reading this economics stuff, is the **opportunity cost** of your reading it. The best thing you must give up, the best alternative you are not choosing, or the utility (benefit) you are not getting is the opportunity cost of your choice.

Opportunity cost is one of the most useful and important concepts in economics. Indeed, it is what we in economics will always mean when we use the word "cost."

utility -the general name for the benefit, satisfaction, pleasure, or other motive for desiring a good or activity

opportunity cost -the highest-valued option that is not selected or the best thing that must be given up when a choice is made

Generally, an opportunity cost is involved whenever we make a choice about how to use an amount of time, an amount of money, a good, or a resource. Opportunity cost may sound simple, but it takes a little practice to get really good at using it.

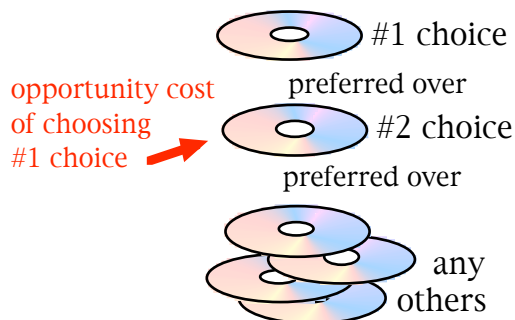
We could always find lots of other ways to spend time or money, or find lots of other uses for goods and resources. The opportunity cost idea gets us to focus just on the best alternative given up, not all of the alternatives. Another way of saying this is that the actual choice a person makes is between the activity he or she actually undertakes and the second-best thing that could have been done (we assume that a person chooses what he or she sees as the best thing to do in the circumstance).

Application: How much does that free CD cost you?

Suppose you receive a \$15 gift certificate to spend in a record store. If CD's in the store sell for \$15 (tax included), you can buy one (but only one) CD with the certificate. You might want to say that the CD you get is free (after all, it was a gift). However, the CD you select does have a cost, even though it may not be in money terms. To get one CD and take it home, you have to give up getting some other CD. That's the opportunity cost concept.

So, what is the opportunity cost in this case? Although there may be thousands of CD titles in the store, we don't have to worry about the CDs of zither music, Gregorian chants, East European National Anthems, or songs by Yanni, because your choice isn't really between all of the titles in the store, just the ones you want. The others don't go into figuring the opportunity cost. Likewise, even of the CDs you might consider getting with the certificate, there are some CDs you would prefer over others.

In a sense, when you pick one CD over the others, you are ranking the CD options in your mind. Your most-preferred CD (the best in your mind) is selected over the CD you consider to be second best. But, you would have selected the second best over any of the others. So, the others don't really matter either. What you really give up when you make your selection is the second best CD. You would have given up all the others to get the second best, but you give up the second best to get the best. The second best CD is thus the opportunity cost of selecting the one you choose; the utility or benefit that the second best CD could have given you is lost.



So, how do we choose?

When people make decisions, they respond to changes in opportunity costs and to changes in benefits, utility, and value in a predictable way. In economics, this is referred to as **responding to incentives**.

responding to incentives - people will make choices that consider the costs and benefits of their actions. They will also change their choices and actions as the costs and benefits change.

Generally, the greater the opportunity cost of an option, the less likely a person is to pursue it. For example, if you learn that "Millionaire Idol Survivor Shoot-out Death-match," a television program you want to watch, is on this evening, it will raise your perception of the opportunity cost of studying, and you will be less likely to study while the program is on. Notice that the cost can take the form of time (as in the example), money, stomach space, or anything else diverted from one use to another.

On the other hand, the greater the expected utility or benefit of an option, the more likely you are to select it. If you learn today that there will be a previously unannounced quiz tomorrow, it raises the utility you will get from studying. This will tend to increase the amount of studying you do. The point is that people respond to circumstances, and as circumstances change, people will alter their behavior.

How much choice do we actually have?

Choices come in different sizes. When we are making overall plans or setting general goals, we usually have lots of options. This sort of broad perspective, in terms of time and options, is called the **long run**. In the long run, we can change just about anything, and pursue just about any course or direction. For example, at the start of a semester, a college student can pick pretty much any classes in which to enroll.

However, once we commit to a plan or start off in a particular direction, our options become more limited. When some of our options are limited because there are some things we can no longer do or change, we are in the **short run**. Once the period for enrolling in classes is over, you cannot change which classes you are signed up for. Still, you have to make other choices, day by day, concerning the classes you are enrolled in. One day, you might decide to ditch one class to see a movie, or you might choose to skip doing a homework assignment in order to watch the playoffs (neither of these choices are endorsed by the author).

The distinction between the long run and the short run in economics is an important one. The kinds of decisions people can make in the long run will generally differ from those they can make in the short run. Not only that, but the results of people's decisions and behavior will often be different in the long run from what they are in the short run.

What can we change?

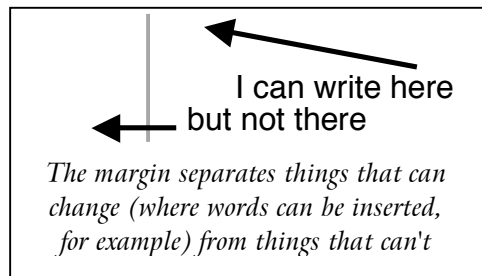
We dream and plan in the long run, but we live every day in the short run. Our long run choices impose limitations on our short run options, but only in the short run can we make the choices that move us towards our long run goals. We really accomplish even big things a little at a time, or incrementally, and life is made up of a bunch of tiny decisions we make as we go along. One name for this fact of life is **marginal decision-making**. As someone who could have been famous said, "The journey of a thousand miles begins by deciding what to wear."

long run -the situation in which choices can involve changing almost anything, such as when plans are being made, general goals are being set, or new projects can be considered

short run -the situation in which choices involve limited options, because past actions or decisions have reduced the alternatives currently available, or because there is not enough time to change some things

marginal decision-making -acting and making choices bit-by-bit or a little at a time

With every choice, especially in the short run, there are things that can be changed and things that won't be changed in making that choice. The **margin** is the



chunk of goods, resources, time, money, space, or whatever that we are making a decision about, and that will be changed when a decision is made. It's similar to a word processor program, in which the margin of the page marks the edge between where you can write and where you can't. Another way to think of the margin is that it is the next little bit or increment that we are making a decision about. The margin in a decision will not include things that we did in the past, and thus

cannot change. Also, the margin will not include things that we might be able to decide about in the future, but cannot change yet. Thinking of the margin in economics is sort of like telling yourself "don't cry over spilled milk," and "cross that bridge when you come to it."

You deal with marginal decisions and thinking all of the time. For example, how many kernels of popcorn will you eat if you are given a big bowl of tender, butter-kissed, fluffy, white puffs of gustatory pleasure? You might eat the whole bowl and then want another. You might not finish the first bowl. One of the nice (normatively speaking) things about life is you don't have to know...just start eating. As you consume the popcorn, one kernel at a time, you will eventually stop. You might stop when you get full, or when you just get sick of popcorn, or when the telephone rings and you get up to answer it. In any event, you decide to stop when you decide to stop. You don't have to decide when that will be in order to start eating. Even if you originally planned to eat the whole bowl, you can change your mind.

Popcorn eating, like everything else, is a process of marginal decision-making. Each kernel of popcorn would be a margin. You decide whether to eat the next one on a one-at-a-time basis.

How do we use marginal thinking?

The marginal idea applies to cost and utility (benefit). When you are considering the opportunity cost of obtaining one more of some thing or doing a little bit more of an activity, we refer to it as the **marginal opportunity cost** or sometimes just the marginal cost. When you consider the benefit or utility gained by obtaining one more of some thing or doing a little bit more of an activity, we call it the **marginal utility**. Marginal opportunity cost and marginal utility are the two tools of economics that show up, in various forms, in just about every decision.

Using marginal cost and marginal utility actually gives us a shortcut for thinking about and solving problems that might be solved with more effort if we don't use marginal thinking. (Shortcuts save brain cells so they can be used for other important stuff, like video games.) Sometimes, using marginal thinking will even help us solve problems we couldn't solve at all without it.

margin -the piece or increment involved in a decision; the thing that is changing as a decision is made and action taken

marginal (opportunity) cost -the opportunity cost of making an incremental change or the additional cost of doing a little more of something; sometimes, the word opportunity will be omitted, but it is always implied

marginal utility -the benefit of making an incremental change or the additional benefit from doing a little more of something

Application: Should You Fix Your Car?

Suppose your car breaks down while you are driving down the road. You pay \$50 to have it towed to a garage with an honest mechanic (play along with me, here). The honest mechanic says that the problem is with the transmission. The only way to figure out exactly what is wrong is to take the transmission apart. If the problem is minor, then the transmission can be fixed during this disassembly. However, taking the transmission apart will cost \$400. You agree to let the mechanic take the transmission apart to find out what is wrong, and pay him \$400.

After the mechanic takes the transmission apart, he discovers that the transmission can't be repaired. The only way to fix the car is to replace the bad transmission. Replacing the transmission will cost \$1,200 (and checking around finds that \$1,200 is as cheap as it can be done for). Should you fix the car?

Well, we don't yet have enough information to decide. We probably also want to know how much the car is worth if it isn't fixed, and how much it is worth if it is fixed. Suppose that several phone calls are made, finding that the car is worth \$0 if it is not fixed (maybe a junk yard will tow it for nothing, but won't pay anything for it). Cars like this one sell for about \$1,400, so you could fix it and sell it for about \$1,400, or it would cost \$1,400 to replace it. Assume the car has no personal value other than its sale value (you don't have any special emotional attachment to the car, but if you did, that might have been important). Also, assume that other things are pretty much the same. For example, suppose fixing the car will take about as much time (without a car) as finding a new one.

There are actually two ways of deciding whether to fix the car. They both give the same answer. One way is to think of everything (all of the expenses, all of the alternative things you will do with the car after it is fixed, whether you want to replace the car with some other car anyway, etc.) The other way is to use marginal thinking. Marginal thinking gives us a shortcut to the answer.

Using marginal thinking requires you to ignore what has already been paid, and look only at what your decision to fix the car will change. You spent \$50 to tow the car and \$400 to find out what was wrong, but those expenses are in the past. The only additional or marginal cost if you fix the car is \$1,200 (that's how the cost of this episode changes if you go ahead with the repair). Fixing the car will change your car from being worth \$0 now (broken) to being worth about \$1,400 (fixed), a marginal benefit of \$1,400 (the change in value). So, since marginal cost of fixing the car is less than marginal utility of fixing it, **fix it**.

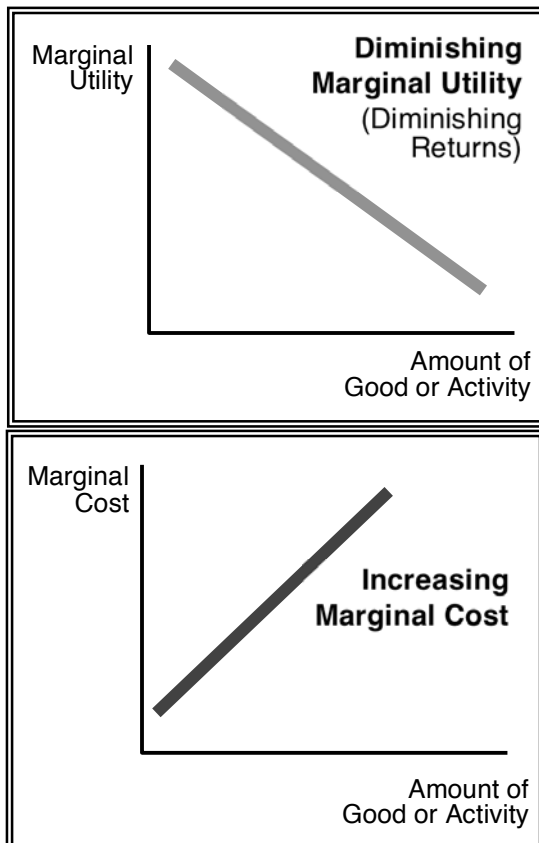
You could get the same answer by considering all the costs (not just the marginal ones) but you have to be sure to look at everything if you do. Overall, if you fix the car, you spend a total of $\$50 + \$400 + \$1,200 = \$1,650$ on the car, and end up with a car (fixed) that is worth \$1,400 if you want to sell it (so you end up \$250 poorer). You could also think of it as spending \$1,650 and ending up with the same car as you started with. On the other hand, if you don't fix the car, you have already spent \$450, but have a car that is worth nothing (so you are \$450 poorer). To end up with the same kind of car as you had originally, you would have to spend an additional \$1,400 (for a total of \$1,850). Either way, you are better off by \$200 if you fix the car. Marginal thinking just gives us a shortcut.

How do marginal cost and marginal utility change?

Marginal cost and marginal utility will tend to change for an individual as she/he continues to engage in a particular activity, and understanding these changes will help us understand the person's decisions.

As a person engages in more of a particular activity, such as eating popcorn, in a particular time period, the marginal utility of that activity eventually tends to fall. That is, after a point, each additional unit (kernel of popcorn) tends to yield less utility than the previous unit did because you get full, tired, or bored with it. This is referred to as **diminishing marginal utility**. It is an example of the **Law of Diminishing Returns**, a rule that

Law of Diminishing Returns -the rule that (marginal) benefits of any activity generally fall as more of the activity is done

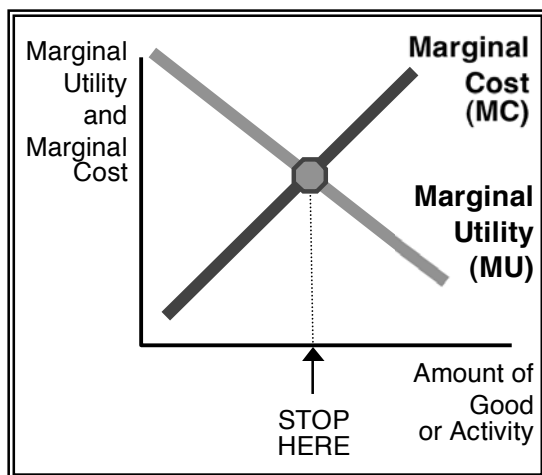


applies to many activities (not just to economics), and states that eventually the benefits (returns) of any activity get smaller as the activity is pursued. Normatively speaking, it's kind of a bummer, but we're stuck with it.

As far as cost goes, the news is equally depressing. The more of something you do, the greater the value of other things which you must give up to continue doing it, so **marginal (opportunity) cost rises**. For example, suppose you study for your economics class on a particular evening. For the first few minutes of study, you will probably give up doing things you don't really want to do all that much, like reading your junk mail or watching reruns of "Coach" that you've seen twelve times before. However, as you study more, the sacrifices become greater, and you begin to realize that you've studied past dinner time and are now missing that show where celebrities talk about *their* junk mail. The more studying you do in a particular evening, the more other activities you have already given up, so the more valuable to you are the (fewer) passing moments remaining in the evening. Eventually, you must give up activities you really enjoy to study for the second hour, and options yet more attractive to study for the third and fourth hours.

When do we stop?

A person will continue to engage in an activity as long as the marginal (opportunity) cost is less than the marginal utility (benefit). In other words, you will "do one more" of whatever you are doing if the additional opportunity cost of doing it is out-



weighed by the additional utility (benefit) you get from doing it. This applies to eating popcorn or passing seconds under the shower or reading words in economics books. You eat an additional kernel of popcorn, stay an additional second in the shower, or read an additional word in your economics text as long as the marginal (opportunity) cost is less than the marginal utility. Abbreviating marginal cost as MC and marginal utility as MU, we could say you continue eating, showering, or reading as long as $MC < MU$.

When $MC = MU$, as it eventually must be for most activities, continuing further is just not worth it, so you will stop. The marginal costs have risen and the marginal benefits have fallen so that it just isn't worth doing any more.

Certainly, if $MC > MU$, you will stop and even may try to back up. The last little bit you did required you to sacrifice more than you got. The straw has broken the camel's back, and all the king's horses and all the king's men couldn't...oh well, that's another story.

Do we have to know everything?

Very often, people look back on the choices they have made in the past, and realize that "if I knew then what I know now, I would have made a different choice." This is especially true of big decisions, but can happen even with small ones. Perhaps you have experienced this yourself. For example, you may be driving from one place to another, and turn onto a street or road, only to discover that traffic is moving slower on that road than you expected it to. If you had known how slowly traffic was moving, you might have picked a different route, but you didn't. Then, you see a way to get off the crowded roadway you are on, but the jerk in the SUV won't let you over in time to make the turn, and... HONK...well, you're stuck in a slow-moving parking lot for a while. If you had known about the turn-off sooner, you might have been able to make it, but you didn't.

This sort of thing occurs because of **information costs**. Usually when we make choices, we know about some of the options that we can pursue, but not all of them. We can guess what some of the opportunity costs of our choices will be, or what some of the outcomes of our choices are, but we don't know them all. It is impossible to know everything, and even getting some of the information that we need to make choices will require us to spend time, money, or resources. Getting information is itself a choice, and will entail an opportunity cost, just as does obtaining every other good. As long as the expected benefit (utility) of getting information exceeds the marginal opportunity cost, it pays to get more information. At some point, it will turn out that getting more information is just not worth it, and the best thing to do is to make the best decision possible with the information we now have.

The existence of information costs means that we will have to make many of our decisions with incomplete information. This also means that many decisions will later appear to have been mistakes. However, doing the best we can, using the information that it is worthwhile to pursue, is not a mistake. It's life.

In many of life's important decisions, no amount of investigation can reveal everything to you before you make a choice. When you decide whom to marry, what career to pursue, what job to take, what city to live in, which house to buy, or what car to drive, the best you can do is make the best decision you can given the information that you can easily obtain. With such decisions, often the only way to ultimately determine what is best for you personally is to make a choice and live with it for a while. The only way to never make a mistake may be to never make a choice, and that is probably a mistake itself.

How do our decisions change things?

Sometimes, making one decision affects things that were not the main, intended results of the decision. If so, that one decision may alter the circumstances and options that the decision maker or other people face. We call these changes in circumstances and options **secondary effects**. For example, if you decide to stay out late with friends, you may not have enough energy the next day to do some of the things you want to do. You certainly didn't intend to make yourself tired, and may not have anti-

information costs -getting all of the information that it might be nice to have before making a decision is costly, and in most cases, it is impossible to learn everything that might help make a good decision.

secondary effects -changes in circumstances that occur even though they are not the main, intended outcome of a decision

pated that you would, but the situation will change the decisions you make the next day.

The secondary effects of a decision are often important, and need to be considered, if possible, whenever a choice is made, especially if the decision will affect many people. To illustrate, suppose that increased airport security measures are put in place to reduce terrorism. The primary goal of these measures is to make airline travel safer. However, these changes will also make airport check-in times greater and raise ticket prices, making traveling by air less attractive. As a result, people who are traveling relatively short distances (400 miles or less) may be more likely to travel by automobile than they previously were. Traveling by automobile is significantly more dangerous than traveling by airplane (fatalities per mile traveled are more than ten times as great for automobile travel as they are for air travel). So, one secondary effect of greater airport security may be that it contributes to **more** travel deaths, since it discourages (safer) airplane travel and encourages (more dangerous) automobile travel.

What if there's more than one way to get what we want?

If a person discovers two (or more) ways of getting particular benefit or marginal utility, and one of these ways entails a lower marginal cost than the others do, that person will select the option with the lowest marginal cost. Another way of saying this is that people tend to **economize**. As with everything else in economics, economizing involves consideration of more than money. Costs always include things of value or utility that must be given up.

You economize all of the time. Take your hair, for example. Have you ever happened to look in the mirror and noticed that you had more hair on your head than you really wanted to have? If so, you might have thought to yourself, "Gosh, I have too much hair. If only there were some way to eliminate the unwanted hair, leaving me with only the hair I want!" Fortunately, whenever this happens, there are at least two ways to get rid of that unsightly hair. You can cut your hair yourself (you probably own a pair of scissors and a mirror), or you can go to a skilled professional (OK, someone at a shop where they have lots of pairs of scissors and mirrors). Since there is more than one way to get your unwanted hair removed, you will have to pick how to have it done. Economizing or economization means that you will pick the way of doing it that will involve the lowest marginal opportunity cost. Remember though, this cost is not only money.

The marginal opportunity cost of each option will consist of the highest valued things given up in choosing that option. If you cut your own hair, you will almost certainly not have to spend money to do it, but you will have to spend time doing it (perhaps a lot of time, if you have never done it before and you don't want to look stupid). That means you can't do other things with the time. Thus, the marginal opportunity cost of cutting your own hair is the most valuable (to you) thing or things that you could otherwise do with the **time** it will take you to do it, without looking like a hacked-up mess. If you pay someone else to cut your hair, it will require you to spend some time (though probably less than if you did it yourself), as well as some money. So, the marginal opportunity cost of going to a shop or salon to have your hair cut consists of the most valuable thing or things that you could otherwise do with the **time** it takes to have your hair cut by someone else *plus* the most valuable thing or things that you could otherwise do with the **money** you will have to pay. If you are like most people, even

economize -to pick the method of obtaining a benefit that requires the least cost. Economization is the name for this process.

though it costs more money to have someone else cut your hair, you will find that the opportunity cost of time and money spent is lower if you pay for someone else to cut your hair than it would be if you did it yourself.

From the discussion of hair cutting, you might have noticed that one result of economizing by people who want things is that they will sometimes **trade** to get the things they want. Giving up something to another person in exchange for another thing that you desire may actually enable you to obtain it at lower (marginal opportunity) cost. The exact conditions for this are discussed in the next chapter. However, most of the things you own, eat, live in, watch, listen to, wear, etc. were produced by someone else. You engaged in trade to obtain them, and by doing so, you were economizing. Certainly some things you own (and that provide you with utility) you could have produced for yourself (in whole or in part), just like a haircut. You chose to buy those things rather than make them yourself only because they cost you less to buy than they would have cost if you had made them. Often, the cost savings to you of buying an item is not in the form of money that you save. In fact, it almost always costs you more money to buy an item rather than if you make it or do it for yourself. However, the cost in terms of other things that could have been done with your time is at least as important as the money.

Application: When cleaning your house will and will not make sense.

Suppose you want your house to be clean and tidy. (This is assuming that you are not "untidiness tolerant.") Which costs more, cleaning the house yourself or hiring a maid service to do it? It depends. Cleaning your own house will require giving up some money to buy cleaning chemicals, vacuum cleaner bags, and such, but mostly you will have to give up time that you could be using for other things. To hire a maid service to do a comparable job of cleaning will take a small bit of time, but probably a much larger amount of money than if you clean the house yourself. Thus, the marginal opportunity cost to you of each option will consist of the time and money (opportunity) costs of that option.

If you have lots of things you would like to do with the money, but not very many attractive alternative uses of your time, the option which requires you to spend time will seem to you to have the lower marginal opportunity cost. Thus, it will be less costly for you (all costs considered) to clean your own house. On the other hand, if you really have very few other things you want to spend the money on, and if you have other things you desperately want to do with the time, the option which requires the least time expenditure will seem less costly to you, even though it may cost more money. In such a circumstance, hiring a maid will seem less costly.

Thus, people who place a high value on alternative uses of their money and/or who place a low value on the alternative uses of their time will tend to clean house themselves. People who place a low value on the alternative uses of their money and/or who place a high value on the alternative uses of their time will tend to hire a maid service, as that option will seem less costly to them, even though it costs more money.

We can use this thinking to explain why people may change from their usual choice as well. If you plan to host a party or reception, you may find that the alternative uses of your time become more valuable (since you have to spend time making arrangements for the party). The time component of cost thus gets more important to you, and you might decide to hire a maid service to clean things up before the party. As the value you place on your time increases, the options' relative costs change and the option of hiring the maid service becomes relatively cheaper than the do-it-yourself option. If the values you place on the alternative uses of your time or money change, so will the marginal opportunity costs of the two options.

trade - giving up something valuable to another person in exchange for the receipt of some other good or service. Sometimes, trade enables us to obtain things at a lower cost.

Questions for Review and Practice

1. How do you think the person will respond to the changes in incentives created by each of the following?
 - a. A student is informed in one of his classes that the next exam will consist entirely of questions from the back of the textbook chapter.
 - b. A farmer is contemplating what crop to plant for next year. He discovers that the price of soybeans is now double its normal value
 - c. A person is thinking of walking his dog. The temperature outside was 90 and now it has fallen to 75 degrees.
 - d. A woman buys several ingredients for salad each week, and finds that the tomatoes that were on sale last week for 79 cents per pound are now \$1.29 per pound.
 - e. A student who hates to get up early discovers that she can only get into the 8:00 am economics class, because the economics classes scheduled for later in the day are all filled.
2. Can the government provide anything for free? Are things that the government supplies, like public housing, national defense, health care, highways, or education, really free? What opportunity costs does the government face?
3. What was the opportunity cost to you (personally) of reading this chapter in the textbook? Did reading the chapter have a cost even if it did not cost you money?
4. In 2003, the government gave all families an extra deduction for their dependent children. What incentives do families have as a result?
5. In economics terms, how does a student decide how long to study for an economics quiz?
6. What effect does a past cost have on your current decisions?
7. What might be the secondary effects of new regulations requiring that all new cars have a sophisticated device to monitor tire inflation? If the device will add \$800 to the cost of making each car, how would the new law affect the decision of people to keep their old cars or buy new ones?
8. What does economization mean? Do you economize? When?

Chapter 3

How Do We Use Resources and What Do They Produce?

At the end of the last chapter, we just started to see how economizing might lead us to trade with other people to get things we want sometimes, while at other times, we might be better off making or doing things for ourselves. You may have sensed that our discussion was incomplete. You may have hungered for more details. You may have thirsted for even greater depth. ...Well, you're gonna get it anyway.

In this chapter, we will do something that's very common in economics. We'll take the basic methods and assumptions of chapter 1, combine them with the basic tools from chapter 2, and adapt them to some particular situations. It's sort of like putting different kinds of blades in a food processor or different kinds of bits on a power drill. Effectively, you get a new tool (a slicer instead of a chopper, or a buffer instead of a screwdriver). This means that you might want to review the tools from chapter 2, because you're going to need them again.

But that's not all! Also, we'll look more deeply into the ways in which individuals doing their individual decision-making are ultimately interdependent with one another. You'll see why economics, in addition to being the study of decisions, is a social science.

How do we think about production in the short run?

Production involves taking resources and using them to make goods. That's probably obvious from previous chapters. However, trying to imagine how each resource might be used, in combination with other resources, to make each of the many goods that people want seems like an overwhelming task (just thinking about it makes my brain hurt). Fortunately, we have some ways of making things simple, thanks to our friends the models. No, don't look at that magazine! I mean models as in simplified versions of what's happening. If we start with a simple concept of how one aspect of the whole thing works, we will understand the more complex reality a little better.

What are the possibilities for production?

At first, we'll take a **short run** view. You may remember from chapter 2 that the short run is a period in which some things cannot be changed. Also, to start, suppose there is only one resource that we have any ability to make choices about, and we can really only decide how a certain amount of it will be used to produce some of two kinds of goods. Other resources and goods are assumed to be fixed or unimportant right now for our purposes; we are only considering choices involving one resource and two goods.

Even in this limited model, there are choices. We can choose to use the resource entirely for making one good, use it entirely to make the other good, or use portions of it to make some of both goods. Depending on our choice, we might end up with lots of one good and none of the other, or a mix of both goods. All of the possible mixes or combinations of the two goods that can be produced are called the **production possibilities**.

production possibilities - the combinations of two goods that can be produced with given resources

Application: Finding production possibilities with one resource

Suppose that our resource is a full day's work from a person called "Johnny." We will use his labor to produce baked goods, either cookies or cakes. If we assign Johnny to spend the whole day preparing and baking cookies, Johnny would produce 4 dozen cookies. If we have Johnny instead spend the whole day preparing and baking cake, he would end up baking two cakes. Notice, Johnny can't make 4 dozen cookies *and* two cakes at the same time. If he makes the 4 dozen cookies, he is making no cake; if he makes two cakes, he is making no cookies.

We might also divide up Johnny (or at least his work effort), having him make cookies part of the day and cake the rest of the day. Let's assume that to produce a portion of the day's maximum production of one of the goods, Johnny only needs to spend that portion of a day producing that good. This would mean that every one-fourth of a day that Johnny spends making cookies will produce 1 dozen cookies (one-fourth of 4 dozen) and every one-half of a day that Johnny spends making cake will produce one cake (one-half of 2 cakes). If he makes only 1 dozen cookies, he would have enough three-fourths of the day left over, which would be time enough to make $1\frac{1}{2}$ cakes on that same day. If he makes 2 dozen cookies, he will have half the day left, which is enough to make 1 cake, and so on.

Thinking in this way, we can find all of the combinations of cookies and cakes that our resource (Johnny) could make in a day. The possible combinations of cakes and cookies Johnny could make, or Johnny's **production possibilities** can be put in a table like that below:

Production Possibilities		Portion of the Day Making	
Cookies	Cakes	Cookies	Cakes
4 doz.	0	<i>all</i>	<i>none</i>
3 doz.	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{4}$
2 doz.	1	$\frac{1}{2}$	$\frac{1}{2}$
1 doz.	$1\frac{1}{2}$	$\frac{1}{4}$	$\frac{3}{4}$
0	2	<i>none</i>	<i>all</i>

What is the marginal opportunity cost of making a good?

Remember from chapter 2 that the cost that matters whenever a decision is made is the **marginal opportunity cost**, which is the best or most valuable thing that could have been done instead. If resources are used to make one good, other goods cannot be made with the same resources; production of one good entails a cost in terms of other goods not being made. So, the **marginal opportunity cost of producing one unit of one good is the amount of the other good (or the most valuable of the other goods) that could have been made instead with the same resource(s).**

Finding the **marginal** opportunity cost of making one more unit of a particular good will require us to figure out how much the output of some *other* good changes (falls) when we use the resource to make one more of the good we want to find the cost of. Remember, marginal means changes, so we are going to be looking at differences that occur as we change the mix of output.

Application: Finding the marginal cost in production

Let's use Johnny, from our previous application, to think about the cost. Johnny could make 4 dozen cookies if he spends the day making cookies or he could make two cakes if he spends the whole day making cake. However, if Johnny makes 4 dozen cookies, he won't be able to make any cakes. If he makes 4 dozen cookies, he is in effect giving up making the two cakes he might have made. Similarly, if he makes two cakes, he is giving up making 4 dozen cookies. So, we could say that Johnny's cost of making 4 dozen cookies is two cakes, and that the cost of Johnny making two cakes is 4 dozen cookies (Mmm, cookies).

We still don't have the **marginal** opportunity cost of making the baked goods, since that would mean having the cost of "one more." One way to estimate the marginal opportunity costs of using Johnny to make each good is to divide (average). **To find the cost of making one good, divide the total amount of the other good that can be produced by the total possible amount of the good you are trying to find the cost of.** For example, since Johnny gives up making 2 cakes if he spends the day making 4 dozen cookies, the cost of making 4 dozen cookies is 2 cakes. That means that one dozen cookies cost him, on average, $1/2$ cake (2 cakes divided by 4 dozen cookies). On the other hand, since Johnny gives up making 4 dozen cookies to make 2 cakes, each cake costs him, on average, 2 dozen cookies (4 dozen cookies divided by 2 cakes).

A more common sense way to do this, if we are lucky enough to have a table of Johnny's production possibilities (as on the previous page), would be to pick a good, such as cookies, and **see how much the production of cakes goes down when we increase the production of cookies by 1 dozen.** If we changed the output of cookies from 0 to 1 dozen, for example, the cakes being produced will fall from 2 to $1\frac{1}{2}$. Thus, it costs one-half cake to make an additional dozen cookies. Similarly, changing the number of cakes produced, from 1 to 2, for example, will reduce the number of cookies produced from 2 dozen to none, a reduction of 2 dozen. Thus, it costs two dozen cookies for Johnny to make one more cake.

Yet another way to figure the marginal cost is to observe that every one-fourth of a day that Johnny spends making cookies will produce 1 dozen cookies and every one-half of a day that Johnny spends making cakes will produce one cake. This means that in the amount of time that it takes Johnny to make one dozen cookies (one-fourth of a day), he could instead be making half of one cake. The marginal cost to Johnny of making one dozen cookies is thus one-half cake. On the other hand, in the time that it takes Johnny to make one cake (one-half of a day), he could be making 2 dozen cookies. The marginal cost to Johnny of making one cake is thus 2 dozen cookies.

What are the possibilities with more resources?

So far, we've kept things so simple that you've no doubt been bored. No, go ahead and admit it. I won't be hurt. So far, it seems easy because it is easy looking at the possibilities and the cost with just one resource. Now that we have a start, we can make the example a bit more realistic by adding in some other resources. However, rather than adding in stuff like materials (flour, sugar, etc.) or capital (baking pans, ovens, etc.), we'll add in some more labor resources (more people).

Again, still in the short run, we can look at all of the possible output mixes or combinations of two different goods that can be produced by the resources we have. We are still keeping it simple by focusing on only two goods (we could use more, but it gets confusing and doesn't add anything useful as far as understanding is concerned). We are also thinking in the short run, changing only how resources are moved from making one of our two goods to making the other.

What is efficient production?

As soon as we have more than one resource to decide about, the possibilities for production will depend on whether or not we are using the resources in an **efficient**

manner, or whether we are achieving **efficiency**. In general, efficiency is getting the most we can of whatever we are trying to get. When making production decisions, **production efficiency** requires that, given the amount of one good that is being produced, production of the other good is the most that it can be. Since using the terms efficient and efficiency can get confusing sometimes, here's a little guide. "Efficient" is used as an adjective to describe either a situation that exists or a change; "efficiency" is a noun for a situation that is efficient.

One way to tell if production efficiency exists with our current mix of goods is to see if more of any good can be made without having to move resources away from making some other good. If it is possible to change the use of resources to make more of at least one good without making less of any other good, then the change gets us closer to production efficiency, or the change is efficient. Thus, the new situation (after the change) is more efficient than the original situation. If no way exists to make more of at least one good without making less of another good, then there is no change that is productively efficient, and thus no situation that could be more efficient than the current one. In that case, we can say that production efficiency now exists and the current situation is efficient.

Whew. You may have to ponder that for a while, but it pretty much covers anything you will encounter regarding this production stuff. Honest.

How do we find the efficient possibilities then?

Remember that production possibilities are sort of a collection of all the mixes or combinations of two goods that can be made with the resources available (see page 23). With only one resource, the easiest way to find this collection is just to list all of the possibilities. With more than one resource, the possibilities become more complex, partly because different resources have different productive abilities. Each way of combining or using resources will produce a different mix or combination of goods. Some ways of using resources will result in more production, and thus be more efficient, than others. So, some possibilities are efficient and others are not. Still, we don't need to find all of the possibilities, just the efficient ones (since combinations that contain less than the most possible are also possible).

In finding the efficient mixes of goods (and uses of resources), there is a shortcut. It turns out that getting the most (being efficient) goes along with giving up the least. Suppose we start out using all of the resources to make all we can of only one good, "good A." If we then change the use of resources to produce one unit of the other good "good B", being efficient would require us to end up with as much of good A as possible while still getting the one unit of good B. We can do that by giving up as little as possible of good A to get good B. In essence, the formula for efficiency is to find the resource that can switch into making good B at the lowest cost in terms of good A given up, and use that resource to make any good B desired. Remember that picking the lowest cost way of getting or doing something is called economization.

Regarding the use of resources to produce goods, economization leads to effi-

efficient, efficiency -getting the most possible of whatever you are trying to get; efficient is the adjective, efficiency is the noun

production efficiency - (sometimes also **productive** or **productively** efficient) the situation in which the amounts of goods being produced with available resources and abilities is as great as possible. When two or more goods are being considered, this requires that no good can be produced in greater quantity unless the output of some other good is reduced.

ciency and economization means looking for the lowest marginal opportunity cost.

Application: Finding efficient production possibilities with several resources

Suppose that we are running a bakery, and we have three workers, Johnny, Juanita, and Ivanna. Johnny (from our previous example) can produce either 4 dozen cookies or two cakes in a day, or some mix in between (by dividing his time as we saw on page 24). Juanita can produce 30 dozen cookies or 10 cakes in a day, or some mix in between (by dividing her time). Ivanna can produce 20 dozen cookies or 5 cakes in a day, or some mix in between (by dividing her time). How do we find the maximum (efficient) production possible in a day if these three people are doing the work?

Taking all of them together, the easiest outputs to compute would be if all three produce either cakes or cookies. If all three produce cookies on a particular day, the total will be 54 dozen ($4 + 30 + 20$), but that goes along with no cake being made. If all three were assigned to make cake, the output would be 17 cakes ($2 + 10 + 5$), but there would be no cookies made.

To start looking at the other possibilities, suppose one day we want one cake and as many cookies as we can also get. To get the most cookies (which we want if we are going to be efficient) along with the cake, we need to give up as few cookies as possible to get the cake. In other words, the cake needs to be produced by the worker who will make it at the lowest cost in terms of cookies.

We already figured out that the cost to Johnny of making one cake is 2 dozen cookies (see page 25). Using the same kind of calculation, we can determine that the cost to Juanita of making one cake is that she gives up making 3 dozen cookies (in a tenth of a day, she could make one cake or $30 \div 10 = 3$ dozen cookies). For Ivanna, the cost of making one cake is 4 dozen cookies (in a fifth of a day, she could make one cake or $20 \div 5 = 4$ dozen cookies). So, Johnny presents us with the lowest cost of making cake.

Knowing that Johnny has the lowest cost of making cake tells us that we should assign him to make cakes first, since having him make them would leave us with the most cookies in addition to the cake(s) he is making. (Are you tired of hearing that yet?) Every time Johnny makes us a cake, we have to give up making 2 dozen cookies. Thus, if Johnny makes one cake, the total number of cookies will be 54 dozen - 2 dozen = 52 dozen. These are the most cookies that we can get if one cake is being made. (If we had Juanita make the cake instead, keeping Johnny making cookies, we would get $54 - 3 = 51$ dozen cookies with our one cake, which is less than if Johnny made the cake.) If Johnny makes a second cake, the number of cookies will go down by another 2 dozen, to 50 dozen.

Johnny can produce only two cakes for us, so if we want more than that, we have to turn to the next-lowest cost cake producer. We discovered that to be Juanita. Every time Juanita makes us one cake, it costs 3 dozen cookies that we can't make, so our cookie output would be lower by that much for every additional cake we get from Juanita. Once our cake total gets to 12, Juanita and Johnny are both making all of the cakes they can make.

If we produce more than 12 cakes, we have to assign Ivanna to make the additional cakes (starting with the 13th). Ivanna's cost of making cake is 4 dozen cookies, so each cake beyond the 12th will reduce our cookie production by 4 dozen. Finally, if we have all three workers producing cake, the total will be 17 cakes, but no one will be making cookies.

Cookies (dozens)	Cakes	Resource Use (Who is Producing What)
54	0	all cookies
52	1	Johnny cake, others cookies
50	2	
47	3	Johnny cake, Juanita switching to cake, Ivanna cookies
44	4	
41	5	
38	6	
35	7	
32	8	
29	9	
26	10	
23	11	
20	12	
16	13	Johnny cake, Juanita cake, Ivanna switch- ing to cake
12	14	
8	15	
4	16	
0	17	all cake

All of the efficient possibilities for one day are shown on the table at the right (at least those involving whole numbers of cake). The table looks a little funky because of ç&â€œ MS Word.

Can we make this more generally useful?

While our example on the previous page deals with two baked goods (cakes and cookies), the ideas we have been talking about (and will be dealing with below) can apply to **any two goods** that can be produced by the people or resources we are using. The two goods could be "Britney Spears CDs" and "everything else." For that matter, the ideas work even if you have lots of goods (not just two), but looking at all of the different costs and trade-offs, and listing all of the possibilities would take up lots of space. However, dedicated professional economists (in lab coats) have tested and tested to see what happens if you have millions of resources and millions of goods. They have found that the story of finding the production possibilities and such is pretty much the same as our simple three-person, two-good example on the previous page.

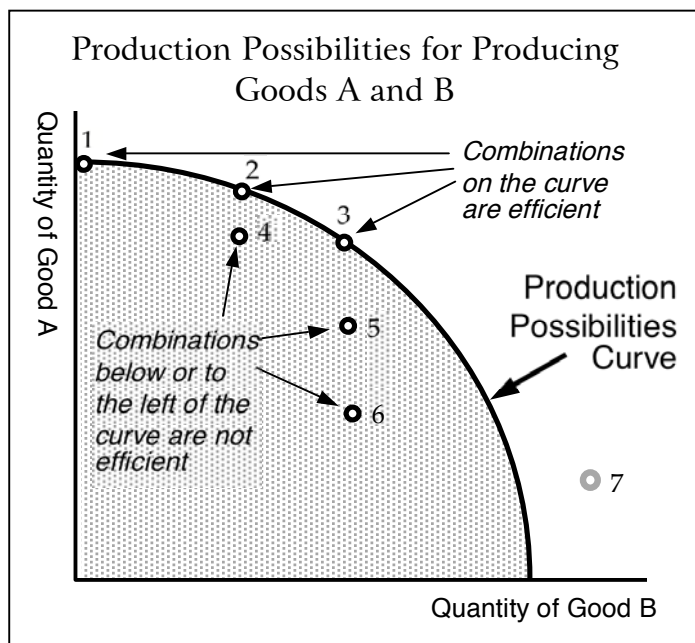
How do we show production possibilities graphically?

We can create a graph showing all of the possible and efficient combinations of two goods that can be produced at a particular time. The result is called the **production possibilities curve**. The production possibilities curve (or PPC for short) can graphically represent the production of a person, group, business, industry, region, or country. It shows all of the mixes of goods that could be produced simply by making different decisions about how resources are used in the short run. Every combination represented on the PPC represents the most of one good that can be produced at the same time as a given amount of the other good is being made.

Construction of the production possibilities curve does not require overpaid day laborers, expensive equipment, or heavy lifting. In fact, if we are given a table of all of the production possibilities, making a graph of them is easy (we might need a pencil, but these are generally inexpensive and not very heavy). Even if we don't have a table of

the possibilities, if we have some knowledge of the productive abilities of the resources available, and know how to use them efficiently, we can construct a production possibilities curve.

Generally, production possibilities curves look like the example at the left. Each point on the PPC represents a mix of good A and good B that could be produced and that would be efficient. Just three of these are drawn on the diagram (they are labeled 1, 2, and 3), but the whole PPC is made up of such points. Points below or to the left of the PPC represent mixes of the two goods which would be possible to produce, but which would not be efficient. Only three of these are shown on the diagram (labeled 4, 5, and 6), but the whole shaded area is full of them. If we were to imagine a mix of goods that is not possible to achieve, we would represent the mix by



production possibilities curve -a graphical representation of the efficient combinations of two goods that are possible to produce at a particular time, given a set of resources (and their current abilities).

a point to the right or above the curve (such as point 7 on the diagram).

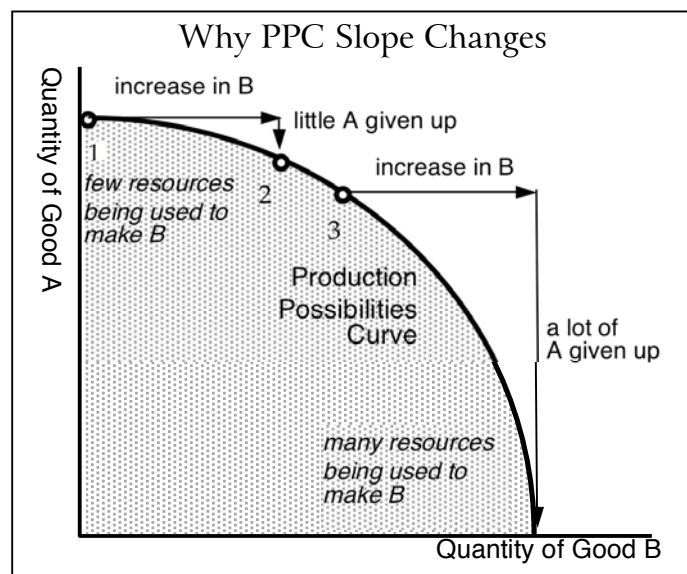
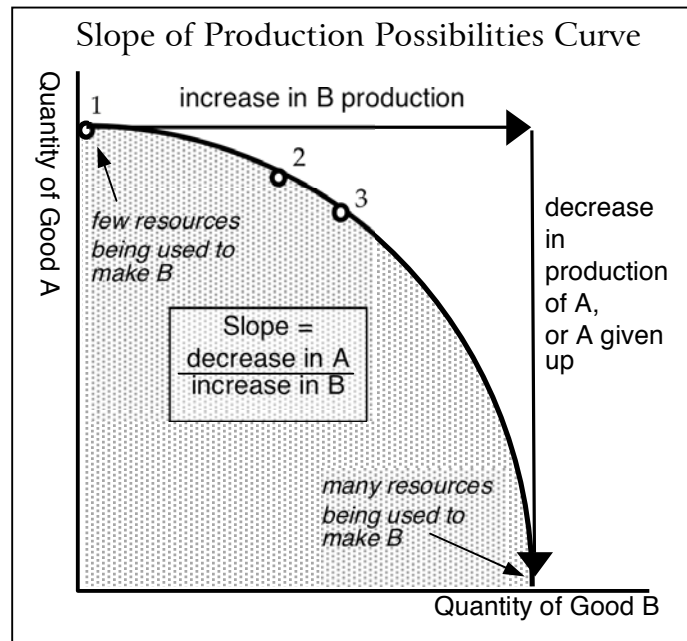
Using the PPC, we can tell immediately if a combination of two goods is efficient or not. Suppose we were thinking of producing a mix of goods A and B that would put us on point 4 on the diagram. Simply by picking combination 2 instead, we could produce more of good A without producing less of good B. Also, if we chose point 3 instead of 4, we could produce more of good B without producing any less of good A. Remember, if it is possible to produce more of one good without producing less of another good, then the mix we are producing (or thinking about producing) is not efficient. Thus, point 4 (and the mix of products that it represents) is not efficient.

How does the production possibilities curve show cost?

One thing you may have noticed about the production possibilities curve is that it is... well, curvy. The slope of the curve is small at the top (left) and gets bigger (steeper) as we move right or downward. It bends down as we move from left to right. This may be stylish, but it isn't just for looks. The curvy shape comes from changes in the slope of the curve.

Notice what the slope of the PPC is. Graphically, as we move down the PPC from left to right, we are seeing what happens to the combinations possible as you switch from making all A to making some (and eventually all) B. Thus, the movement reflects giving up some A to produce additional B, and so shows the cost of getting B (in terms of A given up). In other words, the slope of the production possibilities curve represents the marginal opportunity cost of producing additional B (or, in general, the good being measured on the horizontal axis). But why does that slope change?

If we were to pick a mix of goods that was at the top or right side of the curve (such as 1 on the diagram), not much B would be made, so not many resources are being used to make B (most resources would be making A). If we wanted to change the use of resources a little, to end up with more of good B, it is easy to find resources which have a low (opportunity) cost of making B and put them to work making B. The amount of other goods (A) sacrificed would thus be small. The change from point 1 to point 2 on the diagram to the right is an example. However, if we had started with a mix of goods that already included a large amount of B, such as point 3, many resources would already be used to produce it. Thus, it would be more costly to increase production of B (by the same quantity), since all of the low-cost resources that could be used to produce it are already producing it. If any more is to be produced, resources which are not much good for producing B must be pressed into making it, at



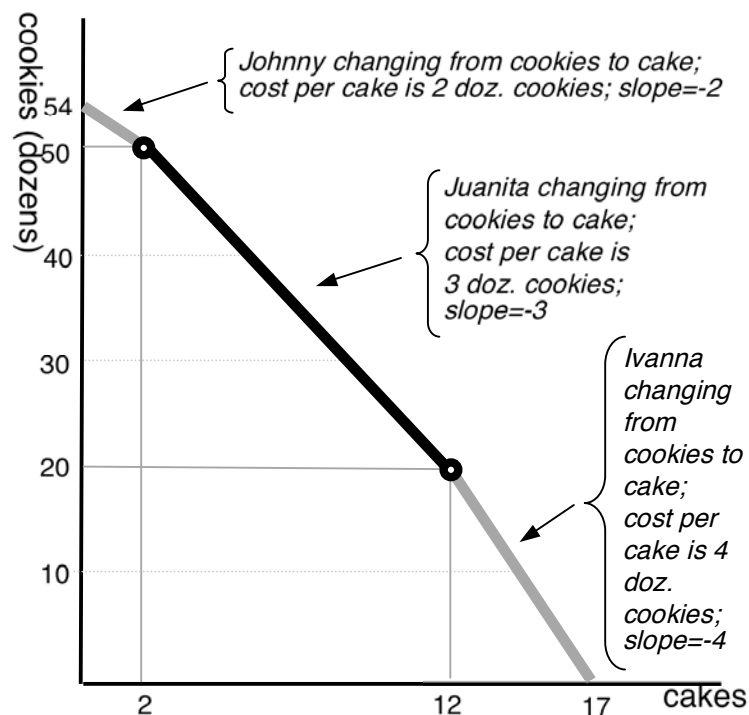
a very high cost in terms of other goods given up. The more B we are already making, the greater the cost (in the short run) of making an additional unit of B. The slope of the PPC thus gets steeper as we pick points further to the right, because of the higher cost of making B if we select those points.

What about the cost of producing A? Well, producing A requires giving up B to make more A, so it would entail moving left or up on the PPC. The cost of making the good on the vertical axis (in this case, A) is lower on right or lower part of the PPC, since points on the right side of the PPC represent combinations of output in which small quantities of A would be made, and not many resources would be making A. At points on the right side of the PPC, it would be easy to find resources that could be switched into making A without much sacrifice of B. However, points on the left part of the PPC, such as point 1, are mixes of goods that involve production of lots of A already. If there are any resources that are not already being used to make A, switching them into making one more unit of A would involve a big cost in terms of B given up. You might also notice that the cost of A would be the change in B per additional A produced, or the change in B divided by the change in A. This is the inverse of the slope of the PPC, so the cost of making the good on the vertical axis is inversely related to the slope of the PPC.

Application: Production possibilities curve and costs

Even though you may never have to construct a production possibilities curve, seeing how one is made will help you understand what it means. Suppose we start with the table of production possibilities that we got from the previous application (see page 27 if you want to recall how to get it).

Cookies (dozens)	Cakes	Resource Use (Who is Producing What)
54	0	all cookies
52	1	Johnny cake, others cookies
50	2	
47	3	
44	4	
41	5	Johnny makes only cake, Juanita switching to cake, Ivanna makes only cookies
38	6	
35	7	
32	8	
29	9	
26	10	
23	11	
20	12	
16	13	Johnny cake, Juanita cake, Ivanna making some of both
12	14	
8	15	
4	16	
0	17	all cake



Just graphing the points and joining them produces a production possibilities curve, although it looks a little different from those on the previous pages. Notice that the shape is not a smooth curve, but rather looks like three line segments joined together (especially since the segments are colored differently). That's because our example uses only three producers and thus shows only three costs of producing cakes, in terms of cookies given up. The slope of each segment reflects the costs of the producers producing an additional cake, and giving up cookies to do it.

The smoother PPCs shown earlier assume many kinds of resources, each with different costs.

What's different about production in the long run?

For the long run, we won't really be thinking about things in a vastly different way or developing strange new tools of analysis. In exploring production in the long run, we will do something that we seem to do often in economics. We will think of the long run as a change in (or opportunity to change) the short run. Thus, we will create a new short run, with new and different versions of all the things we said we couldn't change in the short run, and compare it to the original short run.

So far, we've dealt with production in the short run, by assuming that we had a particular set of resources or producers with particular abilities. We also assumed there could be changes only in how those resources were used and which goods they were put to work making. In the long run, we will see what happens when other things change. The easiest way to see the effects of these changes is to what might happen to production possibilities, and the production possibilities curve.

The production possibilities (and PPC) will change if there are changes in: the amounts of resources available or the ability of resources to produce goods. These are the things we considered to be fixed in the short run.

Specifically, production possibilities for one or both of the goods being produced can increase if...

existing resources become more productive (as when workers become more educated)

new resources become available (as occurs if a society invests in building new equipment and factories, or if new natural resources are discovered)

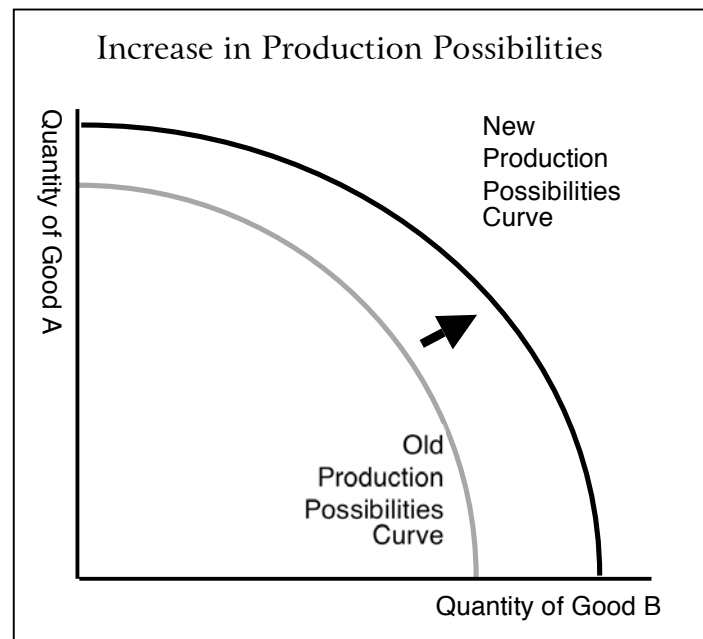
technology improves the way resources are used

institutions (such as the legal system) encourage productive activities

improvements in infrastructure (such as the transportation and communications systems)

If any of these things happen, the table of production possibilities will have bigger numbers. Also, the production possibilities curve will have to be redrawn to the right of its old position, or it will shift to the right (see the diagram to the right). Notice that this means that some combinations of goods that were not possible will become possible. It also means that continuing to produce any of the combinations that were on the old PPC would now be inefficient with the new PPC.

Of course, it is also possible for existing resources to become less productive, for the quantity of available resources to fall, for society's institutions to impede production, or for roads, bridges, and telephone systems to be poorly maintained. Any of these kinds of things will reduce production possibilities, and shift the PPC to the left (opposite of the diagram to the right).



How does efficient production happen?

When a producer (which might be a single person, a business firm, or a whole

country) can produce a good at lower marginal opportunity cost than other producers can, we say that the producer has a **comparative advantage** in producing that good. In the Application on the previous page, Johnny has a comparative advantage in producing cake. Determining which producer has a comparative advantage requires us to calculate the opportunity cost, for each producer, of producing one additional unit of the good. Producing the most or the fastest is not the same as having a comparative advantage. Instead, the cost, in terms of other goods that must be given up, is the only consideration.

The **law of comparative advantage** is a rule that says that if each producer or resource is used to produce the good or goods that it can produce at lowest cost, total production of goods will be maximized. In other words, by making economizing decisions about how producers and resources are used in production, output will be maximized and production will be efficient. The producers don't have to be individual people; the law applies to all resources (not just labor) and it even applies if the producers are countries.

Having each producer concentrate, perhaps exclusively, on producing that good which he (or she or it) can produce at lowest (marginal opportunity) cost is called **specialization** or **division of labor**. If some manager is assigning jobs, and can estimate the (opportunity) cost of each producer producing each good, the manager will assign tasks so that each producer specializes in producing that good for which it has a comparative advantage.

Is there any advantage in being the best?

It is important to remember that efficiency and specialization do not require that each person has an ability to produce absolutely more of one good than another person can. The cost advantage or comparative advantage tells us who will specialize in what, or who should produce each good if we want to be efficient.

However, a producer or resource that has the ability to produce more of a good will generally be paid more money, or will be able to accumulate more goods, than producers with less productive capability. The ability to produce more of something is called an **absolute advantage**.

It is easy to find examples of how comparative advantage, and not absolute advantage, determines which will specialize in each kind of production in the "real world." A lawyer who types very quickly will probably still hire a secretary, even if the secretary cannot type quite as fast as the lawyer, because the cost to the lawyer of typing her own

comparative advantage -the ability to produce a good at a lower (or the lowest) marginal opportunity cost, when compared with other producers (resources)

law of comparative advantage -the rule that says that production of goods is maximized if each resource or producer is used to make the good that the resource or producer can produce at lowest marginal opportunity cost

specialization -a producer concentrating on the production of the good that he or she or it can produce at lowest cost

division of labor -a worker concentrating on the job that he or she or it can do at lowest cost. The job could be producing a particular good or doing a particular task that is part of making a good.

absolute advantage -the ability to produce a greater amount of some good than other producers

letters would be too high in terms of the activities (and "billable hours") she would have to give up. Pop singer Brikley Arrows might pay another person to sign "her" autograph on publicity photos, since she could be doing many more valuable things with the time it takes to sign them. Some of you are thinking, "There's no way Brikley would pretend to be or do something she is not." Ah... maybe, but lots of celebs do it (the autograph thing, I mean). A celebrity is obviously better at signing her or his own autograph (having an absolute advantage) but some lackey (who may have never even met the celebrity, by the way) can do it at lower cost. However, the celebrity will make more money than her lackey will.

Application: Example of cost, comparative advantage, and specialization

Here is a little bit different way of looking at the production example we've been using in this chapter. This is a table of the production possibilities of each of the three resources (producers), and their costs of producing the two products:

Producer	Johnny	Juanita	Ivanna
Production Possibilities	2 cakes or 4 doz. cookies	10 cakes or 30 doz. cookies	5 cakes or 20 doz. cookies
Cost (per cake) Of One Cake	2 doz. cookies (4 doz. cookies divided by 2 cakes)	3 doz. cookies (30 doz. cookies divided by 10 cakes)	4 doz. cookies (20 doz. cookies divided by 5 cakes)
Cost of Making One Doz. Cookies	1/2 cake (2 cakes divided by 4 doz. cookies)	1/3 cake (10 cakes divided by 30 doz. cookies)	1/4 cake (5 cakes divided by 20 doz. cookies)

Remember that to find the marginal opportunity cost of cake for each person (resource), you divide the number of cookies that the person could make (that must be given up) by the number of cakes that can be made by that same person. To find the cost of cookies, divide the number of cakes that a person could make by the number of cookies the same person can make.

The cost (opportunity cost) of making the goods tells us about **comparative advantage**. Since Johnny can make cake at the lowest cost (2 doz. cookies per cake), he has a comparative advantage in making cake. In our previous Application, we got the most output of cookies for the amount of cake we were producing by first having Johnny make cakes, then Juanita, and lastly Ivanna, basing who was doing what on their relative opportunity costs. That's what the **law of comparative advantage** would have predicted.

Producing the most or the fastest is not the same as having a comparative advantage. The cost, in terms of other goods that must be given up, is the key to finding which resource is used to make each good. In fact, Johnny produces the least cake of any person in our example, but he is even worse at producing cookies, so his cost of producing cake is comparatively low.

From this information, we would predict that Johnny will concentrate on making cakes; if only one or two cakes are desired, Johnny will make them, and if two or more cakes are desired, Johnny will do nothing but make cake. Thus, Johnny will **specialize** in making cake.

Since Ivanna can make cookies at the lowest cost, she has a comparative advantage in making cookies. Even in our previous example, Ivanna was specializing in making cookies (it just wasn't obvious because we were focused on cakes). Since she has the lowest cost of making cookies, Ivanna will produce cookies if anyone does. She might even make nothing but cookies, if few cakes are desired.

Who tells us what to produce?

You may have realized that what we have said so far might apply to several workers working in a bakery, especially if someone is managing the workers and knows

all about their different opportunity costs of making different goods. In the real world, there is no manager who knows what costs each of us has, and there is no person directing us to make one thing rather than another. So how does this comparative advantage and specialization stuff fit into the real world? Instead of a manager economizing and deciding what productive activities each of us will specialize in, we together do it through **trade**.

Since each of us is economizing to obtain things we want, we will be willing to trade to get some good or service if and only if trading entails a lower cost than producing the good or service for ourselves. Remember, we dealt with that in the example at the end of Chapter 2, on page 21. Also, since we will be economizing as we trade, we will be seeking out the lowest cost way of obtaining goods. As a result, we will be drawing-out the low cost producers of each good, encouraging them to specialize. As more and more of us request them to produce goods or services for us that they can produce at low cost, they will find themselves doing little else but producing the goods for which they have a comparative advantage.

Instead of one big manager having to know everything about everyone's comparative advantage, we inform one another of our relative opportunity costs of obtaining items, as well as the utility we expect to get from the items, when we trade. In exposing the trades we are willing to make, we inform each other of the costs of obtaining goods elsewhere (including by producing the items ourselves). We thus each learn what matters to us—how our costs of producing things compare with the costs of others (so as to take advantage of the cost differences and specialize appropriately).

The prices of goods (or the terms of trade) must be at least somewhat reflective of cost. The payment a producer receives for a good must be at least as great as the payment the producer would receive by producing something else (the product he or she is giving up producing). However, other people would only be willing to make such payment if it were less than they would have to give up to obtain the good some other way.

How does trade based on production help us?

Each of us, by seeking the lowest cost ways of obtaining benefits (such as a haircut, a clean house or a cake) weighs the cost of self production against the cost of obtaining those benefits from others. Not only that, but we seek out the others who offer to do things for us at the lowest cost, and so contribute to other people (as well as ourselves) finding their comparative advantages.

Since trade is voluntary, **both the buyer of a good and the seller of a good are better off** than they would have been without specialization and trade. The buyer will only be willing to buy a good from someone else only if the price she has to pay represents a smaller cost (in terms of other goods given up) than other ways of getting the good would entail. The producer is willing to sell the good only if the price she gets represents a greater benefit (in terms of the other goods that can be bought with the money) than the cost of producing the good. Thus, **trade creates utility**.

Trade also enables all of us to **produce more output** by encouraging efficient specialization. Trading (or sharing and swapping of some kind) is necessary if a person is to consume something different from what he or she is making. Since the essence of specialization is the production of a good one does not intend to consume, no one would specialize unless there is a way to trade away what one has made and get something else (that she wants to consume) in return. Instead of each of us having to rely upon our own abilities to produce the things we want (whether or not we have a comparative advantage in producing them), we can specialize in producing only the goods for which we have a comparative advantage. We can then seek out other people with different abilities and comparative advantages to obtain the things that they are lower

cost at producing. Trade also thus **allows us to consume a greater variety** of goods, including those that we would never be able to make for ourselves.

Application: Trade, comparative advantage, prices

Let's continue using our earlier example, and show how trade will be affected by the costs of the various producers (see page 33 for the costs). Efficient production would require that Johnny first produce any cakes, for example, that are produced. If there were some central planner assigning tasks, the planner would pick Johnny to make cake first (to be efficient). However, even if there is no planner, this selection could still occur

If each of the producers sells the goods he or she makes directly to consumers, specialization will still take place along the lines of comparative advantage. Consumers seeking the lowest cost way for them to obtain cake would go to Johnny to get them, because Johnny could charge a lower price for cake than either of the other producers. Johnny might be persuaded to sell a cake for the same price as two dozen cookies, but Juanita would charge at least as much for cake as for three dozen cookies, while Ivanna would charge at least as much for cake as for four dozen cookies.

Another thing you can see from this kind of example is that the money prices of the goods must fall into a range of values, based on cost. In the above example, the money price of cake has to be at least as big as the money price of two dozen cookies. If not, Johnny would not want to produce any cakes, since doing so would not pay him as much as he could make by producing cookies. However, if the money price of cakes were more than four times the price of a dozen cookies, even Ivanna would make more money producing and selling cake rather than cookies. If she makes one dozen cookies, she gives up making one-fourth of a cake. If making one-fourth of a cake paid more than making a dozen cookies, Ivanna would never want to make cookies, so no cookies would be produced.

Thus the money price of cake must be somewhere between the price of two dozen cookies and the price of four dozen cookies, if both cakes and cookies are being produced. To figure out the range of prices, suppose that a dozen cookies sell for \$1 (one dollar is easy to work with). Since a cake costs two dozen cookies in opportunity cost if Johnny makes it, the money price of a cake has to be at least \$2 for Johnny to make a cake. Since the opportunity cost of a cake is four dozen cookies if Ivanna makes it, the price of a cake can't go much beyond \$4, or Ivanna will just make all cake (since she makes more than the \$4 she would get by making the four dozen cookies the cake is costing her). So, cake has to sell for between \$2 and \$4.

Notice that Juanita can produce more cakes in a day than either Johnny or Ivanna. Also, Juanita can produce more cookies in a day than either Johnny or Ivanna. That means Juanita has an absolute advantage in producing both of those goods. This implies that Juanita will make more money selling her baked goods than either Ivanna or Johnny will. For example, suppose that the price of cakes is \$3.50, the price of cookies is \$1 per dozen, and 10 cakes are consumed. These prices are in the range we discussed above. Johnny will make two cakes and thus earn \$7 ($2 \times \3.50). Ivanna will make 20 dozen cookies and thus earn \$20. Juanita will make 8 cakes (the cakes people want in addition to those Johnny makes) and have enough time to make 6 dozen cookies as well. Thus, Juanita will earn \$28 ($8 \times \3.50) from cakes and \$6 from cookies, for a total of \$34.

Questions for Review and Practice

1. In your own words, describe what production possibilities are.
2. What are your personal production possibilities when you spend an hour to study? What sort of products can you produce and what are the alternative things you could do with the hour?
3. How do you think that a decision maker can end up inside or below the production possibilities curve? In the Johnny, Juanita, and Ivanna example, how could their manager end up with a mix of cookies and cakes that is inside the production possibilities curve of the three producers?
4. What does the slope of the production possibilities curve show; what significance does it have?
5. Give an example of some change that would move the production possibilities curve to the right for three bakers (such as Johnny, Juanita, and Ivanna) working in a bakery.
6. In what productive activity do you have a comparative advantage? How do you know? Do you have to be better than everyone else to have a comparative advantage?
7. If we apply the law of comparative advantage to countries, which good or goods will a country end up producing?
8. How do you think the people of a country will be affected if the country specializes in producing goods in which it and its people have a comparative advantage? Why?
9. Explain why trade, or some similar mechanism for moving goods from one person to another, is necessary for specialization to occur.
10. Think of someone who you know who specializes in some kind of productive activity (it could be you or someone else). Explain how that person is better off than if he or she did not specialize.
11. A large computer manufacturer needs technically-inclined people to answer customer support questions (following pre-written instructions) over the telephone. A software company also uses technically-inclined people to check software for errors in the program. Three people can perform these tasks according to the following table.

One Day's Production Assuming that

Entire Day is Spent Performing Only One Kind of Task

Worker	Support Questions Answered	Lines of Software Code Checked
Bandhu	15	75
Shen-Tian	12	40
Pulika	10	25

- a. Which worker has a comparative advantage in answering support questions?
- b. Which worker has a comparative advantage in checking software code?
- c. In what task, if any, should Pulika specialize?
- d. Which worker do you think will make the greatest daily wage?

Chapter 4

When Will We Trade and How Does Exchange Affect Us?

In chapter 2, we introduced the idea of trade as a way of getting things at a lower cost. In chapter 3, we explored how trade assists us in understanding the costs of various ways of obtaining goods, and helps us in making production decisions.

Trade doesn't just assist in those kinds of resource use decisions. It helps us live better lives, and that's important to those of us who are alive. Anyway, I don't want to give the story away, but trade (or "exchange" if you are into polysyllabic words) is kind of neat.

This chapter will show us how. It will also deal with some of the difficulties encountered by people trying to trade, and how people have worked around those problems.

By the way, trade doesn't have to be a formal arranged swap with a stranger of one thing for another. It could include exchanges made between husband and wife when they divide household chores. It could include the give-and-take negotiations between members of a committee when they try to decide an issue in which they each have a stake. The things we say about trade will generally also be true any time there is an exchange in which the people each give something up to obtain a different thing.

How do we distribute goods?

So far, we have seen how production works. However, the whole reason for making stuff is for people to get it and use it. Remember, the benefit, satisfaction, and pleasure that people get from stuff is called utility (see chapter 2). One possible goal for a society might be to maximize the total utility that can be derived from a given amount of goods. If goods are allocated or distributed among people in the way that produces the most utility (adding everyone's utility together), there is a sort of efficiency in terms of utility. Efficiency based on getting the maximum utility is also known as **allocative efficiency**.

Suppose we took all of the goods on planet earth and distributed them evenly among the people. Would this be efficient, from a utility standpoint? The answer is NO. If everyone gets the same amount of every good as everyone else gets, each person would end up with some things that he or she really doesn't want very much. For example, each person would have some cigarettes, even if he or she does not smoke, and each would have several cans of dog food, even if he or she had no dog. Clearly, we could take cigarettes away from a non-smoking dog owner, give her dog food instead, and thus increase her utility. Similarly, if we took dog food away from a smoking man who had no dog, and gave him cigarettes in place of the dog food, we could increase his utility. Thus, without changing the amounts of either cigarettes or dog food in existence, we could increase the utility of both people, just by changing who had what. If it is possible to create more utility, then the original situation was not efficient (efficiency did not exist), and the change is efficient (that is, it gets us closer to the efficient distribution of goods).

Other outcomes are possible however. For example, if we move goods around

allocative (allocation) efficiency -distributing goods in a way that maximizes total utility; sometimes called **distributive** or **distribution efficiency**

in such a way as to make one person better off (that is, give her more utility) and another person worse off (that is, leave him with less utility), it is difficult to determine whether the total amount of utility has increased. We could take everything away from Pat and give it all to Chris, thus harming Pat and making Chris happier, but we don't know if the gain in Chris's utility will outweigh the loss of Pat's utility. In general, such inter-personal comparisons of utility are impractical to make. Thus, we will focus on those changes that help at least one person without hurting anyone else.

If it is possible to change the allocation of goods so as to make at least one person better off (in terms of utility) without making anyone else worse off, then the change gets us closer to allocative efficiency, or the change is allocatively efficient. Thus, the new situation (after the change) is more efficient than the original situation.

If no way exists to make at least one person better off without making someone else worse off, then there is no change that is allocatively efficient, and thus no situation that could be more efficient than the current one. Thus, we can say that allocative efficiency now exists. The current situation is efficient.

Who allocates or distributes the goods?

We can imagine some central decision-maker sitting down with a knowledge of everybody's preferences and values, moving goods from person to person until the distribution of goods is more efficient, in an allocative sense, than the way things started out. However, such a decision maker would have to be really smart, and know more about you and I than we probably want any other person to know. Fortunately, there is at least one person who knows (or sort of knows) what gives each of us utility. That's us.

Each of us, given the opportunity, can figure out which goods give us utility and which do not. We know whether we would prefer to have dog food or cigarettes. Individually, we are able to redistribute the goods that exist in a way that creates more utility. The way we redistribute goods is by exchange or trade.

How does trade increase utility?

When kids in the schoolyard swap lunches, they are trading on the basis of values they each place on the food in their lunches. Each child is giving up a lunch item he or she values less highly than the item he or she is getting in return. One of the traits of voluntary trade is that both parties to the trade benefit from the trade (that is, gain utility) otherwise they would not do it (this is ignoring the case in which one person has been tricked into thinking they were receiving something they did not actually get, which is not called "trade," it is called "fraud"). If both parties are being made better off, then the trade creates utility.

Do we have to place the same values on the goods we trade?

For trades to occur the people involved must put different values on the things being traded. No one would go to the trouble of deliberately giving up one thing to get something he valued exactly as much. For example, you might exchange a defective item for one that works, but you wouldn't take an item back to the store and trade it for an item exactly the same in every way. You would only try to swap one item for another if you thought they were somehow different, that is, if you valued the items differently from one another. Similarly, you could only induce others to trade with you if they thought that what they were giving up was less valuable to them than what they were getting.

If Chris sells Pat a used car for \$2000, neither of them really agrees that the value of the car is \$2000. Chris would rather have \$2000 than the car (otherwise, Chris would not have agreed to the deal). Pat must want to have the car more than the \$2000, since Pat acted to give up the money in order to get the car. Thus, Chris and Pat place differ-

ing values on the car relative to the \$2000. One thinks the car is worth a little more than \$2000, the other thinks the car is worth a little less than \$2000.

Where do goods end up?

One result of this is that, through trade, goods tend to end up in the hands of people who value the items the most (among those who can afford them). Notice, if Smith is rich and Jones is poor, it does not necessarily follow that Smith will get everything! If Jones is willing and able to pay more for a particular item than Smith is willing to pay, Jones will still get to buy it. Ability to pay does limit how much you can buy, but willingness to pay determines what and whether you will buy. (This applies also to things that have a large non-money cost, such as education--I am better educated than Bill Gates is, because I was willing and able to pay more for an education than he was).

Which goods will be produced?

Since production of goods requires the use of resources, a corollary is that resources tend to end up in the uses that people value the most highly. For example, suppose the same resources could be used to make either a CD of jazz music or a CD of Crost-T rap music. If the rap music fan is willing to pay more for the Crost-T CD than the jazz fan is willing to pay to have the jazz CD, then the rap CD will be produced. The resources get used to make the rap CD because members of society signal (with their willingness to pay) that making the rap CD is the more valued use of those particular resources.

Altogether, what does trade do for us?

In this chapter and the previous chapter, we have explored how trade affects the use of resources, the choice of which goods will be produced by which producer, our decisions about which goods each of us will consume, and how much utility each of us ends up having. Here's a review of the TOP TEN TRADE FACTS

10. Trade encourages specialization.
9. Trade promotes productive efficiency (by promoting specialization).
8. Trade occurs if production (opportunity) costs differ.
7. Trade involving producers will occur on the basis of comparative advantage.
6. Trade increases utility (creates value).
5. Trade benefits both parties (if no fraud occurs).
4. Trade occurs if people place different values on the same items.
3. Trade is productive (produces utility, even when no new goods are produced).
2. Trade tends to move goods to the users who value them most.
1. Trade tends to move resources into their highest-valued use.

I know, there are no funny ones. But trade isn't funny... it improves our lives in ways that other things could never imagine because they are not alive, but if they could, I mean. We take trade for granted. It's better than chocolate, and it doesn't make you fat. Unless you are trading to get chocolate. Even then, it would be the chocolate and not the trade making you fat. Let's put the blame squarely where it belongs. Chocolate makes you fat, ...at least if you eat too much of it.

Is trade entirely self-centered?

When a person trades, she is merely trying to get something that she wants, either a good or payment for some good that she has made. However, trade has a hidden result.

In pursuing an exchange with another person, each of us must consider how we can offer the other person something that will make her or him happier. We have an incentive to find out what other people want and provide it to them, whether we are

producing it or simply possess it. The philosopher/economist Adam Smith called this result of trade the **invisible hand**. When we trade with other people, our goal may be to acquire things that we desire. However, we are guided, as if by an invisible hand, to make things for others, do things for others, or provide things to others, because that is how we best acquire what we want. The nature of voluntary trade and exchange is that we must concern ourselves as much with what other people want as we do with what we want.

Application: Is trade always efficient?

I hope you have some appreciation for the productive and allocative efficiency that trade creates. However, despite all of the efficiency that trade generates, most societies (including our own) have decided to limit or outlaw certain trades. Some people obviously think that some trades actually diminish efficiency, harm productivity, and reduce utility.

Legally, you can't sell one of your kidneys, you can't buy certain drugs, you can't sell or buy child pornography, you can't buy or sell sexual favors, and you can only buy alcohol or tobacco if you are over a certain age.

Some people even want to ban or restrict the trade in chocolate (because it makes you fat...if you eat too much of it).

Can you think of who these limitations help and who they hurt? Would any of the restrictions increase productive efficiency? Would any of them increase allocative efficiency?

What control over goods is needed to trade?

Any discussion of trade requires an examination of what it is that is traded. Trade can only occur if there is recognition that “yours” and “mine” mean different things. Otherwise, if you possess something I want, I can just club you over the head and take it. Trade requires the recognition of **property rights**, that you have the right to keep and use things you own until and unless you choose to sell them or give them away.

Almost always, these rights to property are limited in some way. For example, while your shoes are your property, and you can do most anything you might want to with them, you cannot throw them at me and hit me in the head without facing the consequences. Also, ownership rights, when others recognize them, prevent some forms of competition that might otherwise take place for the scarce goods and resources around us. If property rights did not exist, and if they were not recognized and enforced by society, it is possible that the “law of the jungle” might prevail; that is, violence might be a much more common way of obtaining things.

In a world without property, when Bono sees that Beyoncé has a gold bauble that Bono really wants, since the gold bauble doesn't really belong to anyone, Bono can have it if he can take it away from Beyoncé. Without ownership of some kind, Beyoncé has no more right to the gold bauble than Bono does, and thus Bono does not have to convince Beyoncé to give up the gold bauble in order to obtain it. All Bono needs to do is grab it and run (and try to keep other people from thereafter grabbing it from him). Without some recognized ownership of some kind, everything is up for grabs, and all of us would be doing the grabbing (or worse) in order to survive (or fighting off the grabbers). We would all be as dogs fighting over a bone, and the strong would leave the

invisible hand -the principle that trade will lead a person to provide things that other people want, even though his intention is to acquire some thing that he wants

property rights -rights, generally recognized by other people, to use or sell an item

weak with no appeal. As Thomas Hobbes put it “...continual fear and danger of violent death; and the life of man, solitary, poor, nasty, brutish, and short.” (*Leviathan*, pt. 1, ch. 13, 1651). On the other hand, with property (ownership) rights defined and recognized by society, certain kinds of (violent) competition are reduced. According to Jean Jacques Rousseau, “The first man who, having fenced in a piece of land said, ‘this is mine,’ and found people naive enough to believe him, that man was the true founder of civil society.” (*Discours*, 1754).

To my knowledge, the above is the first instance in all human history of Hobbes, Rousseau, Bono, and Beyonce being mentioned together in the same paragraph. I couldn’t be prouder.

With property rights defined and protected (recognized by society) if you want something that someone else has, you must appeal to him or her to **voluntarily** give it up. Usually, this is accomplished by offering them something they would rather have (by buying, trading, or bribing). There is still competition of course, but it is competition among potential buyers vying to make the owner a more attractive offer than those of their rivals.

Since the owner of a thing has the right to use or sell it, **property rights give owners an incentive to take care of what they own**, even if they do not intend to use it themselves. Since the salable value of an item depends on its use to people in the future, owners will generally want to preserve or conserve what they own for future users. A homeowner will maintain her home, even if she does not like living in it, since she has a personal stake in the home’s value to future occupants--she will realize a higher selling price if the home is maintained in good condition.

When property rights are difficult or impossible to define or enforce, users do not generally have such incentives to conserve. For example, oceans and lakes are over-fished, since the users of these resources see primarily the current benefits of catching fish. Any fish left uncaught will end up belonging to someone else, so there is little personal gain if a fisherman leaves fish behind. In an example from the “old west,” cattle had clear ownership assigned to them, and the owners thus had incentives to make sure the cattle herds were protected from thieves and the elements. Therefore, we still have plenty of cattle. On the other hand, buffalo belonged to no one in any legal sense. Thus, the person who encountered a buffalo could kill it (for its hide and meat) right away or leave it alone. If a hunter left a buffalo alone, it would be unlikely that the hunter would ever get another chance to kill that buffalo, since other hunters would probably get to it first. Not killing a buffalo right away pretty much guaranteed that the hunter would never get to possess the meat and hide of that particular buffalo. So, a hunter would take a buffalo the first time the opportunity presented itself, and few buffalo were left.

In addition to providing people in society with personal incentives to preserve what they own, **property rights enable members of society to assess responsibility for the use of a good or resource**. If I allow someone to use my car, society will charge me with the damage if that person runs into something. I am responsible, so I have an incentive to make sure that my car is not used irresponsibly. Similarly, since I will be charged with the damage if my dog bites someone, I will attempt to restrain my dog if it is prone to bite people. Thus, property rights help us define who will pay for irresponsible use of a thing, and thus give owners incentives to avoid irresponsible use of the thing.

Of course, the rights that an owner has also enable that owner to act in a way we might consider selfish (normatively speaking). An owner of a thing might choose to withhold it from a use that is very valuable to society. Even so, with property rights, the owner will probably be faced with very real personal costs if he ignores the wishes of others, since the owner will probably have to give up trades or other (non-money)

benefits if he keeps his property from others who would wish to use it.

When will trade be difficult?

When trades occur, parties to the trade encounter **transactions costs**, which are costs associated with the **action** of trading or **transferring** goods. Transactions costs are not the same as the price that must be given up to obtain something or consume it. Rather, they are the costs associated with finding trading partners, deciding upon a mutually agreeable trade, communicating the conditions and terms of trade, and arranging for transportation of the traded items.

Transaction costs fall into two main categories: **information costs** and **transportation costs**. For example, if a trader, Barbie, wishes to barter (trade one item directly for another), she must hunt around for another trader who has what she wants to get and wants the items that she has to trade. This requires that she and her trading partner have a “*double-coincidence of wants*,” since each must have what the other trader wants, and must want the thing that the other has. The costs associated with locating such a partner are a kind of information cost, since they require finding information about potential trades. Finding a trading partner could be difficult, especially if the items a person has to trade or wants to obtain are unusual.

Transportation costs are also a part of transactions costs, since traders have to give up something to get to each other or get their goods to each other. If you have ever purchased a \$5 item through eBay or bought a similarly low-price item from a retailer located across the country (or in another country), you might have even paid more to get the item transported to you than you paid for the actual thing you were buying.

While transactions costs include the costs of acquiring information and transporting goods, they also include other costs of getting to trade with another person, such as the costs of waiting to trade or waiting for traded items to be received. These kinds of transactions costs are often related to information or transportation costs, but need not be. For example, if you have to wait in line before you can buy an item, that would be a transactions cost (since the trade has not yet occurred). However, it would be tough to say that it is due to the cost of information or the cost of transportation.

Middlemen reduce transportation and information costs. A middleman is simply an intermediary that comes between the creator of a good and its consumer. Retailers, wholesalers, brokers, and the like are all middlemen. Such sellers make it unnecessary for buyers to actually locate all the potential suppliers of a good they wish to purchase. Instead, the middleman locates the suppliers, transports the goods to locations near the buyers, and provides buyers with information about price, availability, and sometimes other information as well. Middlemen thus often lower both information and transportation costs.

One invention to reduce information costs is **money**. Money makes it easier to find trading partners. Usually, it is easy for a trader to find some person who will pay money for the item a trader has, and then find someone who will accept money for the

transactions costs -costs leading up to actually trading and that make trading harder; the costs of finding people to trade with, transporting goods, negotiating the trade, etc.

middlemen -people who specialize in reducing the transactions costs of other people

money -an item that is commonly used in exchanges, and is desired because of its value in exchanges, even though it is not consumed or used itself

item she wants to obtain. Trading away what one has for money, then trading the money for what one wants means that money comes in-between the trades. For this reason, money is sometimes called the **medium of exchange**. Money eliminates the need for a double-coincidence of wants among traders, and thus reduces the (information) costs of transacting. For this reason, most modern trades are not swaps of one good for another, but rather involve money.

Another invention that lowers information costs is a **market**. A market is simply a setting or occasion in which traders come together and work out their terms of exchange. A market does not have to be a physical location, although it often is. Information about potential trades is easier to obtain (at lower cost) in a market, since all of the people in such a setting are signaling their willingness to make exchanges. In addition, a physical marketplace might also reduce transportation costs associated with trading, since it is not necessary for traders to carry their goods all over from one possible trading partner to another. Instead, the goods could be taken to a central location, where all potential trading partners can judge the goods.

Despite the invention of money, markets, and middlemen, transactions costs are a part of nearly every trade. If you must wait in line to buy groceries, or look in the newspaper to find where a particular movie is playing, or stop at the automatic teller machine on your way to the 7-eleven, you are bearing transactions costs.

Modern trades are much like those involving barter (swapping of one good for another), except that using money as a medium of exchange separates trading into buying and selling. With barter, these are essentially combined into each swap. Understanding the separate acts of buying and selling will require us to develop two new economics tools, demand and supply, which are discussed in the next chapter.

medium of exchange -an item that is received in one exchange only so it can be traded away in another, and is desired only for this function; an item that is in the middle of most or all trades. Using a medium of exchange reduces transactions costs. Money is a medium of exchange.

market -a setting in which people negotiate and exchange with others

Questions for Review and Practice

1. What is allocative efficiency? How does it differ from productive efficiency?
2. If Jimmy Lightfingers would get a lot of utility from your television set, and steals it from you, is he promoting allocative efficiency? Does your answer change if you were planning to sell the television set anyway?
3. Why are we sure that trade is allocatively efficient?
4. What are the incentives that private ownership of a resource or good gives the owner?
5. A 64-year-old orange grower (who owns the land her groves are planted on) plans to sell her groves and retire in 3 years. Right now, she has some vacant space where she could plant new trees, but they will not produce fruit for another 5 to 10 years. Will she still plant the trees?
6. Some states have laws that make it illegal to re-sell tickets for sporting events or concerts at prices above the original purchase price ("ticket scalping"). Who might be hurt by such a law? Who might be helped by such a law?
7. Are middle men productive? If so, what do they produce?
8. Do middle men help society reach productive efficiency? Do they help society reach allocative efficiency?
9. Does money produce anything? Does money help society reach productive efficiency? Does money help society reach allocative efficiency? Explain.

Chapter 5

What Will Buyers and Sellers Do and What Are The Results?

People sometimes trade one item directly for another, such as when a husband agrees to cook dinner and do the dishes in exchange for his wife making sure he has a clean shirt to wear the next day. This kind of trade is called barter. In such a trade, the act of giving one thing up and the act of gaining another thing in return are integrated into one, much as the chocolate chips and cookie parts of a chocolate chip cookie.

Perhaps more commonly though, a person will sell an item, such as his work, and use the money to buy another item that he desires, such as the services of a laundry to clean a shirt. In such instances, the acts of selling and buying are separated in time and effectively require separate decisions. These kinds of trades are the focus of this chapter.

Still, in both kinds of trades (barter and money trades), a price has to be paid. The price is not always in terms of money. Even if a person goes to a laundry to have his shirts cleaned, there may be costs that have to be paid to get the good, such as time, in addition to the money that is charged for the service.

When we refer to the price someone must pay to obtain a good, we will generally mean the cost of obtaining it. The money part of the cost is easier to keep track of in most trades, and our tendency is to focus primarily on that aspect of the price. However, try to remember that sometimes the price can include non-money costs as well.

What do buyers do?

We will use the tool called demand to analyze and model the behavior of buyers. As we shall see, buyers respond (adjust their desire to purchase a good) when the price they must pay for the good changes. **Demand** is the relationship between the price of a good and the quantity of it that buyers are willing and able to buy, per time period, *ceteris paribus*.

The word “demand” is never correctly used to indicate a quantity or amount purchased; demand is the relationship between price and the quantity desired for purchase. The quantity that buyers are willing and able to buy at a particular price is called the **quantity demanded**. This distinction will avoid confusion later on. Another thing to note is that the quantity desired in the relationship is an amount desired in a particular time frame (such as pounds per week or gallons per year). Sometimes the time period is not explicitly stated, but some time period is always implied. The last thing to note is that the demand relationship is always considered as isolated from other things that might affect the quantity desired of a good. Things other than price that might alter the quantity desired of a good are assumed to be constant, or assumed to be staying unchanged. The importance of this assumption is that if something other than price does change, then the demand relationship also changes.

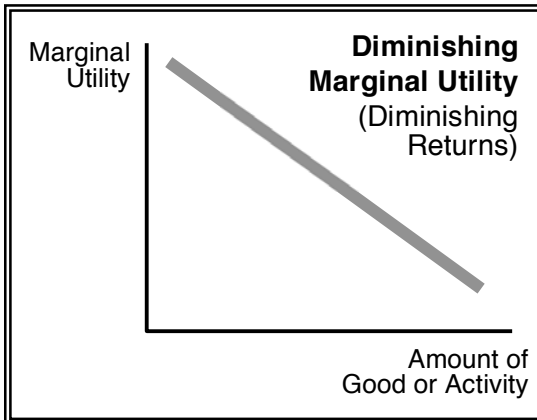
demand -the relationship between the price of a good and the quantity of the good that buyers are willing and able to purchase, *ceteris paribus*

quantity demanded -the amount of a good that buyers are willing and able to buy at a particular price, given existing circumstances

What determines demand?

Marginal utility determines demand. A buyer weighs the marginal utility she expects from a good against the opportunity cost of obtaining the good, in terms of other things of value that could have been bought with the money price that has to be paid for the good. If the utility expected from the good were higher than that cost (price) then the buyer would be willing to buy the good.

We have already seen that the value (utility) a person gets from an additional



unit of a good falls as more of the good is consumed (see chapter 2, page 17). This is the principle of **diminishing marginal utility**. Based on diminishing marginal utility, since the utility a person places on additional units of a good falls as she obtains more of it per time period, the price she would be willing to pay for an additional unit would also fall as she consumes greater quantities of it, *ceteris paribus*. Thus, diminishing marginal utility would lead us to conclude that the relationship between the quantity purchased and the price one is willing to pay for an additional unit of a good would be an inverse or negative relationship. That is, as quantities rise, marginal utility (and the price a person would willingly pay) will fall.

Another factor comes into play here as well. Assume that the amount of money that each buyer has remains constant (remember the *ceteris paribus* assumption). At lower prices, the quantity of the good that each buyer can afford to buy will be larger. Thus, for the lower prices, the number of buyers who are able to afford the good will be large. On the other hand, as price rises, the quantity of the good that each buyer will be able to buy with the money he has will get smaller, and thus, so will the number of buyers who are able to afford the good. This basic mathematical relationship will also lead to a larger quantity of a good being desired for purchase at lower prices, and smaller quantities being demanded at higher prices.

What is demand like?

Due to utility and mathematics, we expect that high prices are associated with small quantities being purchased and vice versa. This is so universally observed in real life that it is called a “law,” which is strictly enforced by the police force of human nature. The **law of demand** says that the relationship between price and quantity demanded of a good (per time period), *ceteris paribus*, is a negative or inverse relationship. That is, demand is a negative or inverse relationship, so that higher prices and lower quantity demand go together, as do low prices and high quantity demanded. Again, the *ceteris paribus* assumption is made so that it is clear that only price and quantity demanded are being altered. If something else is changed (such as the amount of money a person has in her possession), the law of demand says nothing about the change.

The demand relationship can be presented (and used as a tool) in several ways. One is tabular, or as a table of numbers, where each price is paired with a corresponding quantity demanded. Below is an example (where P is price and Qd is quantity

law of demand -the rule that says that price and quantity demanded are inversely related, *ceteris paribus*; higher price means lower quantity demanded, and lower price is associated with higher quantity demanded.

demanded):

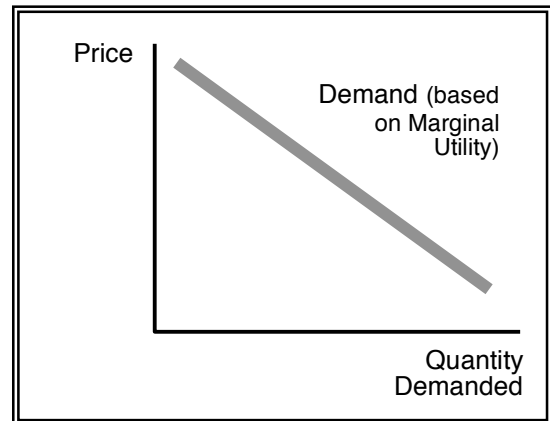
P	\$10	\$9	\$8	\$7	\$6	\$5	\$4
Qd	0	10	20	30	40	50	60

Actually, this is a partial example, since ideally one might want to know the quantity demanded associated with any price, not just the few shown above. Notice that the table does show the relationship between P and Qd, and that as P gets smaller, the Qd associated with it gets bigger.

Another way to show demand is with a mathematical formula. For example, the relationship in the above example could be expressed by either of the formulas below:

$$P = \$10 - .1Q_d \text{ or } Q_d = 100 - 10P.$$

A third way to express demand, and the way we will generally find most convenient, is graphically. Since price and quantity demanded are related, we could show their relationship by graphing it. Traditionally, we do this by putting price on the vertical axis and quantity demanded on the horizontal axis. The resulting graph is called the **market demand curve**, and it will always be a downward-sloping line or curve. At each price, there is a different quantity demanded on the curve, and as price gets smaller, the associated quantity demanded gets larger.



For all three ways of representing demand, it is important to note that **demand is always a relationship**. It is the entire table, or the entire formula, or the entire graph, since no part of these alone would show a relationship between price and quantity demanded. Please note that if the price of a good changes, its demand does not change. Quantity demanded of the good will change, but the table, formula, or curve representing the demand relationship between price and quantity demanded of the good will not change.

What happens if one of the things we held constant or the same or ceteris paribus changes? In that case, the demand relationship changes and we have to either make a new table or compose a new formula or draw a new curve to represent the new relationship. We'll see how to do this in the next chapter.

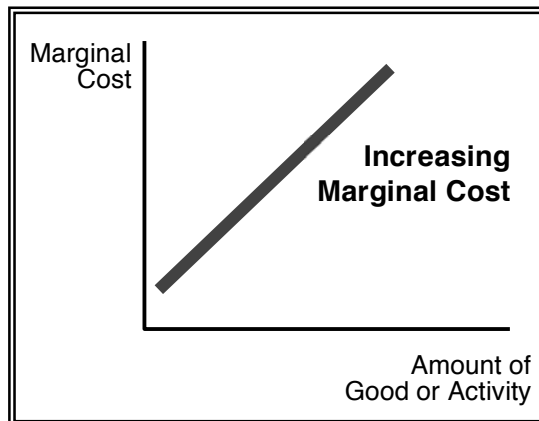
market demand curve -the graph showing the quantity demanded by buyers at every price

What do sellers do?

We will use the tool called supply to analyze and model the behavior of sellers. As we shall see, sellers respond (adjust their desire to sell a good) when the price they are offered for the good changes. **Supply** is the relationship between the price of a good and the quantity of it that is supplied (offered for sale) by sellers, per time period, other things being equal. This statement indicates that the word “supply” is never correctly used to indicate a quantity or amount offered for sale; supply is the relationship between price and the quantity offered for purchase. The quantity of a good that the sellers are willing and able to sell at a particular price is called the **quantity supplied**. This distinction is similar to the one we made concerning demand, and getting it straight will also avoid confusion later on. Another thing to note is that the quantity offered for sale in the relationship is an amount offered in a particular time frame (such as pounds per week or gallons per year). Sometimes the time period is not explicitly stated, but some time period is always implied. The last thing to note is that the supply relationship is always considered as isolated from other things that might affect the quantity offered for sale. Things other than price that might alter the quantity offered for sale of a good are assumed to be constant, or assumed to be staying unchanged.

What determines the supply?

In essence, supply is determined by the **marginal opportunity cost** of selling something. For example, each of us might work for an employer if the employer offered to pay us enough to compensate for the other things we are giving up to work for her. A merchant might be willing to sell you an antique if you are willing to compensate him by paying him more than he can get from another potential buyer. Notice, that the supply relationship is determined by the marginal cost of selling (parting with) a good or resource, NOT necessarily the cost of making or replacing it. If fruit is about to spoil, the cost to a grocery store of selling it may be much less than the cost of replacing it or the price originally paid for it by the store. Similarly, if an object has collector value, the cost of selling it may be much higher than the money or time costs of originally



producing it, or the costs of duplicating it.

Since the marginal opportunity cost of doing or obtaining something rises as one attempts to do a greater amount in a given time period, there will tend to be a positive relationship between quantity supplied and price (suppliers will request a higher to produce or offer for sale a larger quantity in a given time period).

supply - the relationship between the price of a good and the quantity of it that sellers are willing and able to sell in a particular time period, *ceteris paribus*.

quantity supplied - the amount of a good that sellers are willing and able to sell, at a particular price

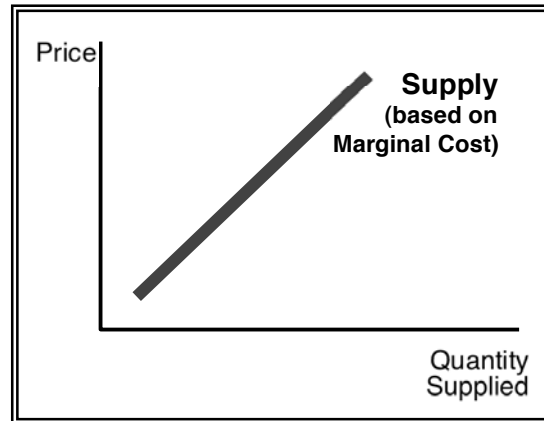
As with demand, the supply relationship can be presented (and used as a tool) in several ways. One is tabular, or as a table of numbers, where each price is paired with a corresponding quantity supplied. Below is an example (where P is price and Qs is quantity supplied):

P	\$0	\$1	\$2	\$3	\$4	\$5	\$6
Qs	0	10	20	30	40	50	60

Another way to show supply is with a formula. For example, the relationship above could be expressed by the formulas

$$P = \$0 + .1Q_s \text{ or } Q_s = 0 + 10P.$$

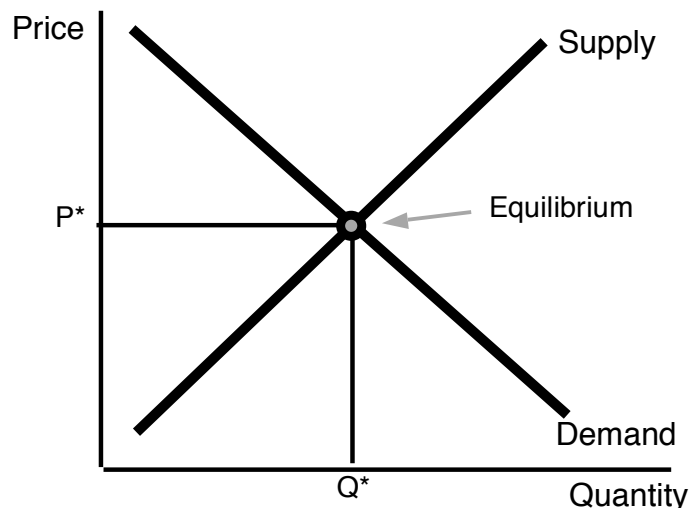
As with demand, the expression of supply we will most rely upon is graphical. Again, we put price on the vertical axis and quantity supplied on the horizontal axis. However, the resulting supply relationship will generally be an upward-sloping line or curve (not downward sloping, as demand is). At each price, there is a different quantity supplied on the curve, and as price gets larger, the associated quantity supplied gets larger.



It is important to note that supply, like demand, is always a relationship. It is the entire table, or the entire formula, or the entire graph, since no part of these alone would show a relationship between price and quantity supplied. Please note that if the price of a good changes, its supply does not change. Quantity supplied of the good will change, but the table or formula or curve representing the relationship between price and quantity supplied of the good will not change.

What happens when buyers and sellers get together?

If we put supply and demand together, we can model the simultaneous desires of buyers and sellers, at a particular time and given current circumstances. To show buyers and sellers together, we put the supply and demand curves into the same diagram. Doing so reveals that there will be only one point at which the curves cross. This point is called **equilibrium**. Since the demand curve shows the quantity demanded at all prices, and the supply curve shows the quantity supplied at all prices, the single point at which the curves cross has a special significance. It represents the place where buyers' responses to price (the amount they wish to buy) exactly match sellers' responses to price (the amount they want to sell); it shows the one price at which the quantity demanded exactly



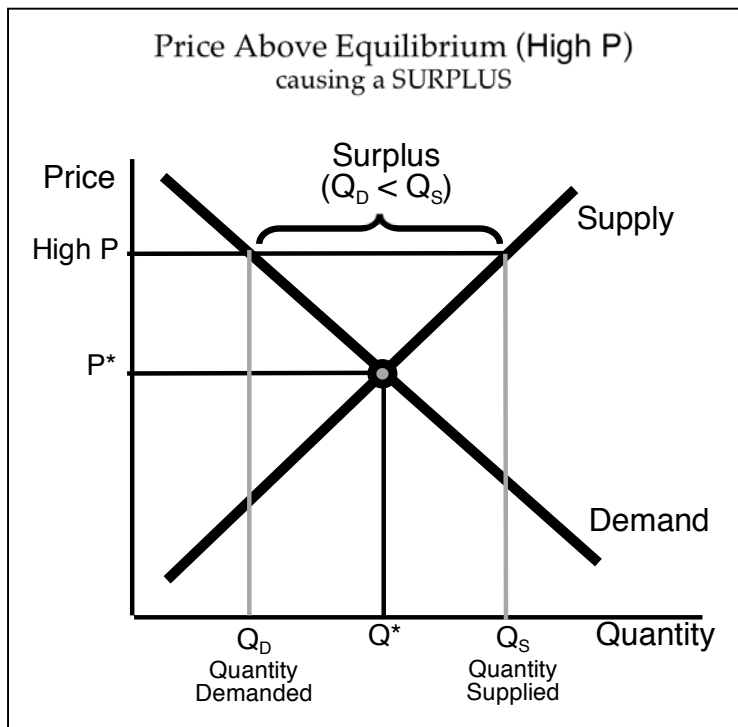
equilibrium -the unique price and quantity combination at which the quantity demanded equals the quantity supplied; the market will tend to (move to) the price and quantity of equilibrium

equals the quantity supplied. We can call this price the equilibrium price (P^* on the graph) and we can refer to the quantity as equilibrium quantity (Q^* on the graph). Equilibrium quantity really is both the quantity demanded and the quantity supplied, since they are equal to each other in equilibrium. For simplicity, and to spotlight the situation that quantity demanded equals quantity supplied in equilibrium, we will simply use the term “equilibrium quantity” or “quantity” to refer to quantity demanded and quantity supplied at equilibrium.

What if the market is not in equilibrium?

Equilibrium is more than just where buyers' behavior and sellers' will coincide with one another. Equilibrium is where the market is (or will soon end up); it is the combination of price and quantity that exists now, or that will be realized very soon. Not to get Star Warsy or spooky in you or anything, but Powerful Forces (called "market forces") are at work to bring price and quantity to their equilibrium levels. If price and quantity happen to wander away from their equilibrium levels in a market for a good, these market forces will push price, quantity demanded and quantity supplied to equilibrium.

To see the forces at work to bring a market to equilibrium, let us first suppose

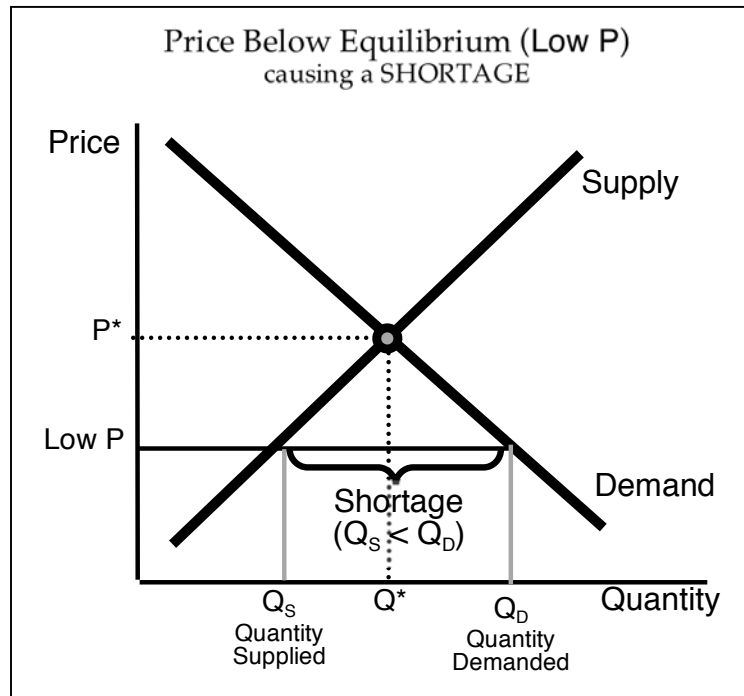


that price is initially above the equilibrium price. At such a higher price, the quantity demanded would be less than in equilibrium (due to the law of demand), and quantity supplied would likely be more than would be the case at the equilibrium price. Thus, quantity supplied would exceed quantity demanded at such a high price. This situation is called a **surplus** or **excess supply**. Sellers seeing this excess supply will reason that they could cut back on the quantity offered for sale, and lower price to entice people to buy the surplus. Buyers may even assist in this process by offering to buy some of the product if the price is reduced (in other words, by bargaining). The actions of both buyers and sellers will thus tend to lead to a reduction of price. Once the equilibrium price is obtained, there no

longer exists a surplus, so there is no longer any further force pushing price down.

surplus -quantity supplied greater than quantity demanded at the current price. Also called an **excess supply**.

Other forces come into play if the price is originally below the equilibrium level. At a price below equilibrium, quantity demanded is greater than in equilibrium (at a low price there is a higher quantity demanded). At a price below equilibrium, quantity supplied will probably be less than at equilibrium. Therefore, quantity demanded will exceed quantity supplied and there will be a **shortage** or **excess demand**. Because of the shortage, demanders will be unhappy with their inability to buy the good they desire (they may be lined up to buy it). The buyers may even offer the sellers side payments or bribes in exchanged for a certainty of buying the good (for example, they may offer to pay extra to cut in front of the line, or to be put first on the waiting list if there is one, or to have some of the good saved for them). The sellers, seeing the large quantity demanded for their product may reason that they could offer a larger quantity for sale at a higher price than the product now has and still sell all of the product offered for sale. These forces will together work to raise price if it is below equilibrium.



If the market forces pushing price down are in balance with those pushing price up, then equilibrium exists. At equilibrium, the forces pushing price and quantity are equal, or in balance with each other. Thus, equilibrium is the ultimate resting place of price and quantity.

shortage - quantity demanded greater than quantity supplied at the current price. Also called an **excess demand**.

Questions for Review and Practice

1. Which curve is based on the marginal utility (value) that buyers get from consumption of a good? What does it look like?
2. In your own words, explain why demand curves slope down. What is the rule that says this is true?
3. Does the demand for air conditioning in Phoenix during the summer obey the law of demand? What would it say about the price and quantity demanded of this good?
4. When a family's income rises, they tend to buy more restaurant meals. This is true even though the price of restaurant meals has not changed. Is this a violation of the law of demand?
5. What is the concept underlying supply? In other words, what determines supply?
6. How can we tell when a market is in equilibrium?
7. Water is necessary for life, and yet it is inexpensive. Oil is not really necessary for people to stay alive, and yet is much more expensive than water. Why is this? What explains a good's price?

Chapter 6

When, Why and How Does Equilibrium Change?

Given a particular demand and a particular supply, the price and quantity traded in a market will be the equilibrium price and quantity. As long as that demand and that supply continue to reflect what buyers and sellers are willing to do, the price of the good will remain at the equilibrium price. Also, if the quantity of the good that is bought and sold each day or week or month will remain at the equilibrium quantity.

However, you no doubt have noticed that prices of some items will change over time, as will the amounts people buy of those items. Every time you see the price of a good changing or see people changing how much of it they are buying, it is a sign that a new equilibrium has been created in the market for that good. This happens when buyers or sellers (or everybody) have changed how they want to respond to the good and its price. In other words, a new equilibrium is created if demand changes, if supply changes, or if both demand and supply change. The new equilibrium may take some time to reach; indeed, things might change again before the market reaches its new equilibrium. Still, the observed price of a good and the quantity of it that is traded will move in the direction of the new equilibrium price and quantity.

In this chapter, we will explore what we mean when we say that demand has changed or that supply has changed. Also, for each of the changes, we will see what happens to equilibrium as a result.

What is a change in demand?

A change in demand occurs if the quantity demanded by buyers at every price is different from what it was before. That is, at each price for the good, buyers want to buy an amount of the good that is different from the quantity they were willing to buy before. This is a change in the whole demand relationship.

What is an “increase in demand” and what does it look like?

One kind of change in demand occurs if buyers want to buy more of the good, at every price, than they wanted to buy before. When this occurs, we say that there has been an **increase in demand**. Such a change would alter the example table we had in the last chapter from

P	\$10	\$9	\$8	\$7	\$6	\$5	\$4
Qd	0	10	20	30	40	50	60

to something like

P	\$10	\$9	\$8	\$7	\$6	\$5	\$4
Qd	10	20	30	40	50	60	70

Notice that the quantity demanded is larger (by ten) at each price.

If we were using a mathematical formula to represent demand, the formula would also have to be rewritten, to show that a greater quantity demanded now goes

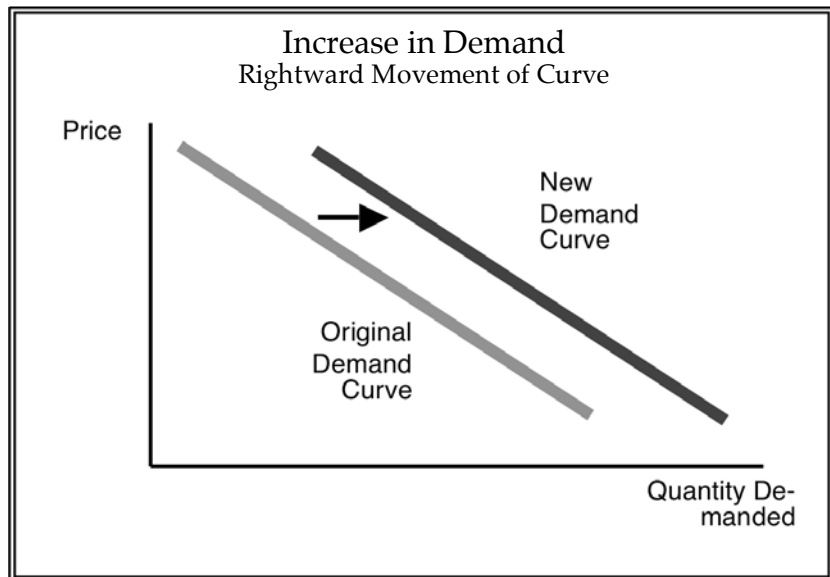
increase in demand -the change that occurs if buyers desire to buy a larger quantity of the good, at every price, than they were willing to buy before (quantity demanded is larger for each price)

with each price. In this case, our example formulas

$$P = \$100 - .1Q_d \text{ or } Q_d = 100 - 10P,$$

would have to be changed to

$$P = \$110 - .1Q_d \text{ or } Q_d = 110 - 10P.$$



Similarly, we would have to redraw the market demand curve to reflect the higher quantity demanded at each price. This would mean drawing a new demand curve, upward and to the right of the original curve. Such a curve indicates that at any price, the quantity demanded is now bigger than before. It is still true, however, that if the price of the good is raised, the quantity demanded will be smaller and if the price of the good is lowered, the quantity demanded will be greater. It is just that now ALL of the quantity numbers are larger than they were

before the change in demand occurred. An increase in demand means that every price now has a new, bigger quantity demanded associated with it:

What causes an increase in demand?

An increase in demand means that at every price, the quantity demanded is greater than before. This can happen if the good, the buyers, or the market changes in some way.

One example of this is if a good's market changes so that the good has a larger **number of potential buyers**. For example, the demand for zercs (a good) might go up in the town of Dweebville simply because the population of Dweebville is rising over time. More buyers in the town means the quantity demanded will be higher at each price. Any change that increases the number of buyers of a good will increase demand.

Another situation that will usually affect demand is a **change in the incomes of buyers**. As a person's income goes up, she may be able to afford, and thus be willing to buy, more of a particular good (zercs, for example), even if the price of the good does not change. If the incomes of many buyers are increasing, we would thus expect a larger quantity demanded for the good, at each and every possible price, than before. Goods for which higher incomes of buyers increase the demand in this way are called **normal goods**. Most goods are normal goods. For some goods, however, the opposite happens. These goods are called **inferior goods**, and for inferior goods, as incomes of buyers rise, the demand falls (quantity demanded is lower at every price than previously, and the demand curve moves to the left). Examples of inferior goods are lard, generic-branded products, bus rides, McDonald's dining, and any other good that peo-

inferior goods -goods for which the demand decreases as the incomes of consumers go up (or the demand increases as incomes of consumers fall). Inferior goods are fairly rare.

ple tend to consume less often as their incomes rise. For inferior goods, if incomes of buyers **fall**, demand might increase.

Demand for a good can be affected by the price or availability of **other** goods. For example, demand for a good might increase if there is a reduction in the availability of substitutes. All goods have **substitutes**, which are simply things that might be used (or done) instead. Coke is a substitute for Pepsi, stuffing is a substitute for potatoes, compact discs are a substitute for cassettes, and Tylenol is a substitute for aspirin. The two goods don't have to be exactly the same, or even work in the same way in order to be useful as substitutes. For example, suppose that zercs and zalooms are substitutes for one another. If zalooms are no longer being made or if their price is increased, many people who used to buy zalooms will now start using zercs. The quantity demanded of zercs at every price of zercs will be increased. Thus, the demand for zercs will increase (the demand curve for zercs will move right) if zalooms become more expensive or harder to obtain. In general, a good's demand will increase (the demand curve will move right) if substitutes for it become less available or have a higher price than before.

In addition to the effect that substitutes have on a good's demand, demand can also be influenced by the price and availability of its **complements**. Complements are goods that go along with another good, so as a person buys more of one good, she will tend to buy more of its complements as well. Milk and cereal, coffee and donuts, salad and salad dressing, hamburgers and fries, tennis balls and tennis rackets, and computers and software, are examples of pairs of complements. The two goods don't have to be bought together or even used up together in order to be complements to one another. The thing that makes them complements is that buying one increases the likelihood that a person will buy the other. Suppose that zercs and zercomatics are complements for one another. If zercomatics become easier to obtain, then, at every price for zercs, the quantity demanded of zercs will be higher than before; many people who buy zercomatics will now want to buy more zercs. Thus, the demand for zercs will rise if zercomatics become cheaper or more available. In general, a good's demand will increase (the demand curve will move right) if complements for it become more available or cheaper.

Other things that might increase demand for a good, producing a new relationship between a good's price and the quantity of it that is desired, can also be recognized. If a good is heavily advertised, its demand will tend to rise. If people suddenly expect that future price of a good to be much higher than it now is, demand for the good will increase, as buyers rush to buy before the price increase occurs. If other prices in general are tending to rise, demand for a particular good might increase, since that good won't seem as expensive in comparison to everything else being sold. For some goods, the weather may affect their demand (for example, the demand for soup rises in the winter). Also, if people change their perceptions of the good or its usefulness, this will affect demand (we can label such changes as changes in tastes or perceptions). If a good becomes a fad, its demand will increase. If news is released announcing newly discovered potential benefits of a good, its demand will tend to rise as people learn of the benefits.

substitutes -goods that might be used instead of another good

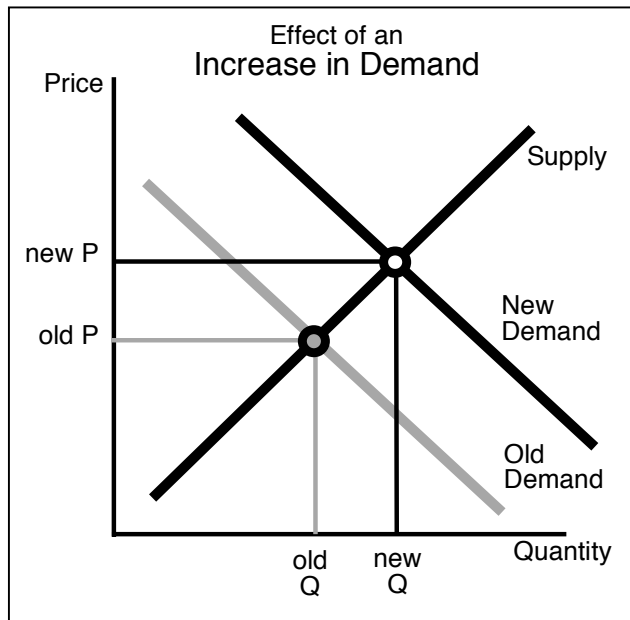
complements -goods that are used together with another good

Summary of Things That Increase Demand (Move Demand Curve To The Right):

increases in the number of buyers for a good
 increases in income (if the good is normal; decreases in income if the good is inferior)
 reduced availability of substitutes (increased prices of substitutes)
 increased availability of complements (reduced prices of complements)
 advertising of the good
 expected *future* price increases (or expected future problems finding the good)
 rises in prices in general
 changes in surroundings (including weather, laws, etc.) that make the good more attractive
 positive changes in perception of the good or taste for the good, including fads and favorable information about the good

What happens when demand increases?

If the demand for a good increases, then the demand curve will move to the



right. Thus, the equilibrium point will move up and to the right, leading to an **increase in the equilibrium price and an increase in the equilibrium quantity**. For example, if demand for glow-in-the-dark mouthwash increases (the demand curve for glow-in-the-dark mouthwash moves rightward) the equilibrium price and quantity will both increase. Because of this, the price of glow-in-the-dark mouthwash will begin to rise and the quantity of glow-in-the-dark mouthwash that is purchased each week will also rise.

In short, an increase in demand (which some folks might refer to as "higher demand") will cause both the price and quantity to get bigger (rise). It is important to remember that the increase in price that occurs is *caused by* the change in demand. **Don't get confused and think that the change in price will cause a change in demand.** A change in demand can

only occur if one of the things in that list at the top of this page occurs!!

What is a "decrease in demand?"

If the quantity demanded is smaller at every price than it had been before, then we say that there has been a **decrease in demand**. With a decrease in demand, a table will show lower quantity numbers for each price. A decrease in demand also will mean that the mathematical formula for demand will indicate lower quantity at each price. When there is a decrease in demand, the demand curve moves (or a new demand curve is drawn) to the left of the original curve.

decrease in demand - the change that occurs if buyers desire to buy a smaller quantity of the good, at every price, than they were willing to buy before (quantity demanded is lower at each price)

What causes a decrease in demand?

Anything that either reduces the number of consumers of a good, or reduces the willingness or ability of buyers to buy the good, will reduce demand and move the demand curve to the left. These things are generally the opposites of the things that would increase demand. The reasoning is similar as well.

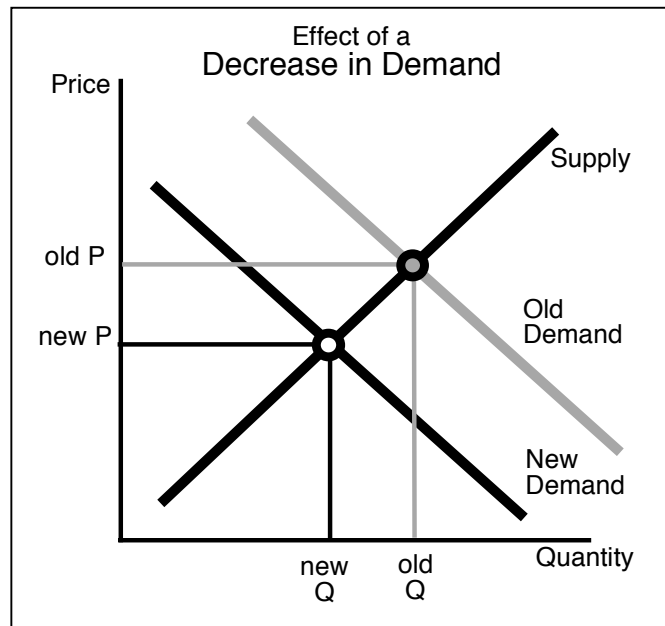
Summary of Things That Decrease Demand (Move Demand Curve To The Left):

- decreases in the number of buyers for a good
- decreases in income (if the good is normal; increases in income if the good is inferior)
- increased availability of substitutes (decreased prices of substitutes)
- decreased availability of complements (increased prices of complements)
- reductions in advertising of the good
- expected future price decreases
- fall in prices in general
- changes in weather, laws, and other environmental factors, which make the good less desirable
- negative changes in perception of the good or taste for the good, including fashions, scares, and unfavorable information about the good

What happens when demand decreases?

If the demand for a good decreases, the demand curve will move to the left. Thus, the equilibrium point will move down and to the left, leading to a **decrease in the equilibrium price and a decrease in the equilibrium quantity**. For example, if demand for decaffeinated orange juice decreases (the demand curve for decaffeinated orange juice moves leftward) the equilibrium price and quantity will both decrease. Because of this, the price of decaffeinated orange juice will begin to fall and the quantity of decaffeinated orange juice that is purchased each week will also fall.

In short, a decrease in demand (which some folks might refer to as "lower demand") will cause both the price and quantity to get smaller (fall). Just as when demand increases, try to remember that the decrease in price is *caused by* the change in demand. **Don't get confused and think that the change in price will *cause* a change in demand.**



What is a change in supply?

Just as with demand, if a different price causes the sellers to sell a different quantity, that is *not a change in supply*, it is just a change in quantity supplied. A **change in supply** occurs if, and only if, the sellers are willing and able to sell a different quantity of the good, at every price, than they would have been willing to sell previously. Usually,

this happens if there is a change in the number of sellers (suppliers) or if there is a change in the costs that sellers face when selling a good. Either of these can change the relationship between the price and the quantity supplied.

What is an “increase in supply” and what does it look like?

If there is an **increase in supply**, sellers are willing or able to sell a larger quantity of the good at every price. This means that the table of numbers showing the quantity supplied at each price must change, from something like

P	\$0	\$1	\$2	\$3	\$4	\$5	\$6
Qs	0	10	20	30	40	50	60

to something like

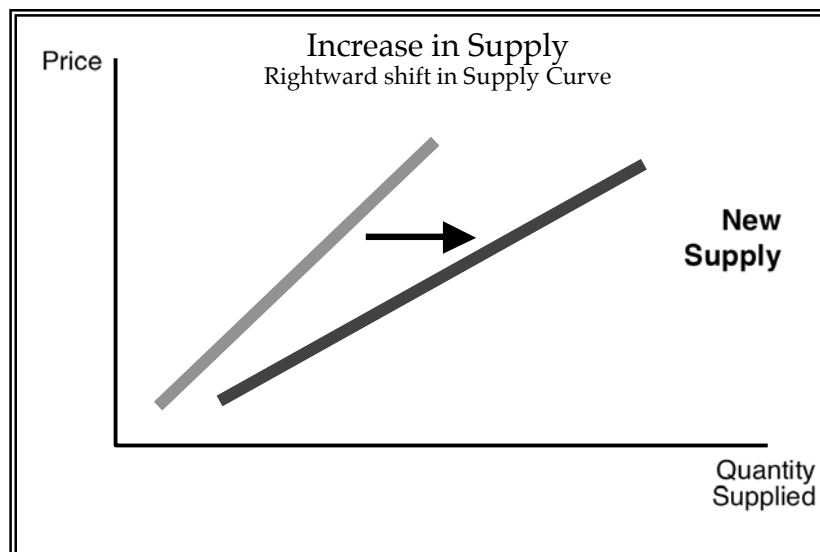
P	\$0	\$1	\$2	\$3	\$4	\$5	\$6
Qs	0	20	40	60	80	100	120

If supply were represented by a formula, this would change that formula from

$$P = \$0 + .1Q_s \text{ or } Q_s = 0 + 10P$$

to something like

$$P = \$0 + .05Q_s \text{ or } Q_s = 0 + 20P$$



Graphically, such an increase in supply would have to be shown as a new supply curve to the right of the original supply curve (see the example to the left). In the diagram shown, the slope of the new supply curve is flatter than the original, which may happen, but is not necessary (it is, however, consistent with the numbers shown in the above example).

What will cause supply to increase?

You'll be relieved to know that, unlike demand, just a few things can change supply. All of them come down ultimately to two: more sellers and lower costs. More sellers will (probably) increase supply because, well, there are more people trying (or willing) to sell the thing. Lower costs will increase supply because each seller will only be willing to sell a good if the price he or she gets for it (the seller's marginal utility gained) can make up for the marginal opportunity cost of what the seller is giving up. A lower marginal opportunity cost means that the price doesn't have to be a big to make

increase in supply -an increase in the quantity supplied at every price.

the seller willing to part with the good. Thus, at the same price, each seller would be willing to sell more than before.

For example, if workers suddenly have fewer alternative things to do with their time, as might happen if daytime TV gets even worse than it already is, the opportunity cost to workers of offering their work to their employers will fall. This means that the workers will be willing to work the same number of hours for a lower price (reflecting the lower cost). Also, some of the hours that once had a higher opportunity cost (for the workers) than the price no longer will. Workers might then work more hours than they now are at the same price (wage) as they are now getting.

In the case of a manufactured good, the cost will go down if new technologies allow the use of fewer resources to make each unit of the good. For some goods, weather or environmental conditions may lower costs sometimes. Also, if the prices of resources go down, costs of the goods produced by the resources will likewise fall. In addition, if the government reduces regulations that restrict production and reduces "red tape" (such as government-mandated paperwork, record keeping, forms and surveys) sellers' costs of making the products they sell will go down.

Summary of Things That Increase Supply (Move Supply Curve To The Right)

increases in the number of sellers of a good

decreases in cost of making or selling the good

technology enabling greater production with current resources

lower prices of resources

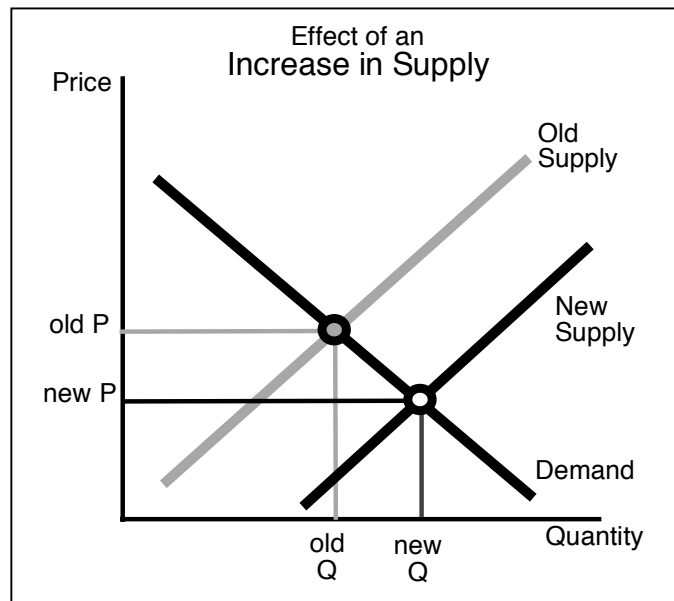
reductions of taxes, regulations and red tape

weather or seasonal conditions that allow for lower cost or greater production

What happens when supply increases?

If the supply of a good increases, the supply curve will move to the right. Sometimes, people may describe this as "supply going up." Notice, however, that when supply increases, the supply curve sort of moves below its old position. For this reason, you may find it less confusing to remember that an increase or *rise* in supply moves it to the *right*. The result of this change is that the equilibrium point will move down and to the right, leading to a **decrease in the equilibrium price and an increase in the equilibrium quantity**. For example, if the supply of frictionless scouring powder increases (the supply curve for frictionless scouring powder moves rightward) the equilibrium price will fall and equilibrium quantity will increase. Because of this, the price of frictionless scouring powder will begin to fall and the quantity of frictionless scouring powder that is purchased each week will rise.

In short, an increase in supply (which some folks might refer to as "higher supply") will cause the price to get smaller, while simultaneously causing quantity to get bigger (rise). Just as when demand increases, try to remember that the decrease in price is *caused by* the change in supply. **Once again, don't get confused and think that the change in price will *cause* a change in supply (or demand, either).**



What is a decrease in supply?

If instead, the quantity supplied at every price were to be smaller than before, we would say that there was a **decrease in supply**. The table of quantity numbers would be smaller for every price, the formula for supply would lead us to calculate smaller quantity supplied numbers for every price, and the new supply curve would be to the left of the original supply curve. These changes are just the opposite of the ones that indicate an increase in supply.

What will cause a decrease in supply?

Any event that reduces the number of sellers or that increases the opportunity cost of selling a good will decrease its supply and move the supply curve to the left. Again, this indicates that sellers will offer a smaller quantity for sale at every price. Generally, the events that cause this will be the opposite of those that increase supply. Technology won't be on the list of things that reduce supply, since producers probably won't adopt new technology that makes it *more* costly to make their products. Instead, since old machines and equipment may wear out and become less productive, the costs of producing output with the existing equipment will increase as it gets older.

Summary of Things That Decrease Supply (Move Supply Curve To The Left):

decreases in the number of sellers of a good

increases in cost of selling the good

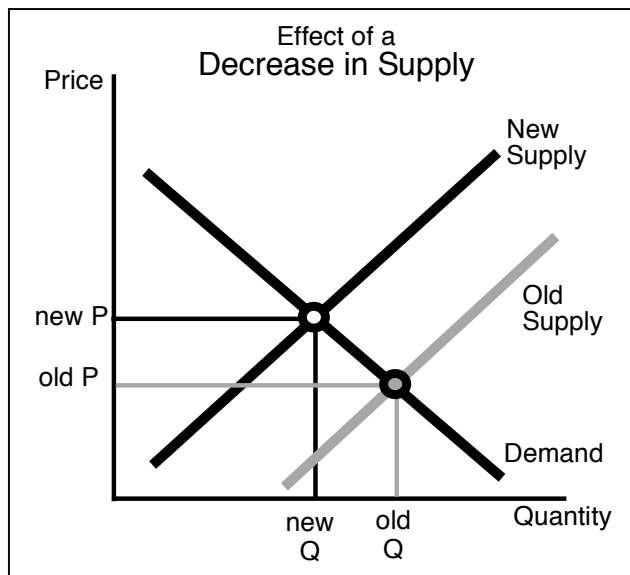
deterioration and wear of existing equipment

higher prices of resources

unfavorable weather or seasonal conditions (for some goods)

increases in regulations and red tape

What will happen if there is a decrease in supply?



If the supply of a good decreases, the supply curve will move to the left. Thus, the equilibrium point will move up and to the left, leading to **an increase in the equilibrium price and a decrease in the equilibrium quantity**. For example, if the supply of bristle-less hairbrushes decreases (the demand curve for bristle-less hairbrushes moves leftward) the equilibrium price rises and equilibrium quantity will decrease. Because of this, the price of bristle-less hairbrushes will begin to rise and the number of bristle-less hairbrushes purchased each week will fall.

In short, a decrease in supply (which might be called "lower supply") will cause the price to get bigger (rise), while causing quantity to fall (get smaller). **Yet again, don't get confused--the change in price will not cause a change in supply (or demand, either).**

decrease in supply -the situation if the quantity supplied is lower at every price than it was before.

How can we predict or explain price and quantity changes?

We can use the findings of the chapter so far to *predict* the effect on price and quantity sold of a good. If we know that some condition has changed, and we know how that condition affects either demand or supply, we can impress our friends and amaze our neighbors by seeing into the future. Actually, we will just be saying how we think the equilibrium will change. However, since the change in equilibrium will dictate the change in the price of the good, and in the quantity of it that is bought and sold in equilibrium, we will have the ability to see into the future.

Predictions- how price and quantity will change:

An increase in demand will cause price to rise and quantity bought (and sold) to rise.

Thus, if *any* of the events that increase demand occur, price and quantity will rise over time.

A decrease in demand will cause price to fall and quantity bought (and sold) to fall.

Thus, if *any* of the events that decrease demand occur, price and quantity will fall over time.

An increase in supply will cause price to fall and quantity bought (and sold) to rise.

Thus, if *any* of the events that increase supply occur, price will fall over time, as quantity rises.

A decrease in supply will cause price to rise and quantity bought (and sold) to fall. Thus, if *any* of the events that decrease supply occur, price will rise over time, as quantity falls.

Additionally, we can use this knowledge of supply and demand equilibrium to *explain* why the price of a good changes, or why people are buying more or less of a good. Always, changes in the price of a good and the quantity traded of it are caused by changes in demand or supply. Rewording the summary above, we get:

Explanations- why equilibrium price and quantity change when they do:

If price rises while the quantity (bought and sold) rises, an increase in demand must be the cause of the changes.

If price falls while the quantity (bought and sold) falls, the changes are (were) caused by a decrease in demand.

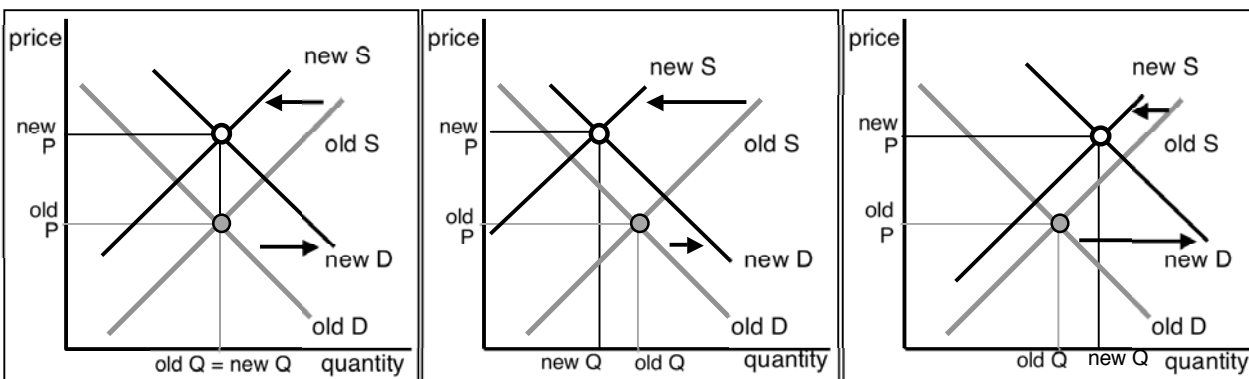
If price falls while the quantity (bought and sold) rises, an increase in supply is the cause.

If price rises while the quantity (bought and sold) falls, the changes are the result of a decrease in supply.

What if more than one thing is changing?

If demand and supply are both changing, we can determine the effect on the equilibrium price and quantity by adding together the demand effect and the supply effect. For example, suppose demand increases at the same time as supply decreases. The increase in demand would cause the price to increase and the quantity to increase, while the decrease in supply will cause the price to rise and the quantity to decrease. Adding the effects together, both will cause the price to increase, so we know that will happen. However, since the increase in demand would cause the quantity to go up, while the decrease in supply will cause the quantity to go down, the effects will tend to cancel each other out. As a result, the quantity might stay the same, go down a little, or

go up a little, depending on the size of the demand change relative to the supply change. The diagrams below show this: the price rises in all cases, but the quantity can change either way (or not at all).



Thus, when supply and demand are both changing, we can usually be very sure about when *predicting* what will happen to either price or quantity, but not both. The results of adding demand and supply changes together are listed below.

Summary of How Demand and Supply Changes, Occurring Simultaneously, Affect Equilibrium:

An increase in demand together with a decrease in supply will certainly cause price to rise, but quantity bought (and sold) might rise, fall, or remain the same.

An increase in demand together with an increase in supply will cause price to rise, fall, or remain the same, but quantity bought (and sold) will clearly rise.

A decrease in demand together with a decrease in supply will cause price to rise, fall, or remain the same, but quantity bought (and sold) will clearly fall.

A decrease in demand together with an increase in supply will certainly cause price to fall, but quantity bought (and sold) might rise, fall, or remain the same.

Just as when only one of demand or supply is changing, we can use the above to *explain*, in terms of supply and demand changes, why we observe changes in the prices and quantities sold of goods. Actually, we can now explain why sometimes the price of a good will change while the quantity sold does not, or why the quantity sold will change even though the price doesn't. Putting the summary above in terms of explanations:

Summary of Why Price or Quantity Changes, but Not Both:

If a good's price rises by a large amount, but the quantity bought and sold does not change much, the cause must be an increase in demand together with a decrease in supply.

If a good's price does not change, yet the quantity of it that is bought and sold rises greatly, the cause is an increase in demand together with an increase in supply.

If a good's price does not change, yet the quantity of it that is bought and sold falls a lot, the cause is a decrease in demand together with a decrease in supply.

If a good's price falls greatly, but the quantity bought and sold doesn't change much, the cause must be a decrease in demand coupled with an increase in supply.

Application: why do people eat more watermelon in the summer?

Most of us know that more watermelon is eaten in the summer than at other times of the year, but why is that? Most people's first instinct is to say that people *want* to eat more watermelon in the summer. If a good is consumed in greater quantity, many people tend to attribute the increase to a change in demand. However, to do so is very often incorrect.

If people ate more watermelon in the summer purely because they wanted to eat more watermelon in the summer, demand for watermelon would increase in the summer. If the demand for watermelon increased every summer, without any change in supply, the quantity purchased would go up (as we observe), *but the price would also increase*. However, watermelon prices actually **fall** in the summer, even though watermelon consumption increases. You can buy watermelon at other times of the year (usually imported from South America), but the price is quite high. Since the price goes down in the summer while the quantity purchased and sold rises, the watermelon market must experience an **increase in supply** during the summer, rather than (or in addition to) an increase in demand.

Why does the supply of watermelon increase in the summer? Blame Mother Nature (or thank her if you prefer). Our society is so urbanized that we often forget that the food we eat, especially fresh produce, is produced by nature on a seasonal basis. The supplies available, and the prices, change with the seasons. Watermelons must be planted in the spring in the Northern Hemisphere, after the danger of frost has passed. They will ripen in the summer, according to Nature's Plan, increasing their supply just in time for summer seed-spitting contests and the like. We associate watermelon with the summer, but a big hunk of the reason is that summer is the only time we can buy it cheaply.

It turns out that similar supply changes explain our seasonal consumption of other goods. Although it is tempting to think that we buy pumpkins in October because of Halloween, pumpkins are associated with Halloween because that is when they ripen (other fruits are actually associated with Halloween in other parts of the world). Turkeys even became associated with Thanksgiving because November is when turkeys mature enough to be edible without being tough.

By the way, gasoline is a better example than watermelon of a good for which demand increases in the summer. Every summer, gasoline prices rise and people buy more gasoline. The demand for gasoline increases as people increase their vacation travel.

Questions for Review and Practice

1. Explain how a change in demand differs from a change in quantity demanded.
2. If people's incomes are rising, what will happen to the demand for the products they buy? How would the prices of the products be affected?
3. Suppose that TV stations and newspapers spread the news that recent floods in South America have ruined the coffee crop that would have made it to stores *next* year. Would there be any impact on the coffee market *now*? Explain.
4. Name some things that will decrease demand for a good. Does an increase in a good's price decrease demand for that good?
5. List some events that would increase the supply of houses.
6. When the price of crude oil rises, what happens to the supply of gasoline (which is made with oil)? How do the price of gasoline and the quantity purchased change, *ceteris paribus*?
7. If a product is made using steel, and the price of steel rises, what do you think will happen to the price of the product? What is true about the amount of the product that is purchased? Assume *ceteris paribus*.
8. What would explain the observation that the price of a good has been going up over time, even though the amount of it that is purchased each year is getting smaller? Is demand or supply changing?

Chapter 7

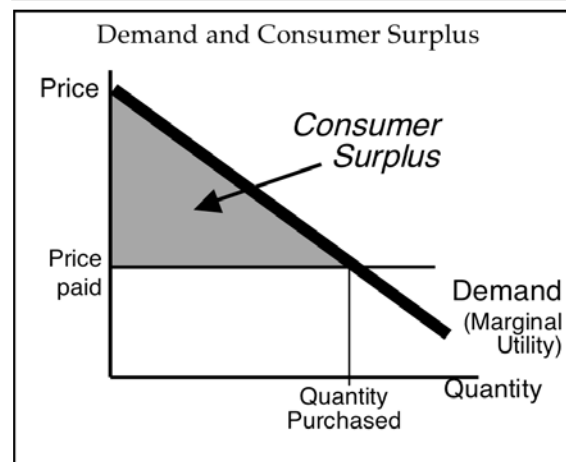
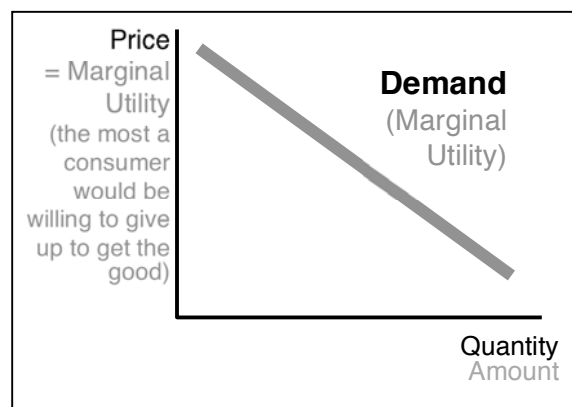
Why is Equilibrium Efficient and What Messes it Up?

In chapters 3 and 4, we examined two types of efficiency. Production efficiency requires that we use resources in the way that yields the most goods. We discovered that this necessitates attention to the marginal opportunity cost of producing goods. Allocative efficiency requires that goods be distributed in the way that produces the most utility. The marginal utility that each good generates for each of its potential consumers is thus important. It turns out that we have the information that we need to ascertain whether the conditions for efficiency exist. We get that information from supply and demand, the tools we used in chapters 5 and 6.

What does demand tell us?

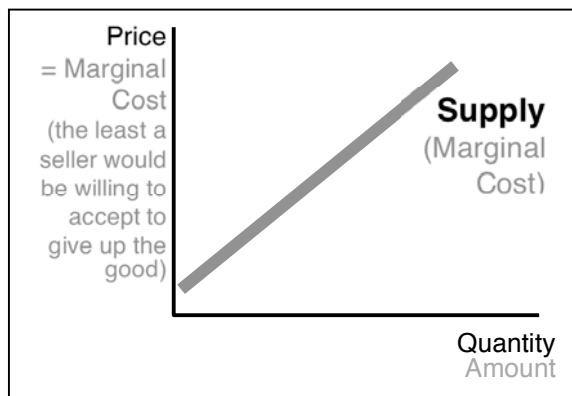
Demand, you may recall, is based on the marginal utility that buyers get from a good. This is because the price that a consumer is willing to pay to buy a good (the cost he or she would be willing to bear) is no greater than the marginal utility the consumer expects to receive from the good. Thus, the demand curve is, in a sense, the marginal utility (of all buyers combined) in disguise.

In addition, we can use the demand curve to measure how much more value or utility buyers get from a good than they pay for when they buy the good. Since all of the buyers will be paying the same price, but most of those who buy the good will receive a marginal utility that exceeds the price they are paying, the buyers get some benefits that exceed the payment they make for the good. The difference between the height of the demand curve and the price represents the difference between the buyers' marginal utilities and the price. If we add the difference together for all of the units bought, the "extra" utility that consumers get, beyond the payment for the good, is called **consumer surplus** and is shown as the shaded area in the diagram to the right. Since the consumer surplus measures how much better off consumers (buyers) are from buying the good (how much more utility they get than they have to give up in payment), the consumer surplus represents the gains consumers get when they trade.



consumer surplus - utility buyers get beyond the payment they make for a good. The consumer surplus can be thought of as the gains from trade that are received by buyers.

What does supply tell us?

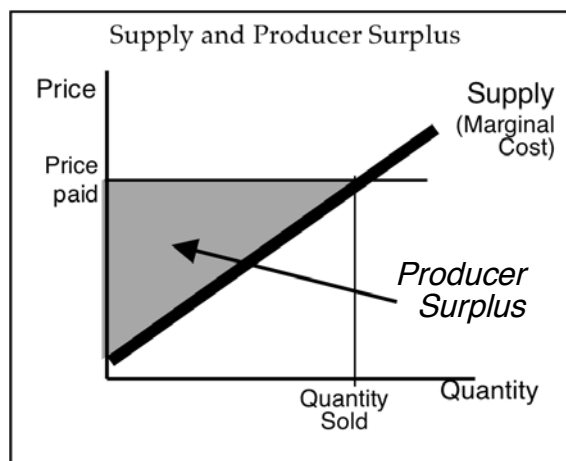


Just as demand is based on marginal utility, supply is based on the marginal opportunity that sellers face when they sell a good. This is because the price for which a seller is willing to sell a good (the utility he or she would be gaining) must be at least as great as the marginal opportunity cost of giving the good up. Thus, the supply curve is a modified version of the marginal opportunity costs, of all sellers combined.

Notice, the marginal cost of producing and selling a particular good tells us something important about the use of resources, since it reflects the opportunity cost of using resources to make that good.

To make one good, its producers must pay enough (in money or other forms) to move the necessary resources away from other uses, including the production of other goods. The cost of doing this will reflect the utility that those other goods could have provided their consumers. Thus, the supply, in reflecting marginal cost, also reflects the utility that consumers of other goods are giving up and the **utility that society could have had if other goods had been produced instead**.

Further, the supply curve can be used to measure how much more payment (utility) sellers get from selling a good than the good costs them to sell. Although all of



the units of a good may sell for the same price, each of the units sold by all of the suppliers will represent a different marginal cost to its seller, and all of the costs are less than the price. Since the supply curve indicates these marginal costs, the difference between the height of the supply curve and the price shows how much the price exceeds the marginal cost for each unit of the good. If we add the difference together for all of the units sold, the “extra” payment (utility) that sellers get, beyond the cost of the good, is called **producer surplus** and is shown as the shaded area in the diagram to the left. Since the producer surplus measures how much better off sellers are by selling the good (how much more utility they get than they have to give up in cost), the producer surplus represents the gains to sellers from trade.

What happens at equilibrium?

For a society that is trying to use resources in a productively efficient way (considering costs) and in an allocatively efficient way (maximizing the utility that goods and resources generate), equilibrium is the fast ticket. At equilibrium, several things occur that promote **economic efficiency**, which is sort of the combination of productive efficiency and allocative efficiency.

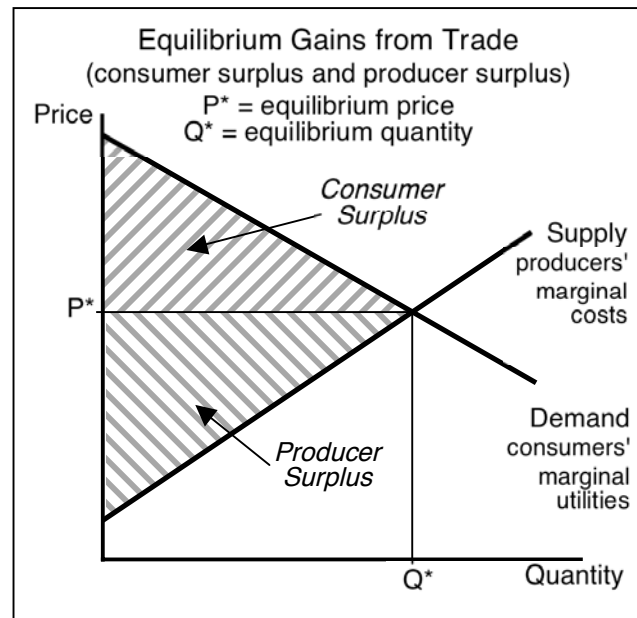
producer surplus -the payment sellers receive for selling a good that is above their costs. This is the gain to sellers from trading.

economic efficiency -using resources to produce goods in a way and in amounts that maximize utility of members of society. It combines considerations of production efficiency with allocative efficiency.

We already know from chapter 5 that quantity demanded and quantity supplied are equal (see page 49). In addition, at the equilibrium price, the **marginal utility that buyers get from the good is just about equal to the marginal cost of sellers selling the good**. This comes noticing that the height of the demand curve (marginal utility) is equal to the height of the supply curve (marginal cost) at the equilibrium. In reality, there is a fraction of a cent difference, since the price has to be a little less than the marginal utility of the buyer of the last unit purchased (otherwise he wouldn't buy the unit), and the price is a little more than the marginal cost to the seller who sells the last unit sold (otherwise, she wouldn't sell the unit).

Remember, the marginal cost of a good and its supply are determined by the cost of diverting resources from other uses, and thus the utility (given up) of making other goods instead. Since equilibrium means producing every unit of a good up to the quantity for which supply crosses demand, at equilibrium, **a unit of a good is provided to someone if, and only if, that unit provides more utility to a consumer than some other good, produced with the same resources, would have provided to some other person**. Not only that, but **every unit of the good that gives someone a greater marginal utility than the good's marginal cost (in terms of utility given up) is being made and sold**.

But wait, there's more. At equilibrium, the **total gains to buyers and sellers from trade are maximized**. Compared with any other price, equilibrium makes the total of gains from trade to buyers (consumer surplus) and gains from trade to sellers (producer surplus) larger than the total would be at any other price. That is, at equilibrium, the increase in buyers' utility and sellers' utility, if added together, is greatest. The diagram to the right shows the consumer surplus and producer surplus, which added together will give us the total gains from trade, which reflects how much more utility is generated in society by allowing trade.



Summary of Important Facts about Equilibrium:

At equilibrium, the quantity demanded of a good equals the quantity supplied.

At equilibrium, there is neither a surplus of the good, nor a shortage of the good.

At equilibrium, the marginal utility of buyers is about equal to the marginal cost of sellers.

At equilibrium, every unit of the good that someone values (in terms of marginal utility) more than the marginal opportunity cost is produced.

At equilibrium, no unit of the good is produced if it costs more to produce (in terms of opportunity cost) than it is valued (in terms of marginal utility).

At equilibrium, the gains from trade are maximized (if you count the consumer surplus and the producer surplus together)

What keeps a market from reaching equilibrium?

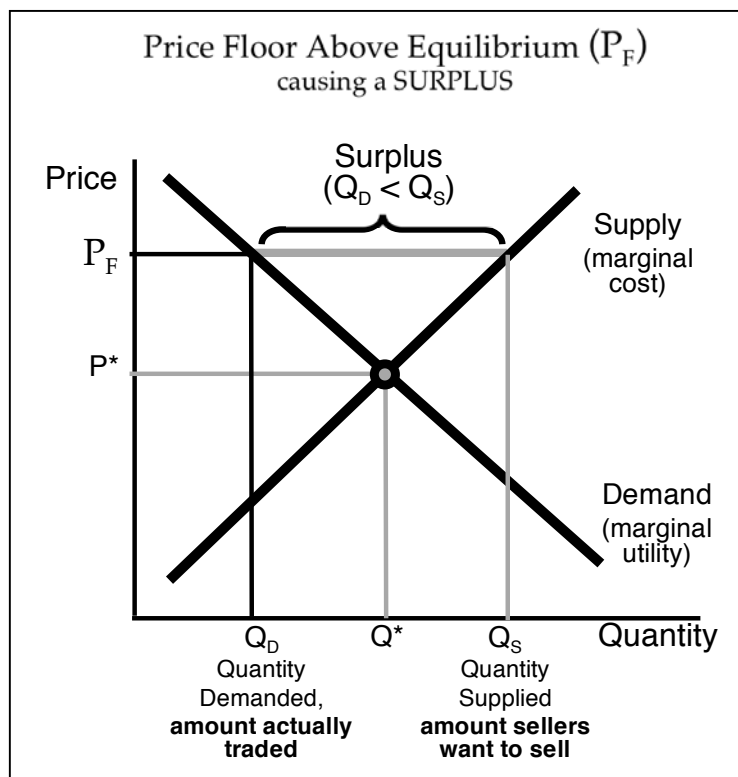
Unfortunately, despite the efficiency and other benefits that society reaps from equilibrium in a good's market, several circumstances prevent markets from reaching the kind of equilibrium described thus far. For example, a monopoly might be in charge of selling the good, and might make choices concerning production that differ from

those we have examined so far. Also, the good might not be the kind of thing that can be sold in a market, such as national defense. As well, there might be some third party who benefits or is hurt when the good is produced and consumed. All of these kinds of situations are topics we deal with in the later part of microeconomics. For now, it suffices to note that they complicate the niceties of equilibrium, or make equilibrium impossible to reach.

Perhaps even more common though, are situations in which the forces leading to equilibrium are not permitted to operate. Sometimes, the price is controlled artificially by law or other institutions. In other instances, taxes prevent the reaching of the market equilibrium. We will now turn to these situations.

What happens if a price is kept artificially high?

Sometimes, sellers are not content with the price that the market equilibrium gives them for their products. These sellers, or their advocates in government, may seek to legally impose a price on the product that is above the equilibrium price. When the price of a product is kept artificially high, a **price floor** is said to exist. With price floors, surpluses are persistent, since the price is not allowed to fall. Examples of price floors are farm price supports (minimum prices on farm products), minimum wages, and contractually controlled prices.



When a price floor is imposed on a product the quantity that is actually purchased will be the quantity demanded, since this will be less than the quantity supplied, and buyers cannot be forced to buy the good. Since less of the good will be traded, there will be fewer overall gains from trade (the total of consumer surplus and producer surplus will be smaller). The reduction in the gains from trade that is caused by the reduced quantity traded is called a **deadweight loss**. The suppliers who get to sell their output at the higher price will benefit from a price floor, as will sellers of substitute products (since demand for substitutes will rise). However, the price floor will make buyers worse off, since they will now have to pay more for the good and will not be able to afford to buy as much of it. Also, sellers who are unable to sell their surplus goods will be worse off than they would be if prices were allowed to fall to equilibrium, since they have given

up the costs necessary to produce or sell their goods, but will not find buyers. For example, some workers will give up other opportunities (such as high school, college or

price floor -a price kept above equilibrium by a law or similar outside force, causing a surplus of the good in the market

deadweight loss -a loss in the total gains from trade that occurs when price is not in equilibrium, and less trade occurs

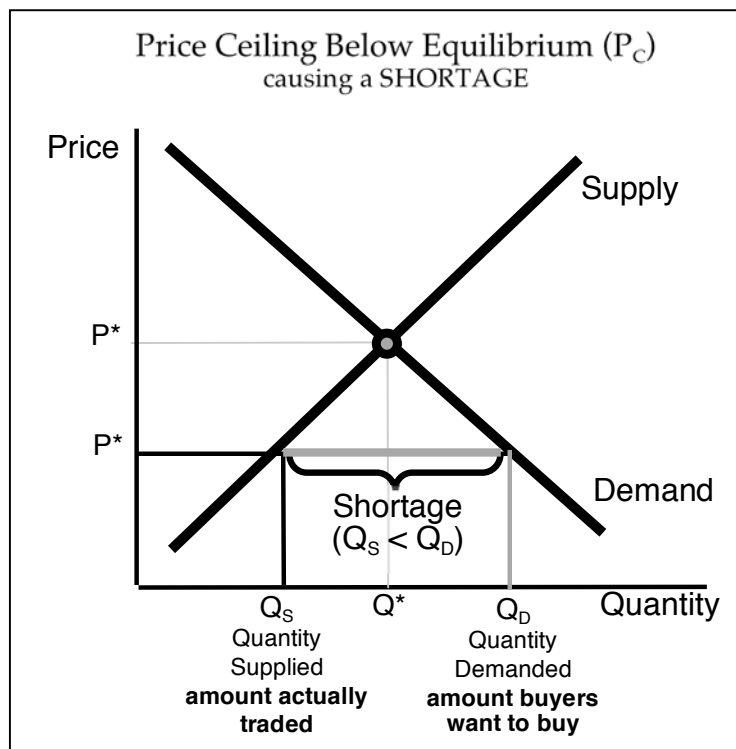
vocational training) to attempt to get a job if there is an attractive minimum wage, but many such workers will be unable to find work--they will be surplus (unemployed) workers. If the government has imposed the price floor, it may choose to assist the harmed suppliers by buying or paying for the surplus. For example, the government may buy surplus agricultural products and destroy them to keep them from forcing prices down, or it may pay producers not to produce the goods in the first place. In the case of workers, the government may give them unemployment payments for a while.

One other result of a price floor is that it may give the few buyers in the market some degree of power over the sellers. For example, if an employer (buyer) will be hiring one worker for a minimum wage job and has several dozen qualified applicants (a large quantity supplied compared to quantity demanded), the employer **MUST** decide among the applicants on some basis other than who will do the work at the lowest price. This requires non-price discrimination on the part of the employer. The exact form that the discrimination takes will depend on the circumstances. The situation requires that the employer decide between the applicants, and the decisions many employers make are based on personal factors (including illegal ones).

What happens if price is kept artificially low?

In cases in which the price is kept artificially low, the situation is referred to as a **price ceiling**. With price ceilings, shortages are persistent, since the price is not allowed to rise. Often, long lines and waiting lists are common results. Examples of price floors are wage and price controls (maximum prices) and rent control.

When a price ceiling is imposed on a product the quantity that is actually purchased will be the quantity supplied, since this will be less than the quantity demanded, and the sellers cannot be forced to sell more of the good than they want to sell. As with a price floor, there will be less trade than in equilibrium, and fewer overall gains from trade (the total of consumer surplus and producer surplus will be smaller). Again, there will be a **deadweight loss**. The buyers who get to buy the good at the lower price will benefit from a price ceiling and so will sellers of substitute products, since less of the good with the price ceiling will be sold, and those buyers who can't get it will seek out alternatives. Sellers are worse off because of the price ceiling (since they will now get paid less for the good). Also, buyers who are unable to buy the good will be worse off than they would be if prices were allowed to rise to equilibrium, since at equilibrium they could obtain some of the good they desire. In addition, since there is a shortage, many demanders will wait in line or bear other costs in an attempt to obtain some of the good, and yet still



price ceiling - a price kept below the market equilibrium price by a law or other outside force, resulting in a shortage

find that they cannot get any. Many buyers will find ways of getting around the inconvenience and higher transactions costs caused by the shortage, such as hiring others to wait in line for them or paying specialists to locate the limited quantity supplied for them. Generally, the buyers who are most able to pay for such assistance will be at an advantage in obtaining the good during the shortage. Also, some buyers may be able to make secret payments to the suppliers of the good in exchange for the ability to purchase (this is often referred to as a “black market” purchase).

One other result of a price ceiling is that it may give the few sellers in the market some degree of power over the buyers. For example, if a landlord will be renting out a rent-controlled apartment, and several dozen qualified tenants show up seeking the unit (a large quantity demanded compared to quantity supplied), the landlord must decide among the applicants on some basis other than who will pay the highest rent. This requires non-price discrimination on the part of the landlord. The exact form that the discrimination takes will depend on the circumstances. Again, illegal forms of discrimination, as well as legal ones, might be used to help the landlord decide between the potential tenants.

Summary of Effects of Price Floors and Price Ceilings:

A price floor reduces the quantity of trade that occurs compared to equilibrium.

A price floor reduces the total gains from trade.

A price floor hurts all consumers, some because they can no longer buy the product and others because they pay a higher price.

A price floor hurts some sellers, if they are no longer able to sell their goods.

A price floor benefits the sellers who can now sell at a higher price (but who will sell a smaller quantity).

A price floor will create a deadweight loss, since it will reduce the total amount of trade.

A price floor will increase demand for substitute goods.

A price floor may result in buyers engaging in various forms of discrimination.

A price ceiling reduces the quantity of trade that occurs compared to equilibrium.

A price ceiling reduces the total gains from trade.

A price ceiling hurts all sellers, some because they can no longer afford to sell the product and others because they are paid a lower price.

A price ceiling hurts some buyers, if they are no longer able to buy goods that gave them utility.

A price ceiling benefits the buyers who can now buy at a lower price (but who will buy a smaller quantity).

A price ceiling will create a deadweight loss, since it will reduce the total amount of trade.

A price ceiling will increase demand for substitute goods.

A price ceiling may result in sellers engaging in various forms of discrimination.

What will taxes do to equilibrium?

To examine taxes, we will use a simple tax on a product called an excise tax. An **excise tax** is a tax on each unit of a good that is sold. For instance, if each gallon of gasoline is charged a tax of forty cents, no matter what the price of the gasoline, that would be an excise tax (and indeed, that is about the average excise tax that is charged on gasoline in most states). Excise taxes are just based on how much of the good is

excise tax -a tax charged on each unit of a good that is bought and sold; it is based on the quantity rather than the good's price

bought, not on the price or any other factors. The reason for using an excise tax is that it is easy to show on a demand and supply graph. Also, we can generalize the effects we discover to other taxes, such as sales taxes, income taxes, payroll taxes (Social Security and Medicare), and even property taxes.

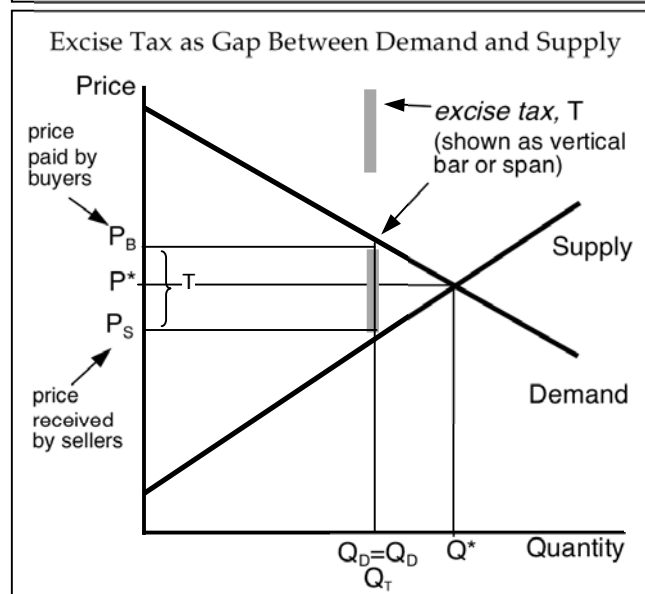
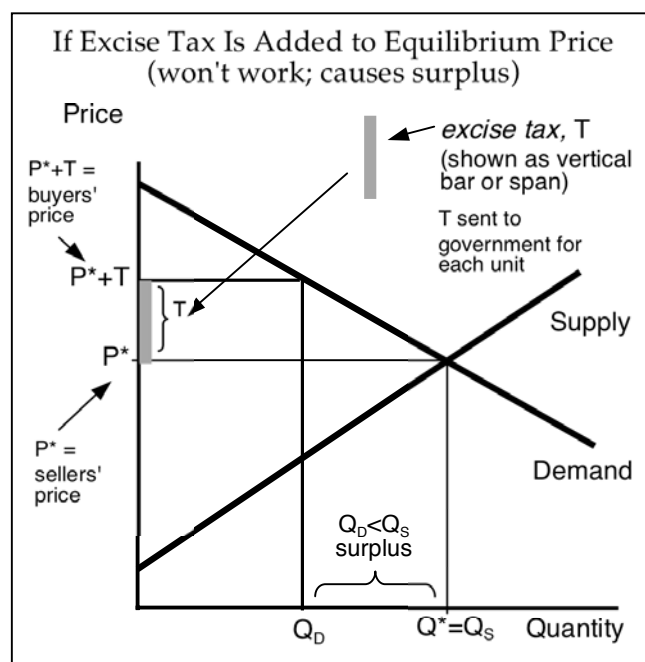
While taxes may be inevitable (they are needed to finance government), they are avoidable, and indeed that is why they affect equilibrium. Taxes raise the price that buyers pay for a good, and lower the amount of payment that sellers get for the good. Thus, taxes will reduce the amount of buying and selling of the good, as buyers and sellers avoid the tax by avoiding trade. Because taxes reduce trade, they reduce overall utility and reduce economic efficiency.

What does an excise tax look like?

An excise tax, since it is a certain number of dollars (or cents) per unit of the good, has the same units as the price, so we can show it as a vertical (price scale) bar or span. The span represents the gap or difference between the price the buyers will be paying for the good and the price sellers get to keep when they sell the good (the difference being the tax that is sent to the government on each unit traded). Where does this span go? If we just added the tax on to the old equilibrium price (P^*), we would be increasing the price that buyers have to pay for the good (by the amount of the tax, T , to P^*+T) but we would not be affecting the price sellers are paid for the good. The higher price for buyers would reduce their quantity demanded, but the quantity supplied would be the same as if there had been no tax. This would create a surplus (quantity demanded would be less than quantity supplied).

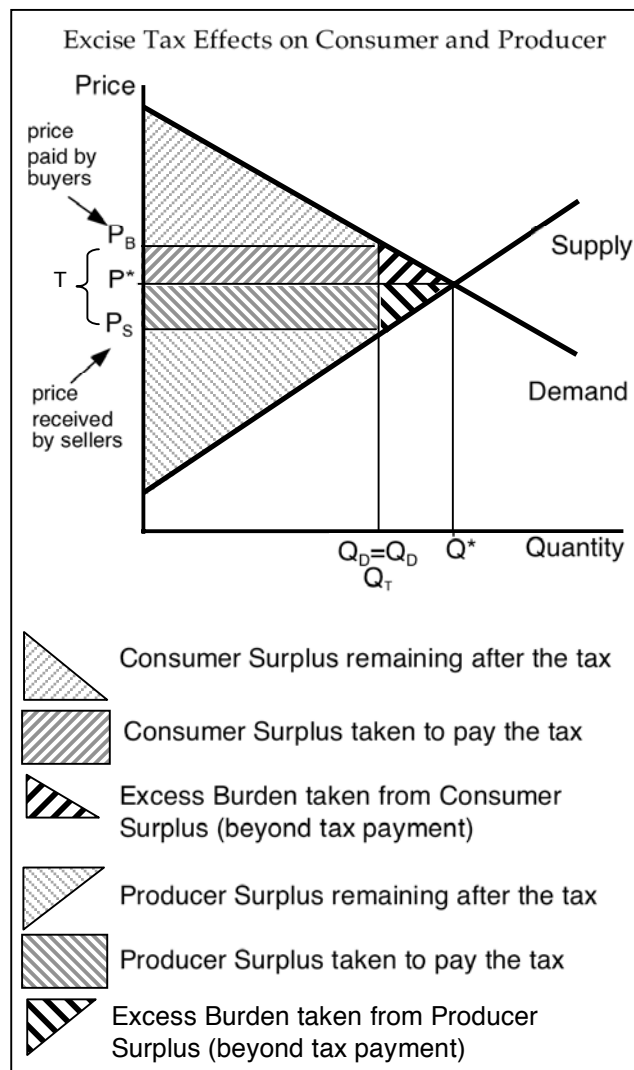
So, this placement would not work, as the surplus would force down the price.

We need to find where the tax will fit on the graph in such a way that the quantity demanded equals quantity supplied after the tax is put in place. We put this span in between the demand curve and the supply curve, as shown at right. The price that buyers pay (P_B on the diagram) is greater than the price that sellers receive as payment (P_S) by the amount of the tax per unit (T), but the buyers' price results in a quantity demanded that is equal to the quantity supplied for the price sellers receive after taxes are paid to the government. Since quantity demanded equals quantity supplied, a new equilibrium exists (called Q_T on the diagram). Both the quantity demanded and quantity supplied are less than the original equilibrium.



How does tax affect the gains from trade?

With a tax, the buyers and sellers are both worse off than they would be at equilibrium.



While part of this is caused because some of their equilibrium consumer surplus and producer surplus will be paid to the government as taxes, the tax reduces their gains from trade by more than the tax revenues the government receives. In the diagram at the left, you can see how the original equilibrium consumer and producer surpluses are changed.

The two triangles at the top and bottom are still consumer surplus and producer surplus. However, some of the original consumer surplus goes to the government as tax revenues, as does some of the original producer surplus (see the dark rectangles in the middle of the diagram). The total **tax revenue** (tax collection) that the government receives is T (the per unit tax) times Q_T (the amount of trade that is done after the tax goes into effect).

However, part of the original consumer and producer surpluses are taken from traders and do not go to the government. These are the darkly lined triangles at the right of the tax collection rectangles. This loss of consumer surplus and producer surplus is called the **excess burden**, and it is due to the reduction in trade that the tax will cause. It is similar to the **deadweight loss** we discussed when a price floor or price ceiling is imposed. The excess burden doesn't go anywhere; it just vanishes, along with the quantity of trade that doesn't take place anymore. The excess burden is proportional to the reduction in trade that the tax causes and is proportional to the dollar amount of the tax.

The effect of a tax on buyers and sellers is called the **tax incidence**. Often tax laws are sometimes written to try to get a certain group to pay the tax (sellers, for example). This intended tax incidence is called the **statutory tax incidence**. The actual tax incidence depends only on supply and demand, and not on how the law says the tax

tax revenue -tax money collected by the government

excess burden -the reduction of gains from trade (consumer surplus and producer surplus) that is caused by a tax and the reduction in trade that the tax causes. Similar to the deadweight loss.

tax incidence -the effect of a tax on buyers and sellers (in terms of who pays the tax out of consumer surplus and producer surplus).

statutory tax incidence -the tax incidence intended by law, indicated by things like who is supposed to send the money to the government

is collected. For example, the sellers send gasoline taxes to the government. However, buyers pay most of the tax on gasoline in the form of a higher price for gasoline. In reality, if the demand curve for a good is relatively steep, indicating that an increase in price will not change the quantity demanded by very much, then buyers will pay most of the tax, regardless of who writes the check to the government. The steep demand curve means that sellers can pass a lot of the tax on to buyers without losing too many sales (since the quantity demanded won't change very much).

In general, the tax burden (incidence) will fall mostly on buyers if the demand curve is steeper than the supply curve. A steep demand curve means buyers don't react, in terms of quantity demanded, to the higher price caused by the tax; buyers are somewhat stuck having to buy the good, perhaps because it has few substitutes. On the other hand, if a good has a flat demand curve, the buyers will stop buying the good if the tax is passed on to them, perhaps because they have many substitute products to buy. If the demand curve is flat, sellers will end up having to pay most of the tax (since adding it to the price buyers pay will reduce the amount sold by a large quantity).

The tax burden will fall mostly on sellers if their supply curve is steeper than the demand curve. A steep supply curve means that the sellers are stuck selling the good as soon as they can (perhaps it is perishable). If so, they will accept a lower price (after the tax is paid) and still willingly sell the product. On the other hand, if the supply curve is flat, the sellers will simply stop selling the good if the price (after taxes) goes down, so buyers will pay most of the tax if the supply curve is flat.

Notice, steep demand curves or steep supply curves mean that the buyers or sellers are not very responsive (in terms of the quantities demanded and supplied) to the price changes that a tax will cause. With steep demand and supply curves, a tax is likely to reduce trade very little, and thus there will be a small excess burden. Also, since trade will not be reduced, the government revenues will be large. On the other hand, if the demand and supply curves are flat, buyers and sellers will reduce trade by a large quantity, and thus the tax will have a large excess burden. Also, the revenue collected by the government will tend to be small.

Summary of Conclusions about Taxes and Tax Incidence:

Taxes can be avoided by refusing to sell or buy the taxed goods. Thus, taxes reduce utility and are inefficient.

An excise (per unit) tax can be shown as a vertical gap between the demand curve and the supply curve

With a tax, the price paid by buyer rises while price received by seller falls, but neither price changes by the full amount of the tax.

The quantity traded falls because quantity demanded and quantity supplied are both lower.

The difference between the buyers' price and the sellers' price is the tax per unit.

The revenue to government is the tax per unit times the quantity of output sold after the tax goes into effect.

Part of the tax is paid by buyers out of consumer surplus, and part is paid by sellers out of producer surplus.

Every tax has an excess burden (sometimes called the deadweight loss), due to the reduction in trade. The excess burden is proportional to the trade reduction and the amount of the tax.

The tax is borne mostly by the group (buyers or sellers) with the steeper curve (not necessarily the group who writes the checks).

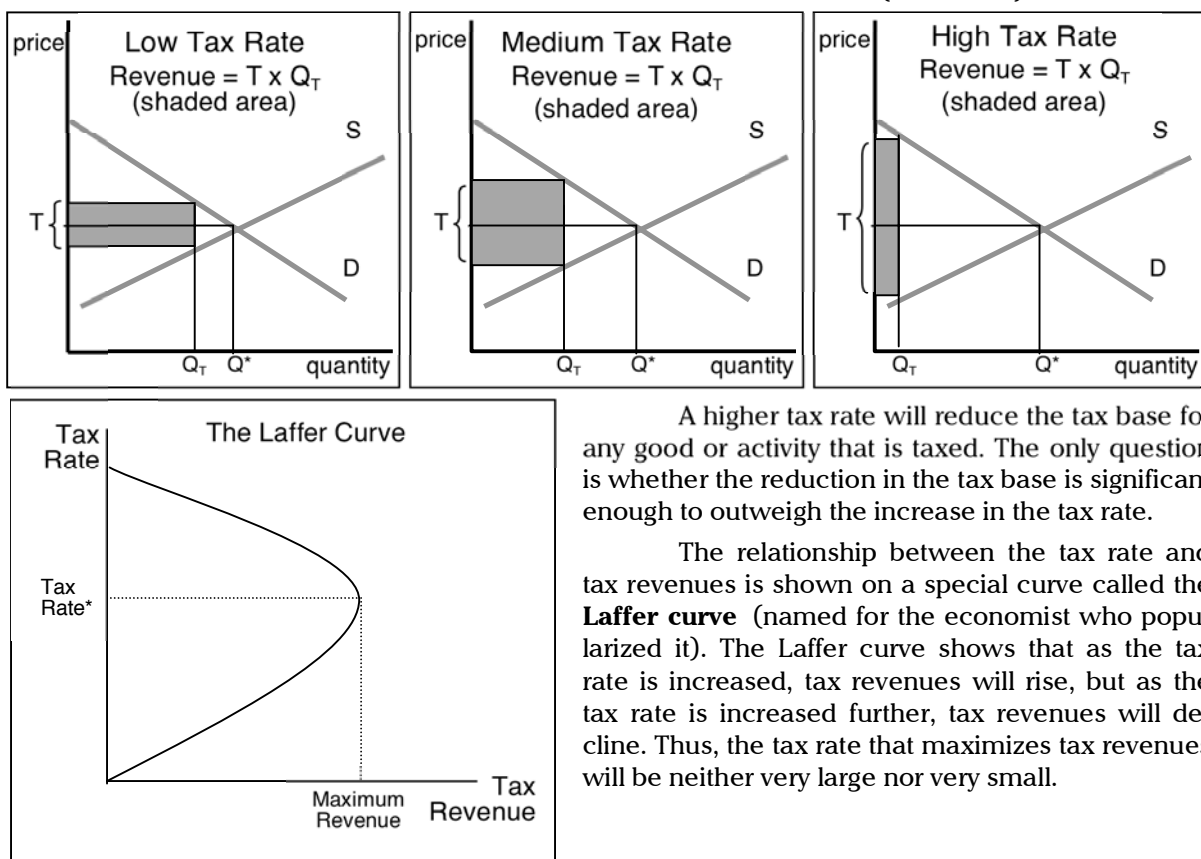
The excess burden of a tax is greater if demand or supply curves are flat (or both).

Other things the same, the government will collect more tax revenue if the demand or supply curves are steep.

How does the tax rate affect tax revenues?

We've seen that, with an excise tax, the amount of money that the government raises from a tax (its tax revenues) will be equal to the tax times the quantity of trade that is taxed. Finding tax revenues from other kinds of taxes involves a similar computation. Generally, the tax revenue that the government collects on any good or activity is the **tax rate** times the **tax base**. The **tax rate** is the amount or portion of money that the government collects in taxes on each unit of a good or activity. In the case of an excise tax, the tax rate is the number of dollars collected on each unit of the good sold. With other taxes, the tax rate is usually some percentage of each dollar spent on a good or activity. The **tax base** is the quantity of the good being taxed (with an excise tax) or the amount of spending being taxed (with other taxes).

While it may seem that increasing the tax rate will increase the government's tax revenues, this is not always what will happen. As a (possibly) secondary effect, taxing an activity will reduce the amount of it that people do. Thus, the tax base will fall whenever the tax rate is increased. If the tax base falls enough, the tax revenues may eventually fall as well, despite the rising tax rate. We can see this by examining the effects of different sized excise taxes on the revenues raised (see below)



A higher tax rate will reduce the tax base for any good or activity that is taxed. The only question is whether the reduction in the tax base is significant enough to outweigh the increase in the tax rate.

The relationship between the tax rate and tax revenues is shown on a special curve called the **Laffer curve** (named for the economist who popularized it). The Laffer curve shows that as the tax rate is increased, tax revenues will rise, but as the tax rate is increased further, tax revenues will decline. Thus, the tax rate that maximizes tax revenues will be neither very large nor very small.

tax rate -the amount of money or percentage of that the government collects on each item sold or on each dollar spent

tax base -the number of units of a good that are taxed, or the number of dollars of spending that are taxed.

Laffer curve -the graph showing the relationship between the tax rate and tax revenue.

How do income taxes affect people?

When taxing things like income, we have two ways of describing the tax rate. These are the marginal tax rate and the average tax rate. The **marginal tax rate** is the percentage of each additional dollar of income that is paid in taxes, or

$$\text{marginal tax rate} = (\text{change in taxes paid}) \div (\text{change in income})$$

For example, if I make \$1,000 more this year and pay \$300 more in taxes than last year, the marginal tax rate is $\$300 \div \$1,000 = .30 = 30\%$

Decisions about how much to work (or whether to work extra hours) are determined by the marginal tax rate. A person who is taxed at a high marginal rate will be less likely to try to earn extra income than she would be if she had a lower marginal tax rate. A higher marginal tax rate means a taxpayer keeps less of each additional dollar she earns.

The **average tax rate** is a person's total tax divided by his or her total income, or the proportion of the person's income that is paid in taxes (expressed as a percent). Thus,

$$\text{average tax rate} = \text{total taxes paid} \div \text{total income}$$

For example, if I pay a total of \$6,000 in taxes on \$30,000 income I earn this year, the average tax rate is $\$6,000 \div \$30,000 = .20 = 20\%$

The average tax rate is used to determine how taxes affect people of different income levels (overall). This is the "income incidence" of the tax. If the average tax rate is greater for people with greater incomes, the tax is a **progressive tax**. If the average tax rate is lower for people with greater incomes, we say the tax is a **regressive tax**. If the average tax rate is exactly the same for people with low incomes as it is for people with high incomes, the tax is called a **proportional tax**.

The proportion or percentage of each person's total income that is paid in taxes is important in making determinations of income incidence; the dollar amounts alone can be misleading. Even if high-income people pay more dollars in taxes than low-income people, the taxes could be regressive or proportional, rather than progressive. In fact, most taxes, unless they are specifically based on a person's income, will end up being regressive.

For instance, a "head tax" or "poll tax" is a tax in which each person is charged the same amount of money, without regard to his or her income. This tax would not affect any prices (since no good or activity is taxed, just being a person is taxed). For this reason, there is no excess burden. However, a head tax is very unpopular, since it is

marginal tax rate -the percentage of additional income that must be paid as taxes, or the change in a person's tax divided by the change in his or her income.

average tax rate - the proportion of a person's total income that he or she pays in taxes

progressive tax - a tax for which the average tax rate is higher for people with higher incomes than it is for people with low incomes

regressive tax -a tax for which the average tax rate is lower for people with higher incomes than it is for people with lower incomes

proportional tax -a tax for which the average tax rate is identical for all taxpayers, so that all pay the same percentage of their total incomes

certainly regressive. An annual head tax of \$1,000 for each person would tax a person making \$10,000 a year at an average tax rate of $\$1,000 \div \$10,000 = 10\%$. A person who makes an income of \$100,000 a year would only pay an average tax rate of $\$1,000 \div \$100,000 = 1\%$. Thus, charging everyone the same amount of money does not result in the same average tax rate for everyone. People with high incomes end up paying a smaller portion of their total income in taxes, and so this kind of tax is regressive.

Even a tax that takes more money from higher income people can be regressive in its effect. Suppose a sales tax is imposed that results in a person who earns \$10,000 a year paying \$500 in sales taxes. The effective average tax rate for such a person would be $\$500 \div \$10,000 = 5\%$. If the same sales tax rules resulted in a person who earns \$100,000 paying \$4,000 in sales taxes (perhaps because such a person saves some of his or her income rather than spending it), the average tax rate from this tax for such a person would be $\$4,000 \div \$100,000 = 4\%$. Even though the person with the \$100,000 income pays more money in sales taxes, the percentage of his or her income that goes to paying the sales tax is less than it is for someone earning only \$10,000. Thus, even this tax is regressive (although the higher income person pays more money, the higher income person also pays a smaller portion of income in taxes). Sales taxes could be proportional if a person with a \$100,000 income purchased exactly ten times as many taxed goods as a person who earned only \$10,000, but in practice, this probably won't happen.

Application: The progressive "flat rate" tax

Many people mistakenly believe that the marginal tax rate must be higher for higher income people in order for a tax to be progressive. This is not true. One income tax system that people propose from time to time as an alternative to our rather complex income tax structure is what is called a **"flat rate"** tax. Interestingly, this tax sounds proportional, but it can be made progressive. Most of the versions of it that are proposed are indeed progressive. Usually, the proposals say that some amount of income can be earned without any tax being charged at all to the earner. Then, any money earned over this base amount is taxed at a flat marginal rate (which, remember, is different from the average rate).

For example, a person could earn up to \$20,000 without paying any tax on the income earned. But, for each dollar earned over the \$20,000, a 20% marginal tax rate is charged. This marginal tax rate stays the same, no matter how much over the \$20,000 (tax free) base a person earns. While the marginal tax rate does not change, the average tax rate will increase, in effect, as a person's income increases.

If Jose earns \$25,000, his total tax will be 20% of the \$5,000 he earns over the \$20,000 base, or $20\% \times \$5,000 = \$1,000$. Thus, Jose's average tax rate will be $\$1,000 \div \$25,000 = 4\%$. If Maria earns \$100,000, her total tax will be 20% of the \$80,000 she earns over the \$20,000 base, or $20\% \times \$80,000 = \$16,000$. Thus, Maria's average tax rate will be $\$16,000 \div \$100,000 = 16\%$. Maria will pay a larger portion of her income in taxes because she has a higher income, so the tax is progressive. This is true even though the marginal tax rate is the same. The marginal tax rate does not tell us what the average tax rate is, unless we do this kind of calculation. The average tax rate is what tells us that this tax is actually progressive.

Questions for Review and Practice

1. What is the consumer surplus?
2. What is the producer surplus?
3. At equilibrium, what can you say about the gains from trade?
4. At equilibrium, what is the mechanism for rationing scarce goods?
5. If a price ceiling, below the equilibrium price, is imposed on a good, how much of the good will be traded? What determines how much?
6. If a price floor, above the equilibrium price, is imposed on a good, how much of the good will be traded? What determines how much?
7. When price floors or price ceilings are enacted, how is the good rationed? Why can't the price be a rationing mechanism, as it is at equilibrium?
8. If the minimum wage were increased to double its current value, who might have a harder time getting or keeping a job? Would anyone have an easier time getting or keeping a job?
9. If a rent control (price ceiling) were put on apartments in Phoenix, so that every apartment must be rented for \$50 per month or less, what results would you predict? Would anyone have trouble finding an apartment? Would the quality of apartments be affected?
10. What is meant by the incidence of a tax? What is the statutory incidence?
11. Social security taxes are supposedly split evenly between employees and employers. Actually, employers send 7.65% of each employee's salary or wage to the government (as the employer's contribution), and deduct an additional 7.65% from each employee's salary to also send to the government (as the employee's contribution). What would be the incidence of the Social Security tax?
12. What is the excess burden of a tax? Are there any taxes you can devise that have no excess burden?
13. How does raising the tax rate generally affect the tax base?
14. What is the Laffer curve? What does it show?
15. A person earned \$50,000 last year and paid \$10,000 in taxes. The same person earned \$60,000 this year, and pays \$13,000 in taxes. What is the person's marginal tax rate (assuming the tax laws have not changed)?
16. If the marginal tax rate for a particular worker is 25% and the worker is offered overtime that pays a total of \$2,000 over the course of the year, how much money would the worker actually be able to keep?
17. A person earned \$50,000 last year and paid \$10,000 in taxes. The same person earned \$60,000 this year, and pays \$13,000 in taxes. What is the person's average tax rate last year? What is her average tax rate this year?
18. Using the calculations you have done for question 17, is the tax progressive, proportional, or regressive? Explain your answer.

19. A new tax is imposed on cigarettes. All packs of cigarettes are taxed at \$4.00 per pack. Would this tax be progressive, proportional, or regressive? Explain your answer.
20. A flat-rate tax program is proposed which taxes everyone nothing on the first \$25,000 earned and 30% of the amount by which his or her income is over \$25,000. Would this tax be progressive, proportional, or regressive? Explain your answer.

Chapter 8

How Do Things Add Up and How Much Is It All Worth?

You may have noticed that our journey through economics has followed a progression. Early on, we focused on choices and effects that were small in scale. As we have proceeded, we have been looking at larger choices affecting larger groups of people. We started with individual choices, then went on to people interacting and trading, then we showed their choices as groups of buyer and sellers, and then looked at how policies affect the markets made up of buyers and sellers. Finally, we used taxes to glimpse how policy choices affect large numbers of people, of various incomes, in society as a whole.

Thus, we have arrived at the threshold of macroeconomics, that is, big choices and big-scale effects that affect everyone together. From here on, one of our interests will be "**the economy**," by which we mean the aggregate of all of the outcomes of all of the choices of all of us in society. Another way to think about the economy is as the "big game," on the big playing field, in which all of the choices of all of the people to consume and produce all of the goods using all of the resources play against and with one another. Remember that it consists of and depends upon the individual choices made by individual "players" (decision makers). From time to time, we may "zoom-in" on certain individual players or groups of players, but mostly we will view the big game from our luxurious skybox seats, taking in as much of the excitement at once as we can. Don't forget the nachos. Face paint is optional.

How do we measure everything that is made?

To understand something as big and complex as the economy, we will find it useful to measure and summarize all of the production decisions and prices that result from all of the individual choices made in the economy. In the vein of the "big game" analogy, we need a way to keep score. This "score" should take into account not only how many goods and services our decisions enable us to produce, but also how valuable to people in the society the goods are. We do this using something called the **gross domestic product**, or GDP. The GDP is the total market value of all final goods and services that are produced domestically in a year. It's sort of like the total bill you would be charged if you took everything that was made in the country in a year, put it in a giant shopping cart, and took it through an enormous checkout line. We ignore whether you ask for paper or plastic. You certainly would need someone to help you take it out to your car, though.

What does GDP include?

The GDP is a measure of the market value of goods and services produced. Thus, GDP counts stuff that is traded in a market. The stuff includes physical goods, like computer software and hamburgers, as well as services, such as haircuts and car repairs. GDP only counts things that are bought and sold in a market, however, so if you

the economy - the production, consumption and trading activities of all of the people in a country or society

gross domestic product (GDP) - the total market value of all final goods and services produced in the domestic economy in a year

give yourself a haircut or fix your own car, it won't be included in GDP. That is not because cutting your own hair or fixing your own car are not productive activities, but because we have no way of knowing that you did them, and no way of knowing how much they would have been worth, unless someone somewhere paid for them.

Also, GDP only includes **final products**. By this, we mean that if an item is produced but is sold to someone who uses it to make another product, we do not want to count the item more than once (since it was only made once). For example, suppose a bushel of wheat is grown and is sold to a mill. The mill grinds the wheat to produce flour. The mill then sells the flour to a bakery company that uses it to bake Twinkies™. The bakery then sells the Twinkies™ to grocery stores, and the grocery stores finally sell the Twinkies™ to consumers. If we counted each sale in this process, the wheat would be counted four times. If instead, we only count the Twinkies™ when they are sold to consumers, the price of the Twinkies™ includes the value of the wheat, as well as the value of the work done by the mill, bakery, and grocery store. Goods that are sold as inputs or ingredients in some other product, such as the flour that is sold to the bakery, are called **intermediate goods**.

The GDP also counts all production that is done **domestically**, or within the country, but no production that occurs outside the country. Thus, if Toyota™ trucks are assembled and sold in the United States, using drive trains that are manufactured in Japan, engines that are made in Mexico, and transmissions that are made in Canada, the only portions of the truck that would count in U.S. GDP are the portions that are made in the U.S. The value of the drive train, engine, and transmission would have to be deducted from the price of the truck to determine how much the truck contributes to U.S. GDP.

Also, since GDP only counts production that is carried out domestically, if U.S. workers produce some good or service in another country, that production does not count in U.S. GDP. In fact, it counts in the GDP of the country where the work is done (even if the factory or workplace is owned by a U.S. company). Likewise, work done in the U.S. by foreign citizens counts in U.S. GDP, including the work of migrant farm workers and *Star Trek*™ captains (Kirk and Picard were played by non-Americans). By the way, there is a measure of the production of a country's *citizens*. It is called "**gross national product**," but it is used less commonly to measure the economy than gross domestic product is.

GDP also counts only production that is carried out during the year. If an item is sold that was made in a prior year, it does not count in this year's GDP. Also, if an item is produced in its final form this year, but is not sold to consumers, it is still counted this year. Technically, it is counted as inventory, and its value is the expected future selling price; if it is later sold for some other price, the calculation of this year's GDP will be revised to reflect the actual price. It is quite common for a particular year's GDP calculations to be revised one, two, or even three years later.

final products -goods that are in the form bought and used by consumers, rather than in some form that will be used in making another good.

intermediate goods -goods which are bought with the intention of using them to make some other product

gross national product (GNP) - the market value of the final products produced by a nation's citizens in a year (including production that the country's citizens do in other countries).

What doesn't GDP count?

GDP counts the value of things that are traded in markets, but it does not count everything traded in all markets. For instance, GDP does not include intermediate goods (non-final goods), since they will end up in some other good eventually. Also, GDP does not include most of the value of imported final goods or sales of final products made in prior years. However, the services of salesmen, brokers, and shippers that are involved in the trading of such goods are counted in GDP.

Further, GDP does not count the value of goods or services that are illegal to sell, such as illicit drugs, or murders for hire. Items that are sold illegally are sometimes said to be sold in the "**black market**." While such things may be valuable to someone in society (people obviously buy them), they are not counted because they are difficult to trace, what with being illegal and all. Besides, the bragging rights for being the country that out-produces the world in prostitution, hired killings, or methamphetamines just aren't that great.

Other market transactions that don't count in GDP occur in the (spooky-sounding) "underground economy." The **underground economy** is the name for buying and selling that is not recorded or reported to authorities such as the IRS, even though the items sold may be legal to make and sell. If a person is paid for work "under the table" or "off the books," usually in cash, there is no way to know that the trade has occurred, and so it is not included in GDP.

GDP does not include the trades that go on in financial markets, such as stock markets, bond markets, and futures markets. These markets do not involve the trading of goods or services that have been produced, but rather ownership of existing businesses, or promises of one kind or another. GDP *does* include the earnings of brokers and advisors in such markets, since they are being paid for rendering services. However, the stocks, bonds, and contracts traded in these markets do not count in GDP.

Also, GDP does not include **transfers** (such as Social Security or welfare payments) or gifts of money, since these do not represent spending for current production; output is not increased when such payments are made, but rather existing output is being moved around. However, the work of people who administer the transfers of funds would be counted in GDP.

Application: Two kinds of trades, and how they count in GDP

If an item is purchased with the intention that it is going to be rented out later, the purchase does not count in GDP. Instead, the rental "service" that is ultimately purchased is considered the final good, and thus it will be counted in GDP when it is bought. For example, apartment buildings do not count in GDP when they are built, but the rent paid by tenants of the apartments in the future will count in GDP, and each year's rent will count in GDP for the year in which it is paid.

Also, state lottery tickets do not count in GDP, at least not completely. Purchasing a lottery ticket is partly a transfer of funds to the state government, and partly a transfer of funds to the winning lottery ticket holders. Thus, the only portions of the lottery ticket purchase that do count in GDP are the funds that go to pay for the printing of the tickets, and the commissions that are paid to the stores that sell the lottery tickets to their buyers.

black market - the market for goods which are illegal to sell or buy

underground economy - the trading of legal goods that is not reported to authorities, often to avoid taxes

transfers - payments made to people that do not represent payment for purchases of goods or services.

How is GDP calculated?

There are two ways of calculating GDP. One method is to directly add up all of the spending on all final goods and services. This is called the **expenditure approach**. Another way to calculate GDP, which should get the same result, is to add up all of the incomes of all of the people who were paid to produce the goods that comprise GDP. This is called the **income** or **resource cost approach**.

How do we find GDP using the income approach?

The income approach would involve adding up the incomes of everyone who supplies a resource that produces goods and services. This includes the incomes of workers (employees) and the incomes of self-employed people. It also includes the rents earned by owners of machines, land, and buildings. It includes the profit income of business owners and the interest income earned by people who have invested in productive assets. All of these are payments to people who are producing something this year with their work, or are payments to people who have provided some assets that are producing something this year. They thus reflect, in part, the utility to society of the things the resources produce.

However, these payments do not represent all of the value of the goods being produced in the economy. For example, consumers who pay for goods that are being taxed (with excise taxes sales taxes, property taxes or other taxes) are paying more for the goods than the resources are being paid to make the goods. In effect, the government is also being paid for some of the value the consumers place on the output. Thus, the income approach adds in a component for taxes, called indirect business taxes, to account for the benefits society pays to the government rather than paying to producers or resource owners. Further, tallying up those payments to resources that we have listed will ignore that some resources, such as those that are owned by a business rather than rented, aren't "paid" anything and yet they are being used up or worn out as they are being used. Replacing these resources is a cost to the business, and thus would not be part of the business profits, which we have already included. To account for this, a factor for depreciation is also added onto the resource payments to get us to GDP.

How do we find GDP using the expenditure approach?

To find the total market value of all of the goods produced in the economy, we find the market value of the production of each kind of good, and then add all the market values together. So, we take the price of apples, p_A , multiplied by the quantity of apples produced, q_A to get $p_A \times q_A$, which would be the market value of the apples produced. Then, we do the same thing for bread, corn, doorknobs, electricity, and every other good, and add them all together. The result is something like

$$p_A \times q_A + p_B \times q_B + p_C \times q_C + p_D \times q_D + p_E \times q_E + \dots = \text{GDP}.$$

In the above, the ... indicates that we add every other good's price times its quantity to the total.

expenditure approach- calculating GDP by summing all of the spending on final goods and services produced in a year

income approach or **resource cost approach** - calculating GDP by adding up the cost of all resources used during a year, or the incomes of the sellers of those resources

Application: Calculating GDP

Suppose the following shows the prices and output in the country of Swollengum, whose population (the Swollens) produced only the following goods in 2003.

Artificial Limbs	Bandages	Crutches	
2003 Quantity	10	1,000	30
2003 Price	\$200	\$1	\$100

2003 GDP for Swollengum would be $\$200 \times 10 + \$1 \times 1,000 + \$100 \times 30 = \$6,000$.

How do we compare GDP for different years?

Calculating GDP for a particular year gives us the value of that year's output in terms of that year's prices. This is referred to as **nominal GDP** or **current GDP**. Over time, however, the GDP will change. It might change because the economy produces different amounts of goods. However, GDP can also change just because of changes in the values (and prices) of the things produced. We want to have some way of figuring out which is happening. Once we have that, we can figure out if GDP is going up over time because the output of the economy is increasing (called **economic growth**). On the other hand, we might discover that the GDP is simply going up over time because prices are generally getting bigger (which is called **inflation**).

To help us do this, we have a concept called **real output**, **real GDP**, or **constant GDP**. Real GDP is the GDP we would compute if we took the production of goods in one year and figured out how much the goods would cost to buy in some other year's prices. Doing so is holding prices constant between the two years (sort of a *ceteris paribus*). For example, regular old nominal GDP for 2003 is

$$P_{A03} \times Q_{A03} + P_{B03} \times Q_{B03} + P_{C03} \times Q_{C03} + P_{D03} \times Q_{D03} + P_{E03} \times Q_{E03} + \dots = \text{GDP for 2003 in 2003 prices.}$$

But, we could take the production of 2003 and figure out its value in 2002 prices

$$P_{A02} \times Q_{A03} + P_{B02} \times Q_{B03} + P_{C02} \times Q_{C03} + P_{D02} \times Q_{D03} + P_{E02} \times Q_{E03} + \dots = \text{GDP for 2003 in 2002 prices.}$$

This is the **real GDP**, using 2002 prices. Any difference between the nominal GDP and the real GDP is due to the differences in prices (since the quantities of each of the goods is the same).

We can get some idea of the differences in prices between the two years by dividing the amount that would have to be spent in the later year (nominal GDP) by the amount that would have to be spent to buy the same things with the earlier year's prices (real GDP). This creates a ratio of the current year's prices (2003 prices) to the prices of the other year (2002). So that we can use the price ratio more easily to calculate percentages, we usually show it as 100 times the ratio. This summary of price ratios is called the **price index**. The price index tells us how much we would have to spend in the current year (2003) to buy the same amount of goods as we could buy with \$100 in the other year (2002). The other year that we are using to compare prices is usually

nominal GDP or current GDP -the total value of the output of an economy in a year, evaluated using the prices of that year

economic growth- increase in the output or production of the economy

inflation- increase in prices, in general

real output or real GDP or constant GDP -an indicator of the amounts of all goods produced; the value of GDP expressed in some reference year's prices

price index -a summary of all of the current year's prices of all goods; an indicator of the weighted average of prices

referred to as the **base year**. The price index for the base year is always 100.

Application: Calculating real GDP and the price index

Suppose the following shows the prices and output in the country of Swollengum.

	Artificial Limbs	Bandages	Crutches
2003 Quantity	10	1,000	30
2003 Price	\$200	\$1	\$100
2002 Price	\$180	\$.80	\$90

Nominal 2003 GDP for Swollengum would be the value of 2003 stuff in 2003 prices, which is $\$200 \times 10 + \$1 \times 1,000 + \$100 \times 30 = \$6,000$. Real GDP for 2003 in 2002 prices would be the value of 2003 stuff in 2002 prices, or $\$180 \times 10 + \$.80 \times 1,000 + \$90 \times 30 = \$5,300$

The price index would be the ratio of the two, multiplied by 100 or $(\text{nominal GDP} \div \text{real GDP}) \times 100 = (\$6000 \div \$5300) \times 100 = 113.2$

In reality, you will probably not have to calculate price index numbers, since the government calculates them for us. Still, it is helpful to have some knowledge about how the price index numbers are calculated, since that makes using them a little more intuitive.

The government publishes several different kinds of price index numbers. The price index that the government creates using all of the prices for all of the things that count in GDP (similar to what we did above) is called the **GDP deflator**. However, since most of us do not buy everything that goes into GDP, the government also constructs price index numbers for just the things that consumers buy. The government does this by taking a list of such goods, and comparing how much that list would cost to buy in different years. It then takes ratios of these totals, and constructs index numbers (multiplying by 100), to produce the **Consumer Price Index**, or CPI.

How do we use the price index numbers?

Now that we have some idea of where the price index numbers come from, we can see how to use them. Using price index numbers, we can convert spending (on GDP or anything else) in one year to its equivalent in another year, by converting from the nominal to the real. In a sense, we are working backwards, to reconstruct the real value from the nominal, using the price index that was constructed from the nominal and real at some point.

For example, to get **real GDP** in base year dollars, find

$\text{Nominal GDP} \times (\text{Price Index}_{\text{Base Year}} \div \text{Price Index}_{\text{Current Year}})$.

If the nominal GDP for 2001 is \$10.0 trillion, the price index for 2001 is 177, and the price index for 1983 is 100 (1983 is the base year), the real GDP for 2001 in 1983 prices or dollars is

$\$10.0 \text{ trillion} \times (100 \div 177) = \5.65 trillion .

base year -the year to which prices are being compared, as when a price index is constructed.

GDP deflator -a price index based on the ratios of the prices of all the things that go into GDP

Consumer Price Index (CPI) -a price index based on the cost of buying a list of goods that consumers are likely to purchase

In general, you divide the number you have by the price index for the year that the prices or values are in, then multiply by the other year's price index (the year you are trying to convert the prices into). Thus, we could have just as easily found the real GDP for 2001 in 1997 prices:

Nominal GDP $\times$ (Price Index_{Other Year} $\div$ Price Index_{Current Year}).

If the nominal GDP for 2001 is \$10.0 trillion, the price index for 2001 is 177, and the price index for 1997 is 160, the real GDP for 2001 in 1997 prices or dollars is

$\$10.0 \text{ trillion} \times (160 \div 177) = \9.04 trillion .

However, we don't have to confine ourselves to calculating GDP. We can figure out the real value of any number, such as a person's income or hourly wage, in real terms. Doing so would be holding the value or purchasing power of money constant.

Application: using the price index to convert dollar values

If a person earned \$50,000 in 2001 and earned \$46,000 in 1997, did the real value of her income go up? If so, she could buy more stuff in 2001 with her income than she could have bought in 1997. Otherwise, she could not. To find out if this is so, we need to know the price index numbers. The CPI in 1997 was about 160, but the CPI in 2001 was 177. We could find the 1997 value of her 2001 earnings, and compare it to the \$46,000 she earned in 1997. Doing so gives us $\$50,000 \times (160 \div 177) = \$45,197.73$, so she was not able to buy as much in 2001 as she did in 1997.

Alternatively, we could find the 2001 value of her 1997 income. Doing so would involve multiplying by the 2001 price index and dividing by the 1997 price index to get $\$46,000 \times (177 \div 160) = \$50,887.50$, which is how much she would have had to earn in 2001 to consume the same amount of things she bought with her 1997 income.

What spending goes into GDP?

GDP spending is done by different kinds of buyers in the economy, and it is sometimes useful to categorize and measure how much spending is done by each. The largest category of GDP expenditures is that done by consumers when they purchase such things as food, clothing, shelter, medical care, entertainment, car washes, haircuts, and cheesy souvenirs of the White House (if they are made in the U.S.). This kind of spending is called **consumption**, and it is conspicuous, weighing in at about 70% of GDP.

Another component of GDP is spending by federal, state, and local governments, when they buy things like aircraft carriers, office supplies, and medical care for veterans, or when they pay money for building roads and hiring the services of teachers. This **government spending** accounts for a little less than 20% of GDP. However, governments together spend much more than 20% of GDP. A large amount of the money governments spend goes for wealth transfers, such as welfare payments or social security payments. Since these expenditures are not going to buy goods and services that are currently produced for governments, they are not counted in GDP.

Business spending on things like buildings, machinery, and office supplies also counts in GDP (if the stuff is not going to be resold). Such spending is called **invest-**

consumption -spending by individuals and families on goods and services they use, eat, wear, and enjoy

government spending -money the government uses to buy final goods and services, including those that are used right away and those that will last a long time

ment. Most of the items included in investment spending are going to be used to make other goods in the future (but not resold in themselves). Investment also includes things that are made in the current year but have not yet been sold to their final purchasers. These items are called **inventory**, and thus are counted (as investment) in the year they are made. When the items are sold in the future, they are deducted from that future year's inventory investment. **Net investment** for a particular year consists of the sum of all items counted as investment (including inventories) that year, minus depreciation and the values of items that are sold out of inventory in that year.

Additionally, GDP is affected by **net exports**, which is the amount of **exports** (goods made in this country, but sold to people in other countries) minus the amount of **imports** (goods sold in this country even though they are made in other countries). Including this is important, since spending on goods made in this country should count in GDP even if people in other countries buy them. Likewise, goods that are made in other countries should not count in GDP, even if citizens of this country spend money on them.

investment- business spending on final goods or services which are not going to be resold, and inventories of final goods that have not yet been sold

inventory- items which are in their final form, but which have not yet been sold. They count as part of investment

net investment- the sum of final goods bought by business or placed in inventory minus depreciation and items sold out of previous years' inventories

net exports- exports minus imports, this measures the spending on goods that are made in this country but sold in other countries, and subtracts spending on goods that are consumed in this country but not made here

exports - items made domestically but sold to people in other countries

imports - items made in other countries but purchased by domestic buyers

Can we use GDP to determine the well-being of people?

One use of the GDP is to compare the productivity, material wealth, and standards of living between countries. However, if a country has a large number of people, each person may have only a very small number of goods and services to consume, even though the country has a large GDP. To address this problem, we can calculate the **GDP per capita**, which is the country's GDP divided by its population. This gives us some idea of the amount of production per person in the country. GDP per capita may give us a very different picture of the productivity in different countries, as the table to the right shows.

If we wish to understand the well-being of people in different countries, even the GDP per capita might be misleading. GDP per capita does not indicate how that GDP is distributed (we have other tools for that, but they are more complex). Also, GDP per capita gives us some idea of the material well-being of a country's citizens, but cannot measure such intangible things as civility or happiness.

Top 25 countries in 2002 GDP		Same 25 countries in 2002 GDP per capita	
Country	GDP in billions of US dollars	Country	GDP per capita in US dollars
United States	\$10,082	United States	\$32,700
China	\$6,000	Canada	\$29,400
Japan	\$3,550	Japan	\$28,000
India	\$2,660	Australia	\$27,000
Germany	\$2,184	Netherlands	\$26,900
France	\$1,540	Germany	\$26,600
United Kingdom	\$1,520	France	\$25,700
Italy	\$1,438	United Kingdom	\$25,300
Brazil	\$1,340	Italy	\$25,000
Russia	\$1,270	Spain	\$20,700
Korea, South	\$931	Korea, South	\$19,400
Canada	\$923	Taiwan	\$17,200
Mexico	\$920	Argentina	\$10,200
Spain	\$828	Poland	\$9,500
Indonesia	\$687	South Africa	\$9,400
Australia	\$528	Mexico	\$9,000
Turkey	\$468	Russia	\$8,800
Iran	\$456	Brazil	\$7,400
Netherlands	\$434	Turkey	\$7,000
South Africa	\$412	Iran	\$7,000
Thailand	\$410	Thailand	\$6,600
Argentina	\$391	China	\$4,600
Taiwan	\$386	Philippines	\$4,000
Poland	\$368	Indonesia	\$3,000
Philippines	\$335	India	\$2,540

Source: 2002 CIA World Factbook

GDP per capita - the GDP per person in a country, found by dividing the GDP by the population of the country

.Questions for Review and Practice

1. Explain how each of the following activities will add to this year's GDP?
 - A. The time that a driver spends in line waiting to buy gasoline.
 - B. The time that an electrician spends re-wiring a house for a customer.
 - C. The time that a dog owner spends showing his dog at a dog show.
 - D. The time that a teacher spends making a meal for his family.
 - E. The time that a mechanic spends to repair his own car at his home.
 - F. The time that a teacher spends teaching a class.
 - G. The time that a college student spends downloading music from the internet.
 - H. The time that a homeowner spends gardening in her yard.
 - I. The time that a woman spends making a homemade card for her father.
 - J. The time that a pastor spends preparing a sermon.
 - K. The time that a lawyer spends on the phone to settle a lawsuit.
 - L. The time that a psychologist spends pretending to listen to a client.
2. Which of the following will increase GDP?
 - A. You earn \$2,000 working in Spain as an English instructor.
 - B. You pay \$300 for this month's rental of your apartment.
 - C. You receive \$300 from your parents.
 - D. You suffer \$10,000 of damage when you wreck your automobile.
 - E. You win \$10,000 in a state lottery.
 - F. You get a raise from \$8 to \$10 per hour and simultaneously decide to reduce your hours worked from 20 to 16 per week.
 - G. You are paid \$300 for computer services provided to a client.
3. How much will each of the following contribute to GDP?
 - A. Nguyen spends \$1200 on parts and rebuilds the engine of her automobile herself.
 - B. Lopez sells her four-year-old automobile for \$5,000 and buys Yee's two-year-old model for \$17,000.
 - C. Garcia sells her twelve-year-old automobile for \$1500 and buys a car (made in the U.S. this year) for \$15,300.
 - D. Horowitz pays a repair shop \$2,000 to have the engine of her automobile rebuilt.
 - E. Gonzalez spends \$1000 on parts and pays a mechanic \$1400 to rebuild the engine of her automobile.
4. In the year 2000, the Arizona Lottery sold \$256 million worth of lottery tickets. \$140 million of that was distributed as prizes, \$43 million went towards expenses of operating the lottery (printing tickets, buying lottery machines, and commissions to stores selling tickets), and \$73 million went to the State government. Based on this information, how much did the lottery add to GDP in 2000?
5. Suppose a Japanese company builds a plant to manufacture motorcycles in Nashville, Tennessee. How will the construction of the plant and profits produced this year in the plant affect U. S. GDP?

6. Determine whether each of the following is true or false:
 - A. Transfers of income, such as cash gifts, entitlement programs, and welfare payments, do not count in GDP.
 - B. Harmful side effects of production, such as pollution, are considered in the calculation of GDP as deductions.
 - C. All productive activity is counted in GDP, whether it is traded in a market or not.
 - D. The production of goods that are used as ingredients of other goods will be directly counted in GDP.
 - E. An increase in GDP always indicates that the standard of living of people has risen.
 - F. GDP includes production done by people in other countries.
 - G. Real GDP is always bigger than nominal GDP.
 - H. GDP does not count production of illegal substances, such as illegal drugs.
 - I. If an item is made this year, but is not sold until next year, it will count in this year's GDP.
 - J. GDP is an accurate measure of the welfare and happiness of a society.
 - K. An increase in GDP does not always indicate that a greater amount of goods or services is being produced.
7. Why doesn't GDP count productive services that people perform in and around their own homes, such as laundry, cleaning, household repair, gardening, child care, and home first-aid?
8. What is a price index? How is a price index constructed?
9. If we wanted to compare the production of the economy in the United States in 1953 to production in 2003, why would even real GDP fail to capture some of the differences between those two years? Give as many reasons as you can think of.
10. In 1990, the average hourly pay of U.S. workers was \$12.98 per hour (not counting benefits). By 2002, the average hourly earnings had risen to \$21.98 (not counting benefits). In 2002, the CPI was 179.9, compared to 130.7 in 1990. What was the average hourly pay of workers in 1990 measured in 2002 dollars? What was the average hourly pay of workers in 2002 measured in 1990 dollars?
11. How does the consumer price index (CPI) differ from the GDP deflator?

12. The following table lists the top 25 grossing movies (by 2003) in current dollar box office receipts. These "gross" numbers do not consider the cost of making the films (or video income), just ticket sales. For each film, determine the real value, in 2000 dollars, of the box office gross receipts. Also, answer the questions below.

Movie	Year	Domestic Box Office (Millions)	CPI in Year Released
<i>Jaws</i>	1975	\$260.0	53.8
<i>Star Wars</i>	1977	\$460.9	60.6
<i>The Empire Strikes Back</i>	1980	\$290.2	82.4
<i>E.T.</i>	1982	\$434.9	96.5
<i>Return of the Jedi</i>	1983	\$309.1	99.6
<i>Batman</i>	1989	\$251.2	124.0
<i>Home Alone</i>	1990	\$285.8	130.7
<i>Jurassic Park</i>	1993	\$357.1	144.5
<i>Forrest Gump</i>	1994	\$329.7	148.2
<i>The Lion King</i>	1994	\$312.9	148.2
<i>Independence Day</i>	1996	\$306.1	156.9
<i>Titanic</i>	1997	\$600.8	160.5
<i>Star Wars: The Phantom Menace</i>	1999	\$431.1	166.6
<i>The Sixth Sense</i>	1999	\$293.5	166.6
<i>Dr. Seuss' How the Grinch Stole Christmas</i>	2000	\$260.0	172.2
<i>Harry Potter and the Sorcerer's Stone</i>	2001	\$317.6	177.1
<i>The Lord of the Rings: Fellowship of the Ring</i>	2001	\$313.4	177.1
<i>Shrek</i>	2001	\$267.7	177.1
<i>Monsters, Inc.</i>	2001	\$255.9	177.1
<i>Spider-Man</i>	2002	\$403.7	179.9
<i>The Lord of the Rings: The Two Towers</i>	2002	\$339.7	179.9
<i>Star Wars: Attack of the Clones</i>	2002	\$310.7	179.9
<i>Harry Potter and the Chamber of Secrets</i>	2002	\$262.0	179.9
<i>Finding Nemo</i>	2003	\$324.9	183.6
<i>The Matrix: Reloaded</i>	2003	\$277.8	183.6

- Which of the films listed had the greatest box office receipts, in real terms?
- Which of the films listed had the second-greatest box office receipts, in real terms?
- In real terms, how do the box office receipts of *Jaws* (1975) compare to those of *Dr. Seuss' How the Grinch Stole Christmas* (2000)?
- In real terms, how do the box office receipts of *Jaws* (1975) compare to those of *Finding Nemo* (2003)?
- In real terms, how do the box office receipts of *Shrek* and *Monsters, Inc.* (2001) compare to those of *The Matrix: Reloaded* (2003)?
- In real terms, how do the box office receipts of *The Matrix: Reloaded* (2003) compare to those of *Dr. Seuss' How the Grinch Stole Christmas* (2000)?
- In real terms, how do the box office receipts of *Jaws* (1975) compare to those of *Jurassic Park* (1993), both Steven Spielberg films?
- In real terms, how do the box office receipts of *E.T.* (1982) compare to those of *Titanic* (1997)?
- Which superhero had the greatest box-office gross receipts in real terms, *Batman* (1989) or *Spider-man* (2002)?

Chapter 9

How Do Growth Rates Describe the Economy and What Do They Mean?

In the previous chapter, we used nominal GDP, real GDP, and the price index to describe the value of stuff the economy produces, the amount of stuff the economy produces, and the general level of prices, respectively. However, it is one thing to notice that the size of some number is getting bigger over time; it is even more useful to understand how much the number is growing over time.

Part of what we will do in this chapter is find the growth rates for things like real GDP and prices. Growth rates are usually expressed as the percentage increases in the numbers from one year to the next, so those are what we will be finding. In addition, we will calculate other percentages that help us understand the impact of people's decisions on the economy. For example, we can look at the unemployment rate to see how fully resources (especially labor resources) are being used. We can also look at the interest rate to determine how decisions are made that involve investments of other resources.

How do we find a growth rate?

When a number, such as GDP, is changing over time, and we want to know how fast it is growing, we determine the **growth rate** by calculating the percentage change (% change) in the number. To do this, we usually find the difference between the number's value one year and its value the next year, and divide by its value in the earlier year:

$$\% \text{ change} = \frac{\text{later year's value} - \text{earlier year's value}}{\text{earlier year's value}}, \text{ converted into a percent.}$$

Remember, that to convert to a percent, you multiply by 100 and add a percent sign.

Mathematically, a short cut for this is to calculate

$$\% \text{ change} = \frac{\text{later year's value}}{\text{earlier year's value}} - 1, \text{ converted to percent.}$$

Whenever you are finding a growth rate or percentage change, you have to compare two years' values. Usually the years are consecutive, which makes the growth rate an annual growth rate.

Application: Finding the growth rate in prices (the inflation rate)

For example, if the price index for 2001 is 182 and the price index for 2002 is 186, the percentage change in the price index between the two years is

$$\% \text{ change} = \frac{186 - 182}{182}, \text{ or (using the short cut) } \frac{186}{182} - 1, \text{ which is } 0.021978, \text{ or } 2.20\% \text{ (rounding off).}$$

growth rate -the percentage change or percentage difference in a value from one year to the next. found by taking the difference and dividing by the value for the earlier year

Which growth rates concern GDP and prices?

If we have values for the real GDP, such as those we computed in the previous chapter, we can find the growth rate, from one year to the next, of real GDP. The percentage change in real GDP is called the "**growth rate of the economy**," or "growth in (real) output," or "growth in real GDP." Of course, it indicates how much more the economy is producing than it produced the previous year.

The percentage change in the price index from one year to the next also has a special name. It is called the **inflation rate**. The calculation example we did on page 91 was actually an example of finding the inflation rate.

Since the numbers we use in macroeconomics, such as the real GDP and price index, are computed at the end of each year, the growth rates we find are telling us how much the value changed from December 31 of one year to December 31 of the following year. Since all of the changes thus have taken place in the later year, we call the growth rate the growth rate for the later year. For example, the value we found for inflation on page 91 (2.20%) is the inflation rate for 2002 (the later of the two years).

How are the growth rates related in macroeconomics?

A simple rule of thumb concerns numbers and their growth rates. We can apply this rule to the growth of real GDP, nominal GDP, and the inflation rate.

If $A \times B = C$, then (approximately):

growth rate of A + the growth rate of B = the growth rate of C.

So, if you think of the relationship between real GDP, the price index, and nominal GDP as

Real GDP x Price Index = Nominal GDP, then

**growth rate of real GDP + growth rate of price index (the inflation rate)
= (approximate) growth rate of nominal GDP**

Or, for any real and nominal numbers, it is approximately correct that
nominal growth = real growth rate + inflation.

If you are one of the people who insist on the exact answer,
nominal growth = real growth + inflation + (real growth x inflation),
but the value of the part in the parenthesis is usually small enough to ignore.

For example, if you were told that inflation between two years was 2% and real GDP grew by 3%, you could figure out that nominal GDP went up by about 5%. Or, if you had been told that the growth in nominal GDP was 5%, and inflation was 2%, you could figure out that the growth in real GDP was about 3%.

What is inflation, and why is it important?

The way we measure inflation is by seeing how much the price index changes from year to year. Which price index we use will depend on whether we are interested in finding the inflation for the economy overall (in such a case, we would probably use the GDP deflator) or inflation as it affects consumers (which would probably lead us to

growth rate of the economy -the percentage change in real GDP, also called the **growth in real GDP** or **growth in real output** or just **growth in output**
inflation rate -the percentage change or growth rate in prices (in general) as indicated usually by the growth rate in the price index

use the Consumer Price Index).

Regardless of which index we use to calculate it, inflation is a rise in the general level of prices over time. It is not merely an increase in the prices of a few items, since other prices may be going down. Also, inflation is not caused by increases in one or two prices—we will discuss the causes of inflation in future chapters.

Who is affected by inflation?

Everyone feels the effects of inflation. If a severe inflation leads to very rapidly rising prices, the inflation may even lead people to stop using money, since its usefulness in purchasing other goods is uncertain. This kind of episode, sometimes called a hyperinflation, can lead a country to economic disaster, and perhaps even political turmoil. Hyperinflations were partly responsible for the rises to power of the Nazi party in Germany and the Communist party in China.

However, even milder and subtler forms of inflation can impact peoples' lives, especially if the inflation is unanticipated. Unanticipated inflation is inflation that decision makers (such as borrowers, lenders and others who make decisions that concern the future) do not consider or fully consider when making decisions.

Two kinds of people are greatly affected by inflation when it is "**unanticipated**" (unexpected). **Net Monetary Debtors** are people who owe more money to other people than other people owe to them. **Net Monetary Creditors** are people who are owed more money by others than they owe to others. This can include money people have in the bank (the bank owes them that money back). How are they affected by unanticipated inflation? Net monetary creditors are harmed, since the money they are paid back with will buy less than the money they loaned to other people. Debtors are helped, by unanticipated inflation, since the money they owe (and will pay back) is worth less than the money they borrow. This only is true if the inflation is unanticipated. If inflation is **anticipated**, the debtors' interest rate will be increased to make up for the inflation that is occurring.

Others affected by inflation include people earning paychecks. If their salaries do not go up enough to keep up with inflation, they will be paid less, in real terms, over time. If they do not anticipate the inflation, they will not ask for greater pay. On the other hand, if the inflation is **anticipated**, then the workers can request higher pay to offset the higher expected prices. Alternatively, if automatic pay increases raise pay when inflation occurs, then workers will not be harmed by the inflation. Such automatic pay increases are called "**cost-of-living adjustments**," or COLAs.

unanticipated inflation- that portion of the inflation rate that is not considered when lending, borrowing or future spending decisions are made; inflation that is not factored into decisions

net monetary debtors -persons who owe more money to other people than is owed to them by other people. Debtors gain from unanticipated inflation.

net monetary creditors- persons who are owed more money by other people than they owe to other people. Creditors are harmed by unanticipated inflation.

anticipated inflation- the inflation rate that is considered when lending, borrowing or future payment decisions are made; inflation that is factored into decisions, either directly or through automatic means, such as cost-of-living adjustments.

Questions for Review and Practice

1. The table below shows nominal GDP and GDP deflator for the U.S. economy from 1995 to 2002 (in billions).

Year	Nominal GDP (in billions)	Real GDP (in billions)	CPI (1983=100)
1995	7400.6		152.4
1996	7813.2		156.9
1997	8318.4		160.5
1998	8781.5		163
1999	9268.6		166.6
2000	9872.9		172.2
2001	10208.1		177.1
2002	10383.1		179.9

- A. Find the real GDP for each year.
 - B. Find the inflation rate for each year (1996 to 2002).
 - C. Find the annual growth rate in real GDP for each year (1996 to 2002)
2. How is the inflation rate determined?
3. In addition to its effects on borrowers and lenders, what results do you think that inflation will have on the economy? What will happen if there is a high, unanticipated rate of inflation?

Chapter 10

What Other "Rates" Describe the Economy and What Do They Mean?

Real GDP growth rates and inflation rates indicate a lot about how and economy is doing, overall. However, specific groups of people or "sectors" of the economy may be affected by other things that are going on, and so other "rates" exist to describe conditions in these sectors. What people are so important that they rate their own rates? Probably people like you, if you ever borrow money, save money, have a job, or hire someone else to do work for you, because the rates we deal with in this chapter are **interest rates** and the **unemployment rate**.

The previous chapter touched upon **interest rates**, and mentioned that they were partly influenced by inflation. Because of that relationship, and because interest rates are can be thought of a growth rates, we'll start with them. Not only can apply your knowledge of growth rates to interest rates, but you can apply the nominal-real-inflation relationship you studied in the previous chapter to interest rates as well. Try to control your enthusiasm.

What are Interest Rates?

To a substantial degree, interest rates are growth rates, since they tell how fast an amount of money that you owe (or are owed) is growing. Suppose you borrow some money to buy a new plasma screen TV (so named because you have to sell your blood, or borrow lots of money, to afford one). The interest quoted to you by your friendly neighborhood bank (or loan shark) in money terms is the **nominal interest rate**. The nominal interest rate is just the annual rate of growth in the amount of money that you owe. On the outside, it seems like a single percentage, but the nominal interest rate is a lot like a Snickers™ bar; from the outside, it looks like one big slab of chocolate, but inside the chocolate coating, there are actually several other things all stuck together. Instead of fluffy nougat, caramel, and peanuts, the nominal interest rate is actually composed of (not so tasty-sounding) things like the real interest rate and the inflationary premium. The **real interest rate** is, in a sense, the opportunity cost (in real terms) of lending to you. The money you borrowed could have been used by the lender to buy goods and services that would have produced utility for the lender, and he or she is doing without that utility for a time. The real interest rate is a reflection of that lost utility over time. The nominal interest rate incorporates the real interest rate, but also includes an additional factor for **inflation**, sometimes called the "**inflationary premium**." When people who loan out money become aware of inflation, they will ask to be paid a greater rate of interest to compensate them for the higher prices of things when they get

interest rate- the annual (yearly) growth rate in the amount of money that a person owes (or is owed)

nominal interest rate- the annual interest rate in money terms; the interest rate that is quoted

real interest rate- the opportunity cost in real terms (or utility) of lending money and doing without goods for a while; the cost, less inflation, of borrowing. Also called the **real rate of return** or **real yield**.

inflationary premium- the portion of the nominal interest rate that is due to inflationary expectations or anticipated inflation

repaid. In doing so, they will anticipate the inflation, and act to prevent the inflation from reducing their wealth (as was described in the last chapter). This **anticipated inflation** will be included in the money or nominal interest rate.

So, (approximately) the nominal interest rate, real interest rate, and expected or anticipated inflation rate are related by the formula

Nominal interest rate = real interest rate + inflation (expected)

As time passes, and the actual inflation is observed, the relationship becomes

Nominal interest rate = actual real interest rate + actual inflation

If you wanted to figure out the real interest rate from the nominal interest rate you are charged and the actual amount of inflation that occurs, you could use the formula

actual real interest rate = nominal interest rate - actual inflation,

Sometimes, this is called the **real rate of return** or the **real yield**.

Why are there many interest rates?

As you probably know, there really are lots of interest rates. The interest rate a person pays when she buys a house and takes out a mortgage is different from the interest rate she pays when she borrows money using a credit card. Also, another person taking out the a mortgage loan for the same amount or charging a purchase with the same credit card might pay higher or lower interest rates.

A major reason why different loans have different interest rates is risk. Every time a person borrows some money, there is a chance that he or she won't pay back all (or any) of the money. Thus, the lender will add in a little extra interest as compensation for this possibility. This extra interest is called the **risk premium**. Since the risk differs for different kinds of loans and for different borrowers, interest rates vary.

The loans with the lowest risk are secured loans, such as home mortgages, in which property can be taken by the lender if the loan is not repaid. Loans in which no property is used as collateral or security will have high interest rates, as will loans to borrowers who have histories of not repaying loans.

In what way is the interest rate a time machine?

Interest rates reflect more than just how much you have to pay back when you borrow. Since any money you have could be saved or invested and thus earn interest over time, **decisions involving money and spending over time are related to the interest rate**. In a way, the interest rate is part of a "money time machine." It helps us to evaluate values of things over time.

To see this, suppose you were to put some money (called the "principal") into an interest bearing savings account today. The amount of money you would have in a year can be found by computing

$\text{principal} + \text{principal} \times \text{interest rate} = \text{future value}$

Since the money you are putting into the account now is the amount you have now, we call it the "present value." Thus, this calculation could be written $\text{present value} + (\text{present value} \times \text{interest rate}) = \text{future value}$

risk premium- the part of the interest rate that reflects the chance that a loan will not be repaid

Or, if we abbreviate "present value" as PV, "future value" as FV, the interest rate as i ,
 $PV + (PV \times i) = FV$

Doing a little algebra (trust me if you don't like to think about such things) gives us the formula in a handy form

$$PV(1 + i) = FV$$

So far, we've just gone from the present to the future using the interest rate. If we waited a year, we would have the amount in the formula above.

But suppose we want to bring some future amount of money, to be received in one year, into the present. We can just divide both sides of the formula by $(1 + i)$ to get

$PV = \frac{FV}{1+i}$ if the FV comes in one year from now Finding the **present value** of some future payment is sometimes called **discounting**; the present value of a future payment will always be less than the future amount.

It turns out that for every year farther into the future the future value will be paid, we just divide by $(1 + i)$ again. This means, for example, that if we were promised some future value (FV) ten years in the future, its present value would be

$$PV = \frac{FV}{(1+i)^{10}} \text{ if the FV comes in ten years from now}$$

Or generally,

$$PV = \frac{FV}{(1+i)^n} \text{ if the FV comes in } n \text{ years from now}$$

See? The interest rate is part of a time machine that can bring future amounts of money into terms we can examine in the present!

How are interest rates related to the prices of things, in general?

An item that a person owns and that gives the person benefits, either now or in the future, is called an **asset**. The present value of an asset that gives a person a single (one-time) future value is inversely related to the interest rate. This can be seen from the formula

current asset price = $PV = \frac{FV}{(1+i)^n}$ (again, FV is the future value, i is the interest rate, and n is the number of years in the future that the asset will produce the future benefit).

present value- the value now of some payment or value that will be paid or owed in the future; the amount that could be invested now, at the current interest rate, to obtain a specific payment in the future. To find the present value, apply the formula $PV = \frac{FV}{(1+i)^n}$, where FV is the future value or payment, i is the interest rate, and n is the number of years in the future that the payment is to be made.

discounting- finding the present value of some future payment or future value

asset- an item of value that retains its value over time or provides benefits to its owner over time

One application of this is an asset known as a **bond**. A bond is a promise to pay some future value; it is simply an "I.O.U." for some future payment. However, its present value or price will be inversely related to the interest rate, since the formula relating present values to future values and the interest rate will apply. So, bond values (prices) tend to go up when interest rates go down, and vice versa.

How is the interest rate related to the prices of long-lasting assets?

A valuable piece of real estate or other asset that gives a particular benefit to its owner every year for many years will have a present value equal to a whole lot of $\frac{FV}{(1+i)^n}$ added together (one for each year's benefit). However, if the asset provides benefits forever, or nearly forever, the sum of all the present values turns out to be a special (and simple) formula:

$PV = \frac{FV}{i}$ if the FV comes once every year forever (beginning one year in the future), and the interest rate is i . Technically, an asset that gives benefits forever is called a "**perpetuity**" ("perpetuity" means it goes on forever).

Application: finding the current value of a long-lasting asset

This formula can be used to figure out the present value (price) of a piece of property. For example, if a house can be rented out for \$10,000 a year (\$833.33 per month), and the interest rate is 5%, the present value of the house is about

$$PV = \frac{FV}{i} = \frac{\$10,000}{5\%} = \frac{\$10,000}{.05} = \$200,000$$

This present value is about what the house could be expected to sell for right now. However, if the interest rate were to change, say to 10%, the house's value would fall...

$$PV = \frac{FV}{i} = \frac{\$10,000}{10\%} = \frac{\$10,000}{.10} = \$100,000$$

Thus, the present value of an asset like a piece of real estate is always inversely related to the interest rate. The higher the interest rate (assuming everything else is the same), the lower the present value (and the price).

What is Unemployment?

Another percentage that helps us understand the economy and the results of all of our decisions is the unemployment rate. The unemployment rate is not a growth rate, but it is a percentage.

To figure out the unemployment rate, first we have to figure out what it means to be unemployed. At first, it is tempting to think of everyone who does not have a job as unemployed (admit it, you are tempted). However, most of the people who do not have jobs are actually quite happy not to be working. For example, millions of people are retired and wouldn't go back to work if you paid them (quite literally). Others are too

bond- an asset that promises to pay a specified amount in the future (sometimes including several payments over time). Bonds are essentially IOUs, and are sold by governments or corporations that wish to borrow money. The prices of bonds are determined in the market, but are inversely related to interest rates.

perpetuity- an asset that gives the same benefit (FV) every year forever, or just about forever. The present value of such an asset is FV/i

young to work, and can blissfully ignore the daily grind they will face when they get older. Still others choose to take care of home and family, and do not want paying jobs. There are also those people who are on disability leaves, those who live off of inherited wealth, those who are full-time students, and those who choose to sponge off their families or friends. Since not everyone wants to work, we only measure the unemployment as the portion of those people who want to work but are not working.

Everyone over 16 who is working or looking for work (in the last four weeks) is part of a group called the **labor force**. If you're a kid, or if you don't want a job, you aren't part of the labor force (sorry, it's an exclusive club). If you want a job, but don't have one because you have been promised one or expect to start one soon, you are still in the labor force, even if you are not looking for a job.

Some of the people in the labor force are **unemployed**, which means they want to work (so they're in the labor force) but they are not working. They could be looking for work, they could have been promised a job that has not started yet, or they could be on a temporary layoff from a job to which they expect to be recalled.

We can figure out what portion of the whole population is in the labor force by finding the **labor force participation rate**. The labor force participation rate is the percentage of the whole population that is in the labor force:

$$\text{Labor Force Participation Rate} = \frac{\text{number of people in the labor force}}{\text{number of people in the population}} \text{ (in percent)}$$

We can also figure out the percentage of people in the labor force that are unemployed. This is the **unemployment rate**:

$$\text{Unemployment rate} = \frac{\text{number of people who are unemployed}}{\text{number of people in the labor force}} \text{ (in percent)}$$

Application: Finding the labor force participation and unemployment rates

Suppose the population of Firebird City is 800,000. Of those, 500,000 are working full or part time, and 50,000 are looking for work (but not working). What are the labor force participation rate and the unemployment rate?

Remember, to find the unemployment rate and the labor force participation rate, you must first determine the size of the labor force (if it is not provided).

To find the labor force, add the number of people who are working to the number who want to work (but are not working), since everyone who wants to work is in the labor force. The size of the labor force is thus $500,000 + 50,000 = 550,000$.

The labor force participation rate is the percentage of the population that is in the labor force, or $\frac{\text{labor force}}{\text{population}} = \frac{550,000}{800,000} = 68.75\%$.

The unemployment rate is the percentage of the labor force (not the population) that is unemployed. For these numbers, that would be $\frac{\text{unemployed}}{\text{labor force}} = \frac{50,000}{550,000} = 9.09\%$

labor force- the people over the age of 16 who are working or who are willing and able to work at current wages

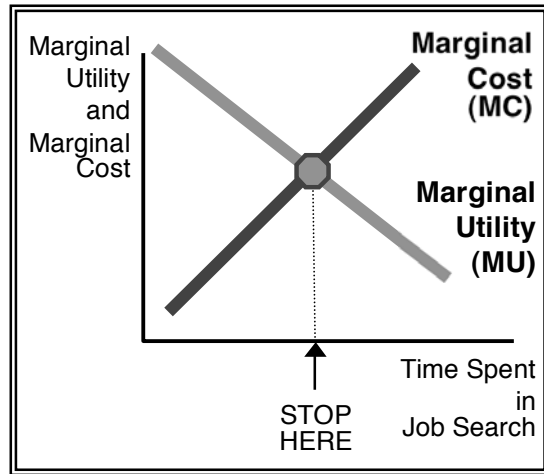
unemployed- people in the labor force who are not working

labor force participation rate- the percentage of the population that is in the labor force

unemployment rate- the percentage of the labor force that is unemployed

Why do we have unemployment?

There are always plenty of job opportunities. However, no individual worker is qualified for every job. Further, no one job would be suitable for every worker. An



unemployed worker must learn what jobs are available, which jobs she is qualified for, what each job pays, what the working conditions are like, and so on. Information is costly, and unemployment results from the search for information about jobs. As with any activity, a person will continue to search for a job as long as the marginal (opportunity) cost is less than the marginal utility. During a job search, the opportunity cost to the worker is the other (highest-valued) activity or activities that she could be engaged in, including taking the best job she has found so far. The marginal utility of the job search is new information about jobs as well as job offers. For the period of time that a worker is searching for a job, the worker is unemployed.

Eventually, the costs of continuing a job search will rise, as the worker finds she is turning down good job offers to hold out for better ones. Also, the marginal benefit of continued job search will fall, since the worker will not really be learning anything of value about the job market, and will have already found the jobs that suit her. When the marginal utility of continued job search is no longer greater than the marginal opportunity cost, continuing further is just not worth it. At that point, the worker will either take the best job she has been offered, seek training to qualify for a better job, or give up altogether on the idea of working.

What are the kinds of unemployment?

As soon as a worker stops her job search, she is no longer unemployed. If at the end of a person's job search, she finds and accepts a job, we say that her unemployment was **frictional**. Frictional unemployment is due solely to the costs of information. If a person looks for a job, but discovers her skills don't match what employers are looking for, her unemployment was **structural**. Structural unemployment occurs partly because it takes time for workers to learn about the training or skills the job market requires. A worker who experiences structural unemployment may take part-time work while receiving training, or may temporarily leave the labor force during the training period.

If a worker decides, after a job search, that she really doesn't want to work at the wages she is offered, and does not want to (or cannot) get training for the available jobs, she may be considered a **discouraged worker**. Maybe she'll move in with her

frictional unemployment- unemployment that is caused by the time-consuming search by workers for jobs, and by the costs of information.

structural unemployment- unemployment that is caused by the need for workers to get new skills or training, and the process that workers must go through to discover that need.

discouraged worker- a worker who leaves the labor force, after an unsuccessful period of unemployment, and who does not seek training to re-enter the labor force.

parents. Maybe she'll live on the streets. Maybe she will enter the black market and sell illegal goods. Either way, not only does she sound depressed, but she will leave the labor force, possibly forever.

Is unemployment unavoidable?

There are always some people moving out of their parents' home, looking for their first job, getting out of the military, or finishing school. Those people will be unemployed for the time that they are searching for a job. The only way to prevent such unemployment would be to force people to take jobs for which they are unsuited or force them into jobs that will make them unhappy. It's bad enough to end up *choosing* a job you don't like, but it would be intolerable to most people if they were required by law to take such jobs. Thus, some unemployment will always exist as long as workers are free to choose where and for whom they will work. This unavoidable unemployment is the **natural rate of unemployment**. The natural rate of unemployment consists of some frictional and some structural unemployment. The amounts depend on the economy and how many people are entering the job market or voluntarily changing professions, etc. Estimates of it range from 4-5%, and it can vary over time.

The unemployment rate that is actually measured (the **actual rate of unemployment**) consists of the natural rate of unemployment plus any extra unemployment that exists. This additional unemployment is caused by fluctuations in the economy, particularly slow growth of GDP or economic recession. This is called **cyclical unemployment**. It has nothing to do with bicycling. Instead, it reflects the cycles of ups and downs that the economy goes through, and the changes in frictional and structural unemployment that are thus caused.

If the economy is operating smoothly, and the only unemployment is the natural rate, then the economy is said to be at **full employment**. Full employment does not mean that there is no unemployment. Rather, it means that no cyclical unemployment exists (the cyclical unemployment rate is zero).

In the long run, the economy will always have some unemployment (the natural rate). This will limit the resources that can be used to produce goods and services in the long run. The most output (real GDP) that we can expect the economy to produce consistently, year after year, will be the amount that can be produced with resources available. Thus, the real GDP produced when the economy is at full employment (with only natural unemployment) is called **long run real GDP** or **potential real GDP**.

natural rate of unemployment- the frictional and structural unemployment that is unavoidable in a society which permits resources, such as labor, to find their highest-valued uses (the jobs that suit them best)

actual rate of unemployment- the measured unemployment rate; it includes the natural rate plus any cyclical unemployment

cyclical unemployment- unemployment that is due to changes in the economy and changes in the use of resources

full employment- the situation that exists when unemployment consists of only the natural rate (cyclical unemployment is zero)

long run real GDP, potential real GDP (output)- the real GDP that will be produced when the economy is at full employment

Questions for Review and Practice

1. The table below shows nominal GDP and GDP deflator for the U.S. economy from 1995 to 2002 (in billions).

Year	Nominal GDP (in billions)	Real GDP (in billions)	CPI (1983=100)
1995	7400.6		152.4
1996	7813.2		156.9
1997	8318.4		160.5
1998	8781.5		163
1999	9268.6		166.6
2000	9872.9		172.2
2001	10208.1		177.1
2002	10383.1		179.9

- A. Find the real GDP for each year.
 - B. Find the inflation rate for each year (1996 to 2002).
 - C. Find the annual growth rate in real GDP for each year (1996 to 2002)
2. How is the inflation rate determined?
3. In addition to its effects on borrowers and lenders, what results do you think that inflation will have on the economy? What will happen if there is a high, unanticipated rate of inflation?
4. What kind of interest rates would you expect in countries that have high inflation rates? Why?
5. Why will even an efficiently functioning economy have some unemployment of labor and other resources?
6. For each of the people described below, determine whether he or she is unemployed, employed, or not in the labor force.
- A. Jasmine is not working; she applied for a job at Kwik-E-Mart last week and is waiting to hear back.
 - B. Mario is on a layoff from his job at Honda U.S.A., due to a model changeover, but he expects to be recalled in three weeks.
 - C. Antoine lost his job as an electrician when a construction project was completed. He is looking for work but has been unable to find anything except a \$9 per-hour job, which he turned down.
 - D. Helene works 45 hours per week as a homemaker for her family of five.
 - E. Sterling works four hours in the mornings at a veterinary clinic and for the last two weeks has spent the afternoons looking for a full-time job.
 - F. Nguyen is a full-time student living with her parents and does not want to work yet.
 - G. Pablo, a 17-year-old, works six hours per week for a web hosting company.
 - H. Benny lost his job as a framer when a construction project was completed. He is working at a Krispy Kreme store for \$10 an hour.
 - I. Carlos is vacationing in Mexico after being fired from his job with a software publisher. He expects to start looking for a new job in a couple of weeks.
 - J. Jim has retired after a long career with the City of Phoenix.

7. How are full employment, the actual rate of unemployment, and the natural rate of unemployment related?
8. If the rate of unemployment decreases, will the proportion of the total population that is employed necessarily increase? Explain.
9. Is the natural rate of unemployment always the same?
10. True or false:
 - A. The actual rate of unemployment always equals cyclical unemployment.
 - B. If the natural rate of unemployment also equals the cyclical rate, then the economy is at its potential GDP.
 - C. If the actual rate of unemployment equals the natural rate of unemployment, then cyclical unemployment is zero and the economy is at its sustainable potential GDP.
 - D. If the natural rate of unemployment is zero, the economy is at potential GDP
 - E. If the economy is at potential GDP, the natural rate of unemployment will be zero.
 - F. If the cyclical rate of unemployment is zero, then the natural rate of unemployment also equals zero.
 - G. If the actual rate of unemployment is greater than the natural rate of unemployment, cyclical unemployment is greater than zero.
 - H. If there is cyclical unemployment, the economy's GDP is below its sustainable potential GDP.
 - I. If the actual rate of unemployment is below the natural rate of unemployment, then cyclical unemployment is negative.
 - J. If the natural rate of unemployment is positive, the economy's GDP is less than potential GDP.
 - K. If the economy's GDP is equal to its potential GDP, the natural rate of unemployment will equal actual unemployment.
 - L. If the cyclical rate of unemployment is zero, then the natural rate of unemployment also equals the actual unemployment rate. However, if this rate is greater than zero, the economy's GDP is less than its sustainable potential GDP.
11. Suppose a country has the following statistics:

Population	200,000,000
Labor force	120,000,000
Not currently working	90,000,000
Employed full-time	80,000,000
Employed part-time	30,000,000
Unemployed	10,000,000

 - A. Using the above information, what is the labor force participation rate?
 - B. Using the above information, what is the rate of unemployment?
 - C. Using the above information, what is the employment/population ratio?
12. If a person is classified as unemployed, does it mean there are not enough jobs? What does it mean?

13. Which of the following will increase a job seeker's likelihood to reject an available job offer and continue searching for a superior alternative? Which would not?
- A. An elimination of unemployment benefits paid to those looking for jobs.
 - B. News that a new job search web site, posting information on thousands of local job openings, will be available in a week.
 - C. The rumor that a major firm in the area is going to expand employment next month.
 - D. The availability of food stamps.
 - E. Optimism about the future of the economy.
14. The table below shows the 2002 population, employment, and unemployment figures for eight countries (all numbers are in millions).

Country	Population 15 and over	Number Employed	Number Unemployed
United States	222	134.7	7.1
Canada	26	15.2	1.2
Japan	108.6	64	3.7
Germany	70.4	37.8	4.1
France	48.7	24.2	2.4
United Kingdom	48.6	28.2	1.5
Italy	49.6	21.5	2.1
Mexico	69.5	38.6	1.2

- A. Based on the table above, how many people were in each country's labor force?
- B. What was the labor force participation rate for each country?
- C. What was the unemployment rate in each country?

Chapter 11

What Markets are Important in Macroeconomics and How Do We Model the Whole Economy?

So far, we have seen that all of the decisions made by all of us result in stuff being produced, economic growth, the price level, interest rates, unemployment, and such. Now that we have several ways of measuring things that are going on in the economy, you might find yourself asking how all these things happen. You yearn to know what causes interest rates to rise and fall. You hunger to know why unemployment increases. You thirst to know why inflation happens. You lust for the secret to eternal life (OK, I just threw that one in to see if you were paying attention). Maybe, at least, you might have some slight desire to know what causes real GDP to grow or shrink. Well, at least some of those cravings will be satisfied in this chapter (not the eternal life one, though).

There are four markets that we will use to understand the economy and the connections between all of those numbers we cranked out in chapters 7 and 8. You might think of the markets as the three little pigs and the big bad wolf, except that they all get along (a sort of politically correct version of the story), and the big market isn't really that bad. All four of the markets are tied together, because the prices in the three little markets affect what happens in the big market, and vice versa. The three little markets are small enough for us to talk about using our old friends, supply and demand. The fourth market is so big and special that we will need to use special, souped-up versions of supply and demand to talk about it.

What three smaller markets influence the economy?

What is the loanable funds market?

Decisions to produce goods and purchase the goods produced by the economy are greatly influenced by the market for loans, or **loanable funds**. This is where loans are "purchased" and "sold." Sometimes, this is called the **capital market** or **money market**.

The price on each dollar lent and borrowed is the **interest rate**. We can also think of it as rent being paid on each dollar, as a percentage of each dollar borrowed. The interest rate was one of those numbers we talked about in chapter 8. If we remember that the interest rate is really a price, determined in a market, we can better understand not only where it comes from, but also how it affects decisions of producers and consumers in the economy. Since it is a price, and some people are willing to pay it to borrow money, the interest rate tells us how much people prefer to have money to make purchases now rather than in the future.

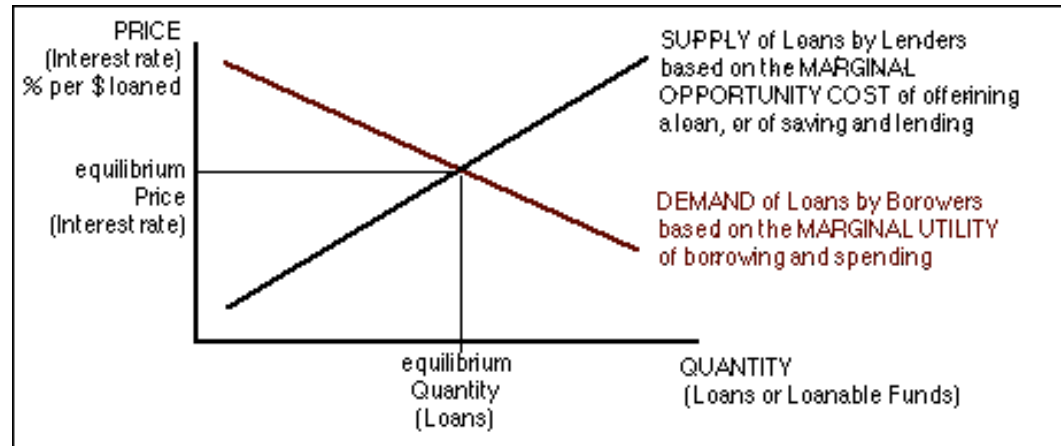
The demand for loans is determined by the marginal utility to borrowers of obtaining goods and other things that they want to buy right away rather than waiting to obtain them. If purchasers discover many goods that they want to buy, or lots of opportunities to invest (for example, the opportunity to start, buy, or expand a business), the

loanable funds market- the market for loans, in which the interest rate is determined; also called the **capital market** or **money market**.

interest rate- the price a borrower must pay each year to borrow, as a percent of the amount borrowed.

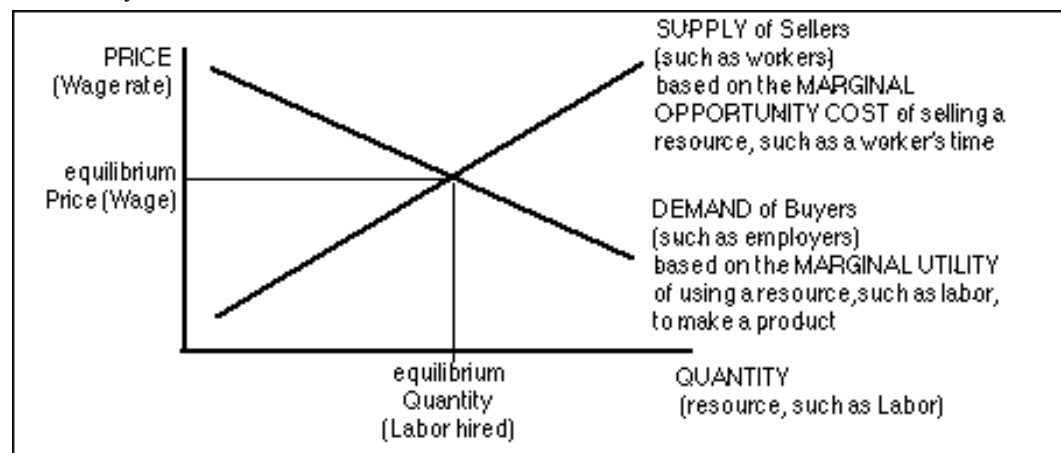
demand for loans will increase.

The suppliers in the loanable funds market are ultimately people who save, although banks act as middlemen (the fancy name is "financial intermediaries"). In order for money to be available for loans, some people must be saving and denying themselves things they could be purchasing. Thus, the supply of loans is based on the marginal cost of saving and lending funds. The less costly or more attractive saving is, the greater the supply of loanable funds will be.



What are resource markets?

The production decisions made in the economy are also influenced by the markets in which resources are bought and sold. These are collectively called **resource markets**. In such markets, resource owners supply resources based on the marginal opportunity costs of doing so. The demand for resources is based on the marginal utility of buying or hiring the use of the resources. Resource demand differs a bit from the demand for goods because resource demand is based on factors like the demand for products that the resources can be used to make, and how productive the resources are when they are used.



One important resource market is the **labor market**. The sellers in the labor

resource market- a market in which a resource is bought and sold.

labor market- the market in which labor resources are sold by workers to employers, at a price generally referred to as the wage

market are workers selling their time to employers. The employers in labor markets are the buyers. The prices of labor resources are usually called **wages** or **salaries**. Otherwise, the labor market is like the market for any other resource.

The demand for labor is based on the productivity of labor and the value to employers (the buyers) of the products made by workers. If worker productivity increases, or if the prices of products go up, the demand for labor will increase.

The supply is based on the opportunity cost to workers of supplying their time. The more attractive working looks to workers, or the lower the cost of working, the greater the supply of labor will be. Also, the more workers who have the skills or abilities needed by employers, the greater the supply will be.

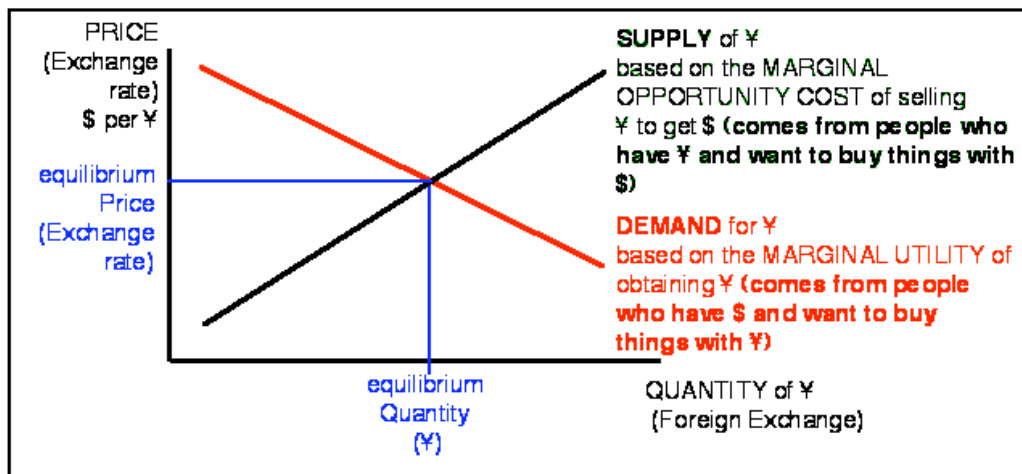
What is the foreign exchange market?

The third market that influences decisions to produce or purchase in the economy is the market for the currency (money) of other countries. This is called the "**foreign exchange market**." The price in this market is called the "**exchange rate**," and as the case with any price, it is determined by supply and demand.

People from the United States who travel to another country or import the products of another country must first buy the money of that country to spend there. By spending the dollars to buy the money of the other country, they create a demand for the other country's money. As their desire to make purchases in the other countries goes up, so will the demand.

The supply of the other country's money comes from people who live there, but who want to buy U.S. dollars so that they can visit the United States or buy things from the United States. As their desire to make purchases of U.S. goods or visit the U.S. increases, so will the supply of the other country's money.

In the following diagram, the money being traded is Japanese yen (¥), which is being purchased with U.S. dollars...



wage- the price in a labor market

foreign exchange market- the market in which money of other countries is bought and sold.

exchange rate- the price in the foreign exchange market; the amount of one country's money that it takes to buy the money of another country.

How do we view the market for goods and services in the whole economy?

Now that we have looked at the three little pigs, er, markets that influence the economy, it is time to explore the big market for all of the goods and services produced in the economy. The market, usually called the **aggregate goods and services market**, reflects the desires of all of the economy's buyers for everything, and the decisions of all of the economy's producers of everything. Since demand and supply, as we have used them before, only consider the price and quantity of one good at a time, looking at all goods in one picture is going to require a change in thinking.

First, instead of looking at just one good's price, we need to use an indicator of all of the prices of all of the things that are produced in the economy. Fortunately, we already have one such indicator (from chapter 8, remember?) – the **price index**. Often, we will just refer to it as the "**price level**," but it's the same thing. Thus, the price level or price index will be the price in our new market.

Second, instead of looking at the quantity of just one good that is being bought or sold, as we would in a typical market, we need to look at the quantity of everything being made all at once. Again, we already have an indicator of how many goods and services are being made in **real GDP**. So, the real GDP will serve as quantity in our new market.

Finally, since the price level is an **aggregate** of all prices (of currently produced goods and services) and the real GDP is an **aggregate** of all production, we will have to adjust the way we think about supply and demand. We will have to adopt an **aggregate** way of thinking about them for this new market. We are used to thinking about how buyers of a particular good make decisions to buy that particular good by responding to that good's price. Instead, we will now have to think about how buyers in general respond to the general level of prices when they make overall purchasing decisions. Similarly, instead of thinking about how sellers and producers of a particular good decide how much of that good they will sell in response to its price, we will have to think about how producers, in general, make production decisions in response to the overall level of prices in the economy.

All of this means that "we're not in Kansas, anymore, Toto." Instead of the black-and-white world of supply and demand that we are used to, we are going to have to go full Technicolor. Just watch out for the flying monkeys.

What is Aggregate Demand?

The relationship between the price level (index) and the quantity of domestically produced goods and services that buyers are willing and able to purchase from the

aggregate goods and services market- the market for all things produced in the economy

price index or **price level**- an indicator of the overall level of prices in the economy

real GDP- the inflation-adjusted measure of all final goods and services produced in the economy

aggregate- putting everything together

economy is called **aggregate demand**. Aggregate demand is an inverse relationship, which means that the aggregate demand curve, its graphical counterpart, is a downward sloping curve. It shows the level of real GDP that will be purchased by consumers, government, businesses, and people in other countries at various price index levels.

The reasons why it slopes down are not the same as the reasons why there is a downward sloping demand for an individual good. Rather, all the reasons have to do with the effect of inflation on the decisions of buyers.

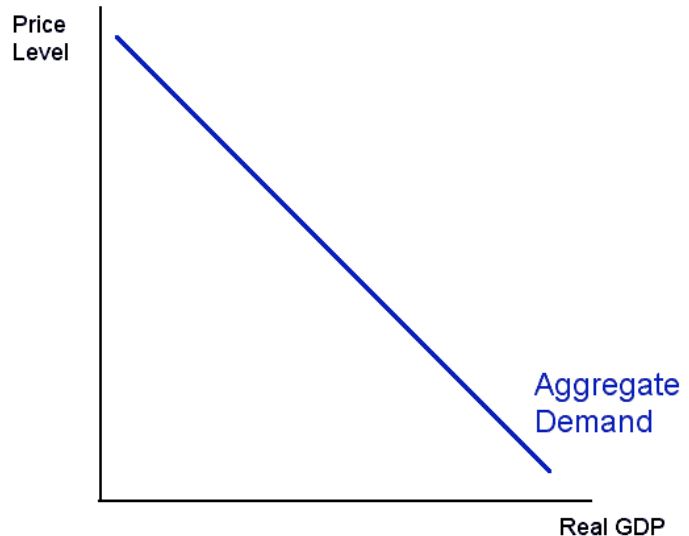
Why does Aggregate Demand Slope Down?

There are three major reasons we believe that the aggregate demand is an inverse relationship, and that the aggregate demand curve is a downward-sloping curve or line.

1. The effect of the price level on buyers' wealth (particularly that of consumers).

When the price level rises (and there is inflation), the value of any wealth that is kept in the form of cash (or non-interest bearing bank deposits) will fall. Since each dollar will buy less, each dollar is worth less, and its owner is made that much less wealthy. This is called the "**real balance effect**" or the "**real wealth effect**." This is something like the effect of unanticipated inflation on creditors. However, notice that there is a bit of this effect even if the holder of the dollar is not a net monetary creditor. Since holders of dollars will become poorer, they will be less able and willing to buy goods at a high price index level than they would at a lower price index level.

2. The effect of the price level on the ability to borrow. A higher price index (inflation) raises real interest rates. This is because inflation requires that buyers of goods borrow more money to buy the same things as they might have bought before the inflation (since prices are higher). This increases the demand for loans, which raises the interest rate (in both nominal and **real** terms). However, at a higher real interest rate, borrowing looks less attractive, and will be more difficult to afford. The result is that buyers will not be able to simply borrow enough to keep up with the higher prices of the things they are buying, and will instead buy fewer things. This is called the "**real interest effect**."

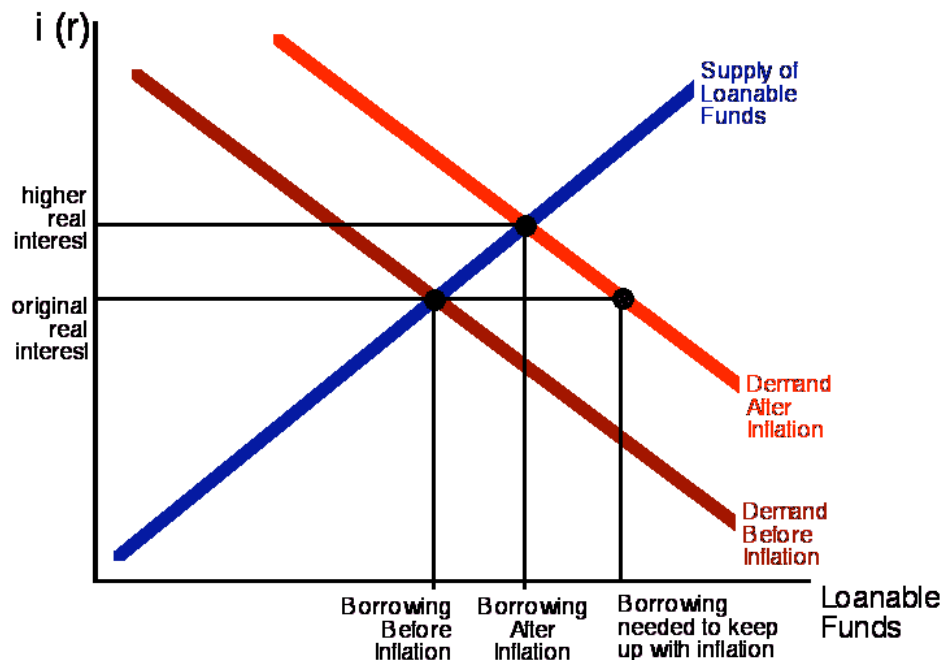


aggregate demand- the relationship between the price level and the total amount of real goods and services that purchasers desire from the economy

real balance effect- the reduction in wealth of consumers that will result because of a higher price level or inflation; also called the **real wealth effect**

real interest effect- the increase in real interest rates that will result from inflation. Higher price levels increase the demand for loans, thus raising both real and nominal interest rates, resulting in less borrowing than would be required to maintain purchases at pre-inflation level.

To see this, look at the loanable funds market (see the diagram to the left). Here, we are using the real interest rate (r) as the "price," since we are interested in the



real interest rate. Notice that after the inflation, purchasers will increase their demand for loans in an attempt to keep up with the higher prices of the things they want to buy. That increase in demand will raise the interest rate "price" of loans, since the supply of loanable funds is not changed. However, at the new, higher real interest rate, borrowers will not be able or willing to borrow enough extra money to keep up with the higher prices of the things

they want to buy. Because their ability to borrow will not keep up with inflation, purchasers will have to buy fewer items than they would otherwise.

3. The effect of the price level on international trade. When there is inflation in one country, buyers will substitute goods they can purchase in countries that have not had inflation, since domestically produced goods will look comparatively more expensive. This is called the "**international substitution effect**."

What is Aggregate Supply?

The relationship between the price level (index) and the quantity of goods and services that producers are willing and able to produce in the economy is called **Aggregate Supply**. With aggregate supply, the effects of the price level depend on how much time producers have to make and change decisions. For this reason, we actually have two Aggregate Supply curves!

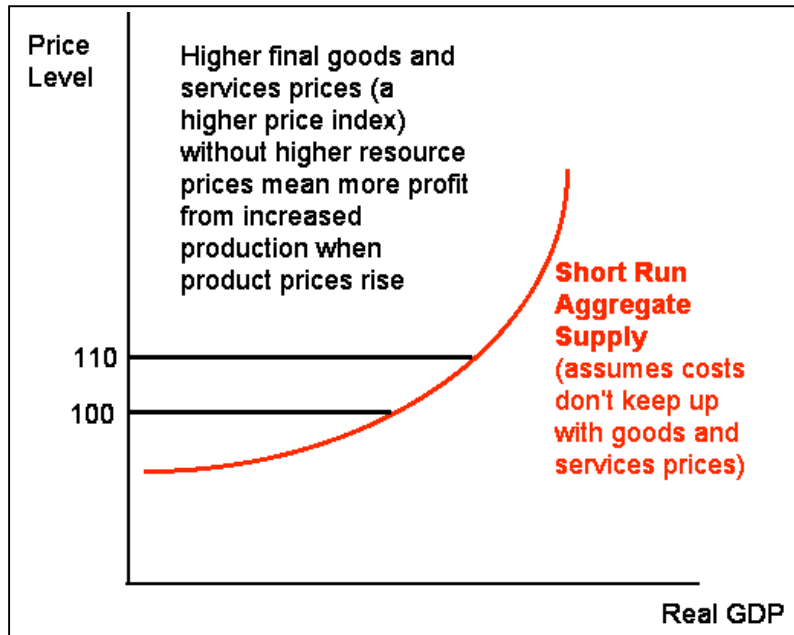
international substitution effect- inflation in one country will cause its consumers to purchase more goods from countries that have not had inflation, and fewer goods will be purchased domestically.

aggregate supply- the relationship between the price level (price index) and the quantity of goods and services that producers are able and willing to supply

What is Aggregate Supply in the Short Run?

In the **short run**, some decisions cannot be altered. For example, commitments to sell resources may be made with contracts (such as labor contracts) that cannot be altered right away. For the producers of goods and services in the economy, this means that the costs buying resources, and the costs of making their products, are not likely to change much in the short run. This will be true even if there is a rise in the final prices of the goods and services they make and sell. Thus, an increase in the price level will cause product prices to go up, but there is no increase in product costs. Producers will thus have an incentive to increase production, since their profits are increasing.

In the short run, then, aggregate supply is a positive or direct relationship between the price level and real GDP production. As the price level increases, the quantity of real goods and services produced will increase. **Short run aggregate supply** is thus shown as an upward-sloping curve.



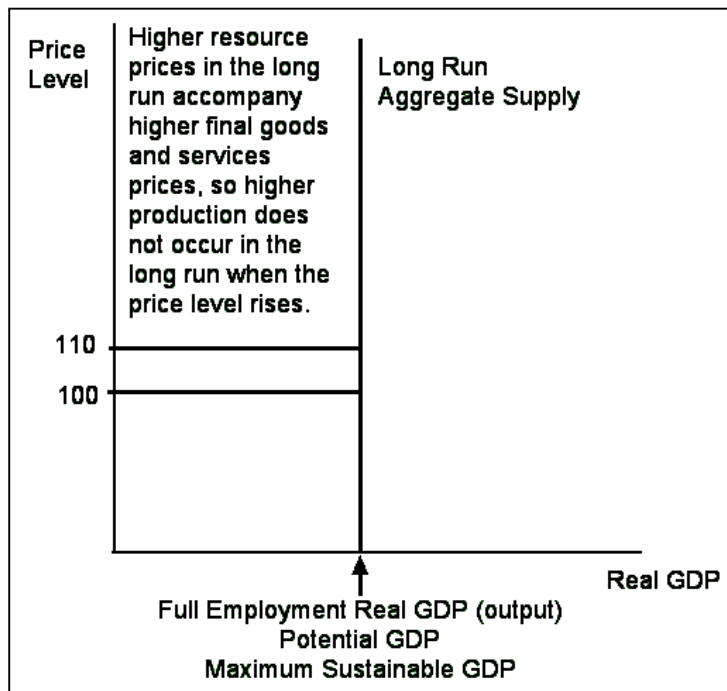
What is Aggregate Supply in the Long Run?

Given enough time, all decisions can be altered. This amount of time is called the "**long run**." In the long run, commitments to supply resources to product producers can be renegotiated. If inflation occurs, resource owners (including workers) will ask for more money in payment, since the prices of goods and services that they buy are going up. As this occurs, producers will find that any increase in the prices in their goods or services will (eventually) be matched by increases in the costs of making their products. So, the producers will have no incentive in the long run to increase production as the price level rises. The amount of production in the economy will be determined instead by the amount of available resources (given that some resources will be unemployed, due to natural unemployment) and the technologies available to producers.

short run- the decision-making period or stage in which some factors, such as contractual obligations, are fixed and cannot be altered

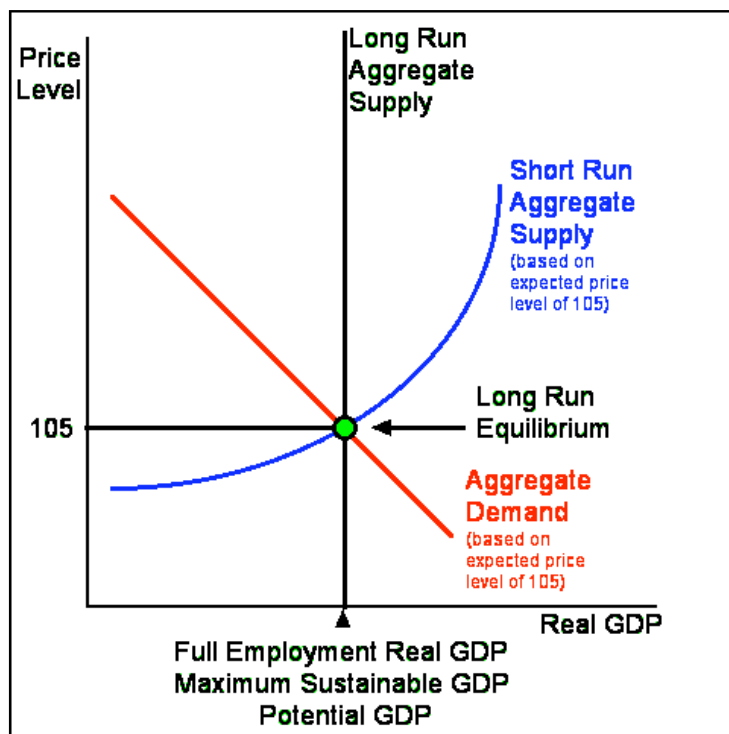
short run aggregate supply- the positive relationship between price level and real goods and services produced in the short run; in the short run only, real GDP production will tend to increase as price level rises.

long run- the decision-making period sufficient for all decisions or obligations to be altered



The price level has no effect on production in the long run. In the long run, the price level of goods and services has nothing to do with the incentives of producers to increase their production. The graph showing **long run aggregate supply** will thus be a vertical line, at the level of real GDP that the economy can produce consistently.

The amount of real GDP (or real output) that the economy produces in the long run is called "**sustainable real GDP**," or "**potential real GDP**," or (since the economy is at full employment, with only natural unemployment) "**full employment real GDP**."



What is Long Run Equilibrium?

If the aggregate demand, short run aggregate supply and long run aggregate supply all meet at the same point, then the economy is in long run equilibrium. The aggregate demand and short run aggregate supply are based on expectations that buyers and sellers have about the price level. At the long run equilibrium, those expectations match with the actual price level that exists. If this is true, then the real GDP in the economy will be the full employment real GDP, also called Potential GDP, or Sustainable GDP.

long run aggregate supply- the relationship between real GDP production and the price level in the long run; in reality, there is no relationship, since real GDP produced will not depend at all upon the price level in the long run.

sustainable real GDP- the real GDP that can be maintained in the long run; also called **potential real GDP** or **full employment real GDP**

What can we say about Long Run Equilibrium?

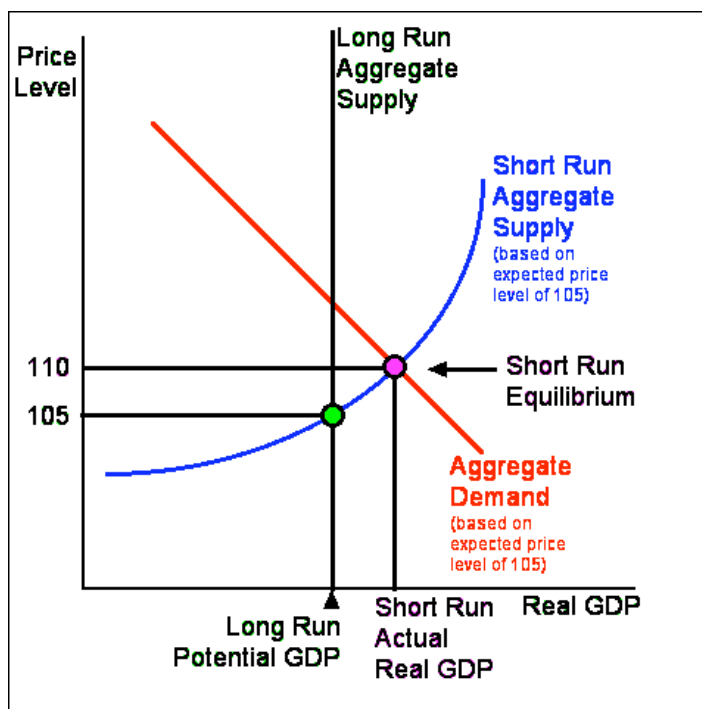
If the economy is in long run equilibrium, the following are true:

1. **Real GDP produced is the full employment or potential or sustainable level.**
2. **Actual unemployment will be equal to the natural rate** (since the economy is at full employment). If you don't remember what the natural rate of unemployment is, you may wish to review the unemployment concepts.
3. **Cyclical unemployment is zero** (this is because the economy is at full employment).
4. **The price level anticipated by decision makers is equal to the actual price level.**

What is short run equilibrium?

It is possible that the curves do not all meet at the same point. In that case, there can be a short run, temporary equilibrium in the economy that differs from the long run equilibrium. This means that the amount of output or real GDP of the economy is not the sustainable full employment level. It also means that, at this short run equilibrium, the price level does not match the price level that decision makers had anticipated. **This short run equilibrium indicates where the economy actually is.** It need not match the long run equilibrium, but if it does not, the equilibrium is temporary.

For example, if the intersection of the short run aggregate supply and aggregate demand is to the right of the long run equilibrium, the following short run equilibrium results.



What can we say about Short Run Equilibrium?

If the economy is in short run equilibrium that differs from the long run equilibrium (as shown above), the following are true:

1. **Real GDP produced is not the full employment or potential or sustainable level.**
2. **Actual unemployment differ from the natural rate**
3. **Cyclical unemployment is not zero** (cyclical unemployment will be greater than zero if unemployment is more than the natural rate, and cyclical unemployment will be negative if unemployment is less than the natural rate, which can happen in the short run).
4. **The price level anticipated by decision makers is different from the actual price level.** In the above diagram, decision makers (buyers and producers) expected a price level of 105, but the actual price level at the short run equilibrium is 110.

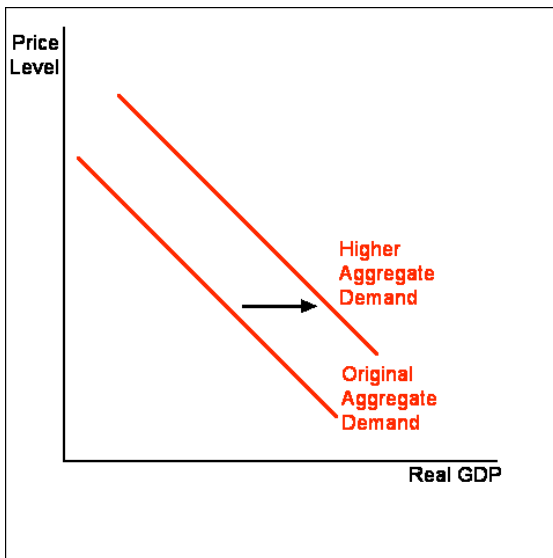
Obviously, either the aggregate demand curve or the short run aggregate supply curve, or even the long run supply curve must have moved from the previous long run equilibrium for this to happen, which brings us to...

What events will move the Aggregate Demand?

Several events or situations move the aggregate demand curve to the right or to the left. Before listing these, it is important to keep in mind that a change in the price level alone will not move the aggregate demand curve, because changes in the price level are built into the curve; aggregate demand already indicates to us how various price levels will affect the quantity of goods and services demanded.

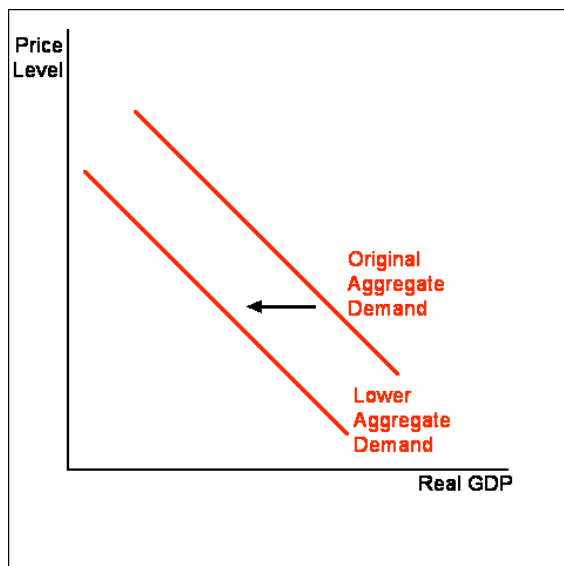
However, the aggregate demand curve can shift, as shown below, if something other than the price level changes.

What will increase Aggregate demand (moving the curve right)?



1. the wealth of domestic consumers increases (for reasons other than the price level changing)
2. real interest rates fall (for reasons other than the price level changing)
3. the wealth of foreign consumers rises
4. the foreign exchange value of the dollar falls (making U.S. goods look less expensive to foreign buyers, since it takes less of their money to buy dollars and hence U.S. goods priced in dollars).
5. people expect inflation, and thus expect a higher price level in the future (by this, we do not mean actual inflation, but if people expect a higher price level in the future, they will tend to buy things now)
6. people have increased optimism about the economy (they won't hesitate to spend if they are confident about their future incomes)

What will decrease Aggregate Demand (moving the curve left)?



1. the wealth of domestic consumers decreases (for reasons other than the price level changing)
2. real interest rates rise (for reasons other than the price level changing)
3. the wealth of foreign consumers falls
4. the foreign exchange value of the dollar rises (making U.S. goods look more expensive to foreign buyers, since it takes more of their money to buy dollars and hence U.S. goods priced in dollars).
5. people expect deflation, and thus expect a lower price level in the future (by this, we do not mean actual deflation, but if people expect a lower price level in the future, they will tend to put off buying things now)
6. people have pessimism about the economy (they will hesitate to spend if they fear for their future incomes)

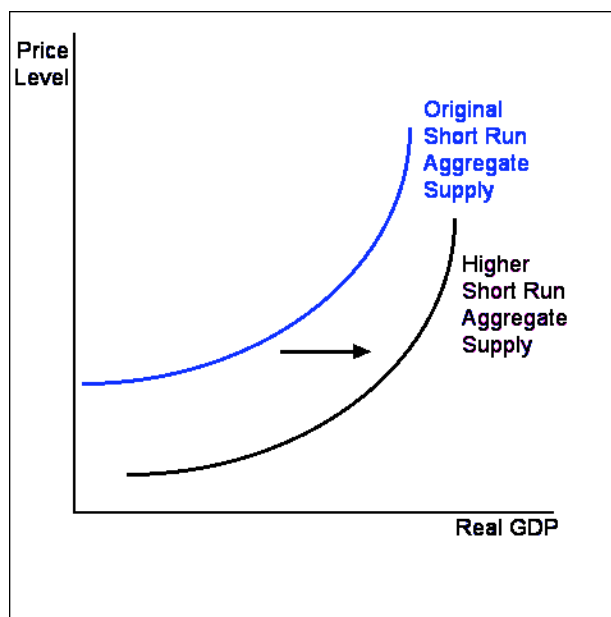
What will change Short Run Aggregate Supply?

There are several events or situations that move the short run aggregate supply curve to the right or to the left. Before listing these, it is important to keep in mind that a change in the price level alone will not move the short run aggregate supply curve, because changes in the price level are built into the curve. The curve already indicates to us how various price levels will affect the quantity of goods and services produced in the short run.

However, the short run aggregate supply curve can shift, as shown below, if something other than the price level changes.

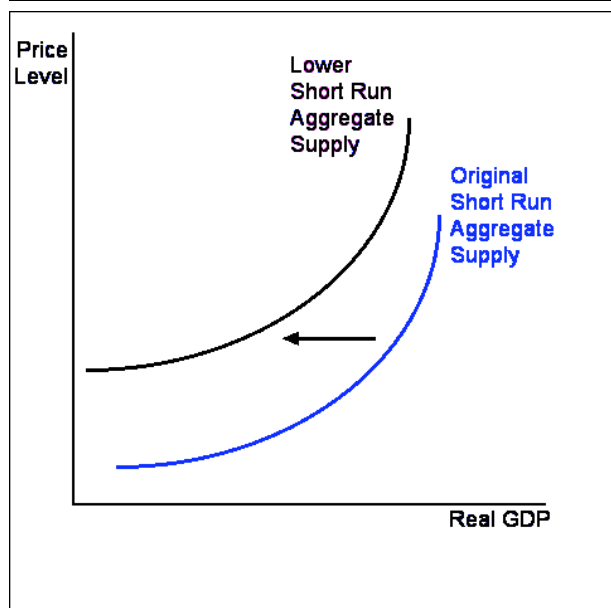
What will increase short run aggregate supply (moving the curve right)?

1. the real prices of resources fall temporarily, enabling more production
2. short term improvements in conditions for production, such as weather, enable more production
3. producers expect a lower price level for their goods in the future, also called deflation (by this, we do not mean actual deflation, but if producers **expect** a lower price level **in the future**, they will tend to produce and sell things now, while prices are still high)



What will decrease short run aggregate supply can decrease (moving the curve left)?

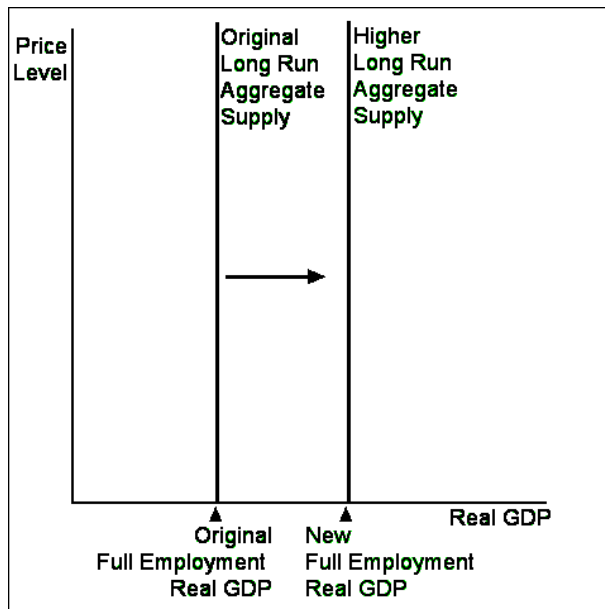
1. the real prices of resources rise temporarily, inhibiting production
2. short term worsening of conditions for production, such as weather, inhibit production
3. producers expect a higher price level for their goods **in the future**, or expect inflation (by this, we do not mean actual inflation, but if producers expect a higher price level in the future, they will tend to hold off on producing and selling things now, and wait for higher prices)



What will change Long Run Aggregate Supply?

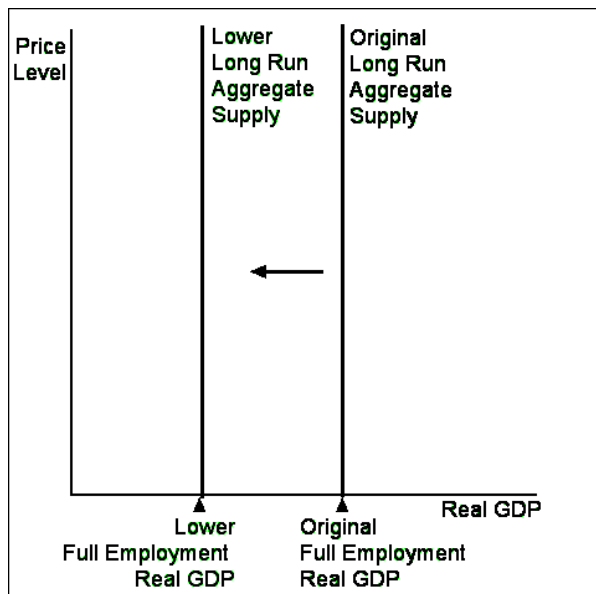
Several events or situations move the long run aggregate supply curve to the right or to the left. Before listing these, it is important to keep in mind that a change in the price level will not move the long run aggregate supply curve. However, the long run aggregate supply curve can shift, as shown below...

What will increase Long run aggregate supply (moving the curve right)?



1. the supply of available resources rises permanently, increasing production capability
2. institutions, such as the legal system, transportation improvements, communications systems, and other infrastructure allow for a permanent increase in production
3. new technology and its applications permanently increase production capabilities of the economy

What will decrease long run aggregate supply (moving the curve left)?



1. the supply of available resources falls permanently, decreasing production capability (for example, a terrorist attack destroys workplaces and kills workers)
2. institutions, such as the legal system, transportation infrastructure, or communications networks degrade or otherwise change to permanently decrease production capability
3. outmoded or inappropriate technology is forced on producers, permanently decreasing production capabilities of the economy (for example, the Taliban forbade the use of most modern techniques in Afghanistan)

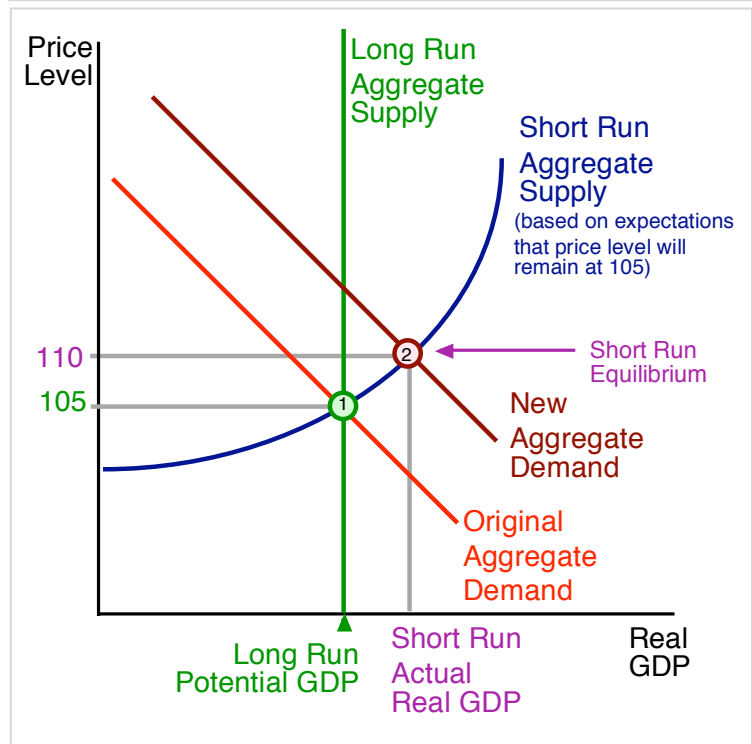
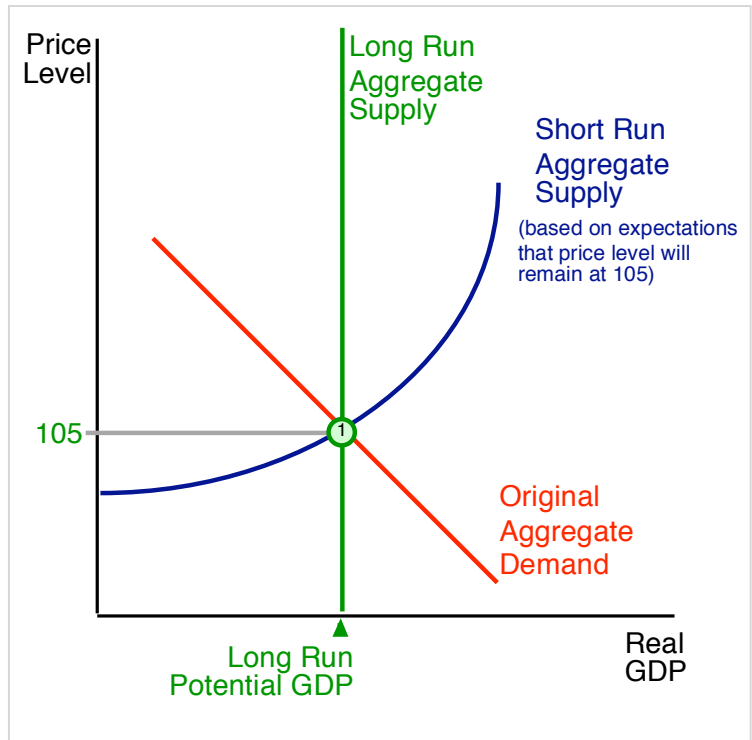
What happens when aggregate demand increases?

Let's start with an economy in long run equilibrium, with the price level equal to that anticipated by decision makers. The long run equilibrium is shown (in the figure to the right) by the dot (1) with the price level at 105.

Then, suppose a change in short run equilibrium occurs. For example, there may be an increase in aggregate demand due to a sudden increase in the wealth of consumers (one of the six things that increases aggregate demand). Producers and consumers will still make decisions based on their assumptions about the price level (in this case, it seems that buyers and producers still believe the price level will remain at 105, its old level). However, buyers are buying more than they previously did, since consumers have greater wealth. The following short run equilibrium results (see figure below and to the right).

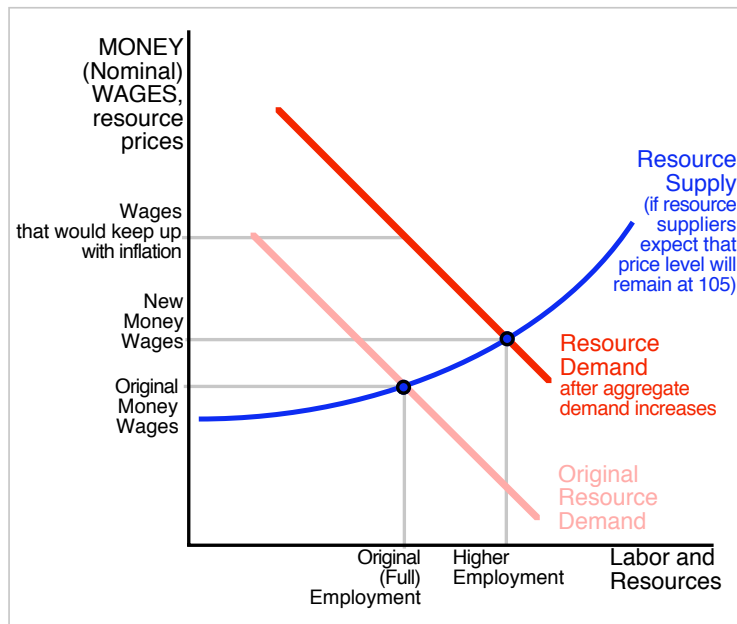
In this short run equilibrium, which is shown as point (2):

1. the price level is higher than what was expected (it's 110 instead of 105)
2. the price level is higher than in the (previous) long run equilibrium
3. as a result of the higher price level, producers will produce more output in the short run than in the previous long run equilibrium, since resource costs will not keep up with the higher price level for products (see below)
4. output (real GDP) will be higher than in long run equilibrium (and higher than the potential, sustainable, full employment level).
5. employment is greater than full employment
6. unemployment is lower than the natural rate (this can occur temporarily)
7. cyclical unemployment is negative (which can happen temporarily)
8. the real values of wages and resource prices will be lower than their long run equilibrium levels (due to the higher than expected price level)



9. real interest rates will be lower than long run equilibrium values (due to the higher than expected price level)

How does short run equilibrium affect resources?



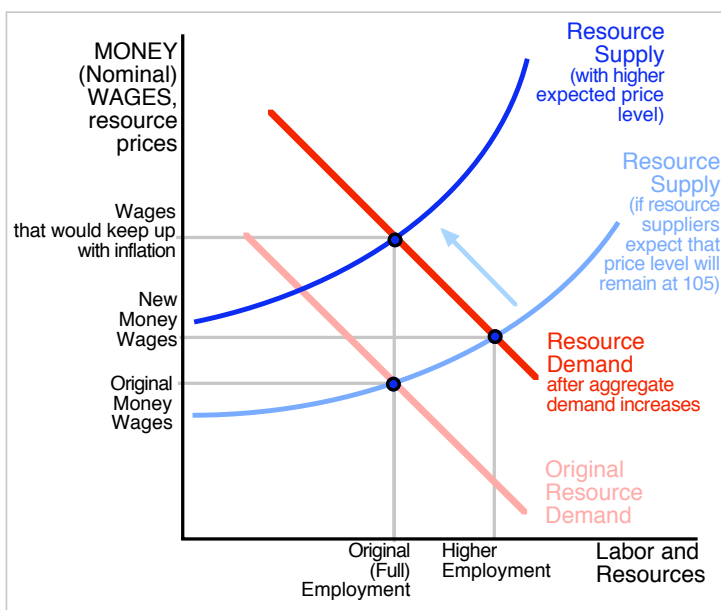
This short run equilibrium will affect the resource market. As the aggregate demand begins to move rightward, producers expand their production in response, and thus increase demand for resources. However, most resource owners and workers will not realize that prices of goods and services are also on the way up. They supply their labor and resources based on the assumption that the price level will stay at its original level (105 in this example). As a result, they will agree to sell their labor and other resources at prices without completely considering the higher price level (110), as shown in the diagram to the left.

In nominal (money) terms, the wage and resource prices may even go up. However, the increase will not be

enough to keep up with the rising price level for goods and services. **In real terms, wages and resource prices actually fall in the short run** as the price level goes up. This is what stimulates producers to increase real output in the short run; the price level of goods and services they produce is going up, but the prices of resources and wages of workers are not keeping up.

Something similar is happening in the market for loans (which is why the real interest rate will be lower in the short run equilibrium), but resource prices determine what happens next.

How is long run equilibrium restored?



Since the price level is not what was anticipated, this short run equilibrium is essentially built on decisions that will be altered in the long run, as the true price level is recognized, and as people have time to change their decisions (and anticipations). All decisions that were based on the incorrect anticipated price level will eventually be altered. This includes decisions by workers and other resource sellers to sell supply their resources to producers. Over time, as workers and owners of resources realize that the price level is higher, they will expect and negotiate for higher pay (to keep up with inflation).

This may take time, since there will be delays in realizing that the price

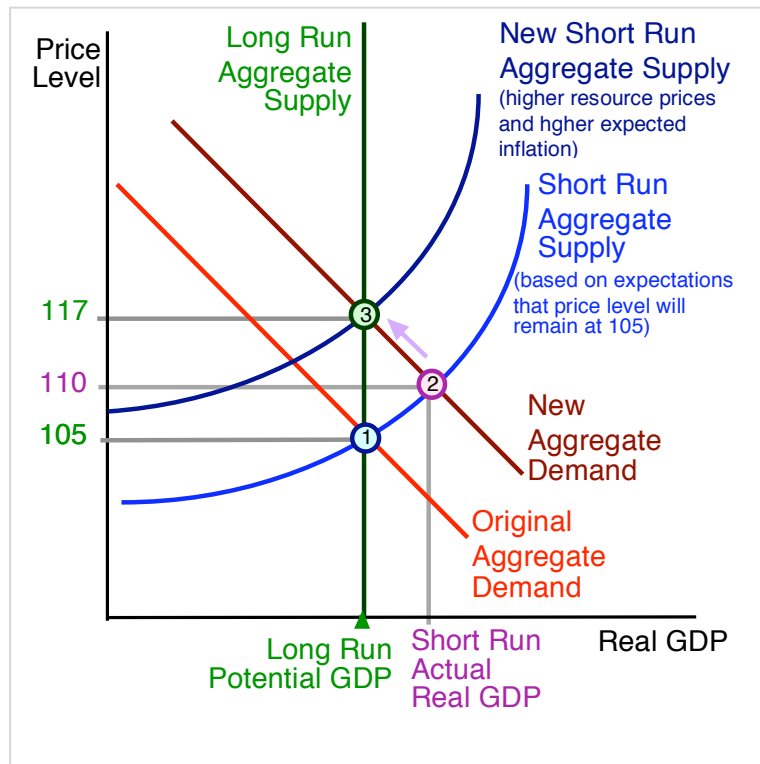
level has increased, and because contracts to supply labor and other resources may have to expire before new agreements (with the higher resource prices and wages) can be made. After the higher price level is included in the expectations and supply decisions of workers and resource owners, the supply of resources will move to the left to reflect this. Real wages will rise (back to their original level).

As the supply for labor and resources reflects more realistic price level expectations, real wages and resource prices will rise. This will cause the short run aggregate supply to fall. It will also result in less employment of resources (a return to full employment).

Eventually, a new long run equilibrium will be established, reflecting the restored real wages and resource prices.

At the final long run equilibrium (3),

1. the price level is as expected (it's 117 now, and that's consistent with expectations)
2. the price level is higher than in the (previous) long run equilibrium
3. even though the price level is higher than the previous equilibrium, producers do not want to produce more than the long run potential GDP, since resource prices have caught up with product prices.
4. real GDP will be the potential, sustainable, full employment level.
5. employment is at full employment
6. unemployment is at the natural rate
7. cyclical unemployment is zero
8. real wages return to their original level, although nominal wages are higher than before.
9. real interest rates will rise back to their original level, as the economy slides up the aggregate demand curve to the new long run equilibrium.



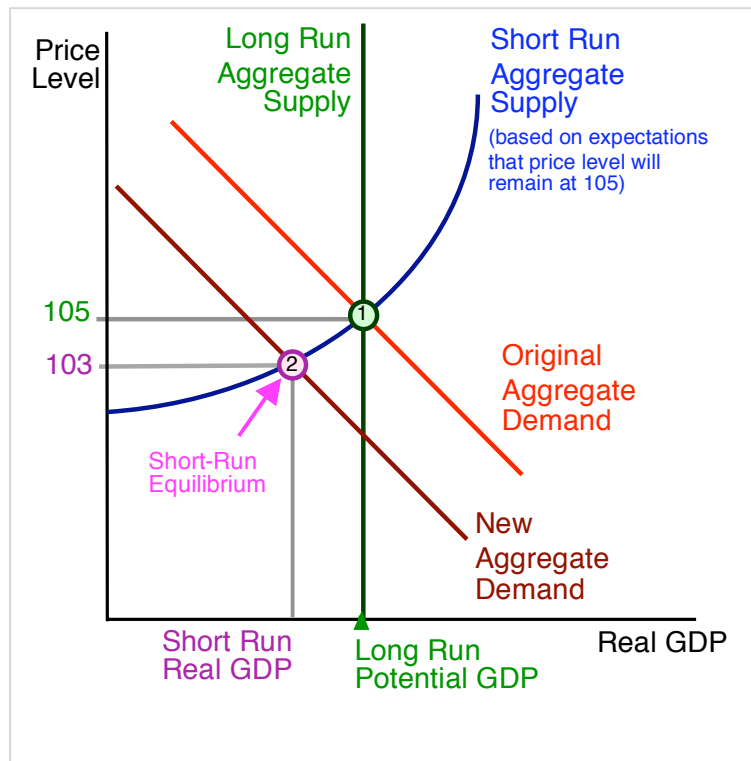
The process restoring the long run equilibrium is called the “**self-correcting mechanism**.” The self correcting mechanism will occur whenever the economy is not at full employment. If employment is larger than full employment, as in the above example, wages and resource prices will rise to restore full employment. When the level of employment is less than full employment, wages and resource prices will fall to restore full employment.

The self correcting mechanism will take time, and the length of time it takes will depend on how entrenched inflationary expectations are. It will also depend on how difficult it is for resource prices to change.

self-correcting mechanism- the process by which an economy in short run equilibrium (at output of some level other than full employment GDP) is brought back to long run equilibrium by changes in resource prices and interest rates.

What happens if aggregate demand falls?

Suppose the economy starts out in long run equilibrium, shown as point 1 on the diagram at the right. Then a decrease in aggregate demand occurs, perhaps due to a sudden decrease in optimism about the economy (one of the six things that decreases aggregate demand). Producers and consumers will still make decisions based on their assumptions about the price level (in this case, it seems that buyers and producers still believe the price level will remain at 105, its old level). However, buyers are buying less than they previously did, since consumers are fearful. The following short run equilibrium results.



In the short run equilibrium, which is shown as point (2):

1. the price level is lower than what was expected (it's 103 instead of 105)
2. the price level is lower than in the (previous) long run equilibrium
3. as a result of the lower price level, producers will produce less output in the short run than in the previous long run equilibrium, since resource costs will not fall along with the falling price level for products (see below)
4. output (real GDP) will be lower than in long run equilibrium (and lower than the potential, sustainable, full employment level).
5. employment is less than full employment
6. unemployment is higher than the natural rate (this can occur temporarily)
7. cyclical unemployment is positive
8. the real values of wages and resource prices will be higher than their long run equilibrium levels (due to the lower than expected price level)
9. real interest rates will be higher than long run equilibrium values (due to the lower than expected price level)

What happens when there is high unemployment?

Once again, the short run equilibrium will affect the resource market, only these effects are the reverse of those that occur when the aggregate demand increases.

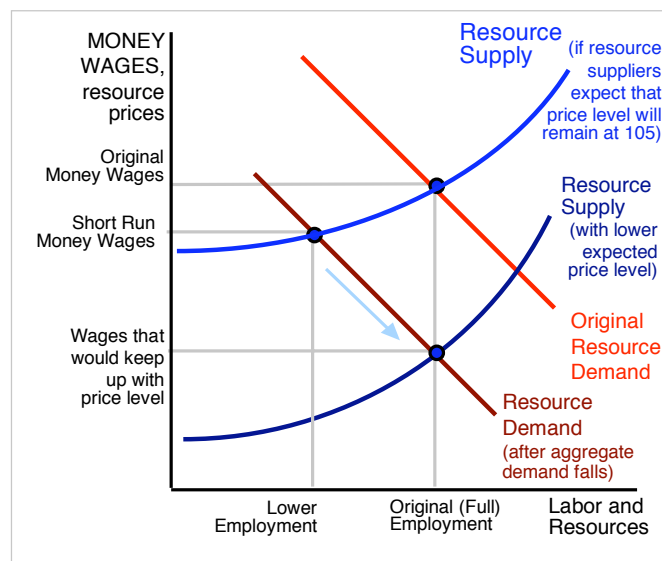
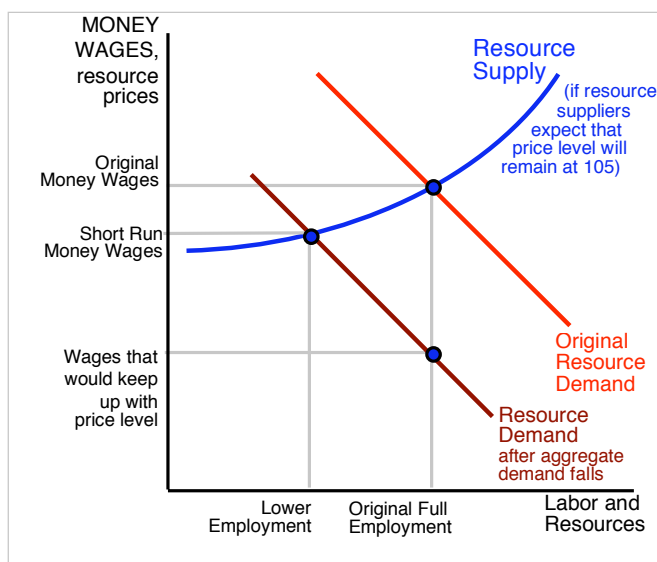
As the aggregate demand begins to move left, producers reduce their production in response, and thus reduce demand for resources. However, most resource owners and workers will not realize that prices of goods and services are falling. They supply their labor and resources based on the assumption that the price level will stay at its original level (105 in this example). As a result, they will expect to sell their labor and other resources at prices that do not reflect the lower price level (103).

In nominal (money) terms, the wage and resource prices may even go down. However, the decrease will not be as great as the fall in the price level for goods and services. In real terms, wages and resource prices actually rise in the short run as the price level falls.

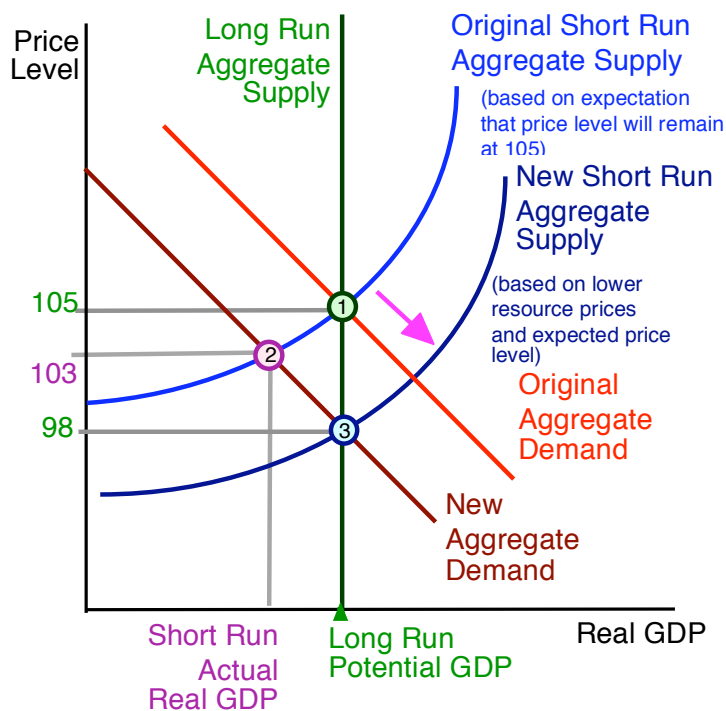
Something similar is happening in the market for loans (which is why the real interest rate will be higher in the short run equilibrium). However, resource prices primarily determine what happens next.

Since the price level is not what was anticipated, this short run equilibrium is essentially built on decisions that will be altered in the long run, as the true price level is recognized, and as people have time to change their decisions (and anticipations). All decisions that were based on the incorrect anticipated price level will eventually be altered. This includes decisions by workers and other resource sellers to sell supply their resources to producers. Over time, as workers and owners of resources realize that the price level is lower, they will be willing to work for much lower wages (or sell resources at much lower prices). Supply of resources will thus increase, causing real wages to return to their original levels.

As the supply for labor and resources reflects more realistic price level expectations, real wages and resource prices will fall. This will cause the short run aggregate supply to rise. It will also result in less unemployment of resources (a return to full employment).



Eventually, a new long run equilibrium will be established, reflecting the re-stored real wages and resource prices.



At the final long run equilibrium, point (3),

1. the price level is as expected (it's 98 now, and that's consistent with expectations)
2. the price level is lower than in the (previous) long run equilibrium
3. even though the price level is lower than the previous equilibrium, producers do not want to produce less than the long run potential GDP, since resource prices have fallen by the same proportion as product prices.
4. output (real GDP) will be the potential, sustainable, full employment level.
5. employment is equal to full employment
6. unemployment is at the natural rate
7. cyclical unemployment is zero
8. real wages return to their original level, even though nominal wages are lower than before.

9. real interest rates will fall back to their original level, as the economy slides down the aggregate demand curve to the new long run equilibrium.

Questions for Review and Practice

1. Why is a **lower** domestic price level associated with a larger aggregate quantity demanded of goods and services (that is, a downward-sloping aggregate demand)?
2. What does a vertical long-run aggregate supply curve mean? What factors determine what the long run aggregate supply curve will be? Why doesn't the long run aggregate supply slope upward?
3. In the short run, what effect will an increase in the price level (in the goods and services market) have on production? What will the short run aggregate supply look like? If the prices of resources and goods and services increased proportionally (by the same percent), would business firms be willing to expand output in the short run?
4. Suppose that prices have been rising at a 2 percent annual rate in recent years. Based on the past inflation rates, major unions sign three-year contracts that include increases in money wage rates of 4 percent per year.
 - a. If the price level grows at about one percent for each of the next three years, what will happen to the real wages of union members, real output in the economy, and the unemployment rate over that time period?
 - b. If the price level rises at 6 percent for the next three years, what will happen to the real wages of union members, real output in the economy, and the unemployment rate over that time period?
5. Is it possible that the actual rate of unemployment is less than the natural rate for a period of time? If so, can this situation be sustained permanently?
6. Suppose the price level in the current period is higher than what buyers and sellers anticipated. What will be true of real wages, real interest rates, and the level of employment in the short run, compared to their long run levels?
7. What is the relationship between the long-run equilibrium rate of output, the potential real GDP of the economy, and the output rate that equates the actual and natural rates of unemployment?

8. The following table shows the aggregate demand (AD) and short-run aggregate supply (SRAS) in terms of real GDP desired and real GDP supplied at various price levels. Both buyers and sellers base their demand or supply of goods on an anticipated price level of $P = 100$.

AD₁₀₀ real GDP	Price Level	SRAS₁₀₀ real GDP
6,000	90	4,800
5,800	95	5,000
5,600	100	5,200
5,400	105	5,400
5,200	110	5,600
5,000	115	5,800

- Based on the table above, what amount of real GDP will be produced during this period?
 - Based on the table above, will the answer you gave in the previous question be a long run equilibrium? Explain.
 - What will be the relationship between the actual and natural rates of unemployment during this period?
 - Is the equilibrium you found in question a. sustainable? Why or why not?
9. The following table shows the aggregate demand (AD) and short-run aggregate supply (SRAS) in terms of real GDP desired and real GDP supplied at various price levels. Both buyers and sellers base their demand or supply of goods on an anticipated price level of $P = 110$.

AD₁₁₀ real GDP	Price Level	SRAS₁₁₀ real GDP
5,900	90	4,300
5,700	95	4,500
5,500	100	4,700
5,300	105	4,900
5,100	110	5,100
4,900	115	5,300

- Based on the table above, what amount of real GDP will be produced during this period?
- Based on the table above, will the answer you gave in the previous question be a long run equilibrium? Explain.
- What will be the relationship between the actual and natural rates of unemployment during this period?
- Is the equilibrium you found in question a. sustainable? Why or why not?

Chapter 12

What is Money and Where Does it Come From?

It has been said that the love of money is the root of all kinds of evil. We see examples of this all around us. Still, we don't have to love money to understand it, or even appreciate what it does for us. Money, after all, is an invention that we all use, and often take for granted. If it didn't do something useful, it probably wouldn't have been invented, and we certainly would not continue to use it centuries later. Money has been around for a long time, and it doesn't seem to be going the way of the steam-powered automobile, poodle skirts, or the Segway™.

Why do we use money?

We use money because of the functions it performs for us

For one thing, money is used as a **medium of exchange**, making trade easier. A medium of exchange is something we use in nearly every trade. Because of money, finding trading partners is easier. If we didn't have money, and had to rely on barter, you would have to look for the rare person to trade with who has exactly the good that you want and who, also, is willing to obtain exactly the good you have. We would all have to carry signs that said, "Will work for food," or indeed, "Will work for shoes," "Will work for shirts," or "Will work for a 1999 Toyota Tercel 5-speed with CD player and power windows." Because of money, you only need to find one person who will pay you the medium of exchange for the good you have to sell, and then find another person who will take the medium of exchange in trade for what you want. Even though this involves two trades with two people, these two people will probably be easier to find.

Money is also a **store of value**. This means that if you have extra goods to sell, you can sell them for this money, and store the money instead of storing the goods. The money is probably easier to store, as goods may be perishable or take up much more space than money. Also, it is impossible to store things like services, so if you have some extra time to do oil changes, give haircuts, or whatever, you can't store them at all. However, you could sell them for money and store the money.

In addition, money is a very **liquid asset**, meaning that it is easy to find people who will trade it for something else, and its value is fairly stable and predictable.

Money is also useful as a **unit of account**. Because we have money, every good only needs one price - its price in terms of money. Without money as the unit of account, every good would need to have a different price for each of the other goods and services that someone might want to buy it with (requiring thousands of different prices for each good).

Money is also handy for **scheduling payments over time**. Because money tends to keep value pretty well over time, people can arrange to pay for things they buy

medium of exchange- an item that is sought in trade only so that it can be traded for something else.

store of value- an item that retains value, usually in trade, over time

liquid asset- an item that can easily be traded for other things

unit of account- an item that can be used to keep track of the values of other goods

now with future installments of money. Making payments in the future with some good or service would be complicated, since you would have to be sure that you could obtain the good or service when you needed it. The future supply and demand conditions of the good may be hard to predict.

What is money?

Figuring out which things are money, and which are not, is sometimes difficult. Money doesn't always look the same, and historically, many different things have been used as money. However, in every society, **money is anything that is commonly used and generally accepted as final payment for a debt.** If you see everybody using a particular item to pay for things, and you see nearly everyone accept that item as the final payment when they are owed a payment, then that item is money. Keep in mind that money is something used as final payment. By this definition, a credit card is not money, since buying something with a credit card simply changes the identity of who is owed the payment; the credit card user no longer owes payment to the store or restaurant, but instead owes payment to a bank.

What kinds of things are or have been used as money?

People have discovered a few desirable characteristics about the things they use as money. Money ought to be durable, so that when you are paid some money, you know it will last long enough for you to be able to spend it. Ice cream and fresh fruit would make poor money, since they may melt or rot before you could spend them. Money should be divisible, so that you don't have to spend the whole thing in one transaction. Goats, cattle, and sheep make poor money on this account; how would you buy something that costs half a goat, without making a mess? Money should be transportable, which is one reason we don't use bulky or heavy items as money. Gold and silver are pretty heavy, and carrying them around would probably wear quite a hole in your pocket. Money should also be easy to identify, which is another problem with gold, since its purity has to be tested. Money should also have a stable value, which is why things that can be grown or manufactured don't make good money, as their values fluctuate with their supply. Most things that were used as money in the past have been shown to lack one or two of these, which is why they are no longer used.

Commodity money is something that has some use or value in addition to its role as money. Examples of some past or present commodity monies are tobacco, tea, cows, goats, sheep, animal pelts, fishhooks, gold, and silver. **Fiat money** is money that is not valuable in itself, and is not backed up by anything of value. Usually, fiat money is controlled by, or at least endorsed by, some governmental authority.

All modern "sophisticated" societies have moved away from using commodity money, since the value of commodity money changes with supply and demand for the item as good. A large crop, production, or harvest of a commodity money, for example, can make the money virtually worthless. Fiat money also has the problem of losing its value sometimes in some countries. At these times, commodity money often starts being used instead.

money- an item that is used by most people to make final payments that are owed, and that is accepted as final payment by most people

commodity money- an item that is used as money, but also has intrinsic value or other uses

fiat money- an item that has no use, except as money

What do we use as money?

To determine what items people are using as money, we examine which assets (things of value) seem to be the most liquid (easily used for buying other things). In the United States, **currency** (paper money and coins) is the most liquid asset. Checking account deposits, also called "**checkable deposits**," are also very liquid, since they can be spent just by writing a check or using a debit card. As such, checkable deposits include such things as travelers' checks and cashier's checks, as well as old-fashioned checking accounts (also called "**demand deposits**"). Other very liquid assets are **savings account deposits** at banks, saving and loan or credit unions. The money in these accounts may have to be accessed by going to the place where the money is deposited, making a phone call, or filling out paperwork. Many of these kinds of accounts are called "**time deposits**," to reflect that it takes a bit of time to get the money out.

Depending upon how many kinds of assets we want to count as money, we could come up with many definitions of what constitutes money. However, two are especially important. "**M1**" consists of all currency in use by the public plus checkable deposits in bank accounts (including debit-card accessed accounts and travelers' checks as well). M1 added up to about \$1.2 trillion at the end of 2002, about half of which was currency, and half of which was bank deposits. "**M2**" consists of everything in M1 plus saving account deposits in banks. M2 was about \$5.5 trillion in 2002, most of which was money in bank accounts. The amount of money (either M1 or M2) is sometimes also called the **money supply**.

For our purposes, we use the term "**bank**" to refer to any banking institution, whether it is a commercial bank (business oriented), savings bank (consumer oriented), savings and loan, or credit union. Thus, when we speak of money in bank accounts, we mean deposits in any banking institution. Remember, bank account money is money in the U.S. and in most modern countries. In fact, most of the money we use is bank account money.

Where does our money come from?

To see where our money comes from, let's tell a little story. It's a story of genies and banks and other magical entities.

Suppose Al Addin meets a genie, who grants him one wish. Al wishes for a mil-

currency- paper money and coins

checkable deposits- bank deposits that can be accessed by writing a check, or by similar means, such as use of a debit card

demand deposits- traditional checking account deposits that do not pay interest, generally deposited in banks

saving account deposits- bank deposits that can be accessed quickly, but not by writing a check or using a debit card. Traditionally, one common form of savings accounts was called a **time deposit**.

M1- money held as currency in the hands of the public (not in banks) and as checkable deposits

M2- money held as currency, checkable deposits, or saving deposits

money supply- the amount of money in circulation (usually either M1 or M2)

bank- any institution that takes deposits. Banks in this generic sense include commercial banks, savings banks, saving and loans, and credit unions.

lion dollars, and the genie grants the wish, with no pesky IRS or legal entanglements. So, Al Addin gets \$1,000,000 cash, created by the genie. However, Al doesn't want to risk his cash getting stolen, so Al deposits his \$1,000,000 in a bank. He still has the million, it's just now in the form of a bank account deposit, and bank account deposits are money.

Now, you may be wondering, "what happened to the cash?" Well, Al's bank has it (Al brought it in to deposit in the bank). However, the cash is no longer money! When a bank holds cash, called "**vault cash**," it magically becomes something called **bank reserves**. Bank reserves are used by banks to "back up" their depositors' accounts. Al's bank has \$1,000,000 in increased reserves, in the form of cash, and owes \$1,000,000 to Al, because of his deposit. The \$1,000,000 the bank owes to Al because of his account is sometimes called a **liability** of the bank.

But, Al's bank has more reserves than it needs to back up Al's deposits. Legally, Al's bank owes Al \$1,000,000, but only has to have a certain amount of that around to pay Al back, because chances are slim that Al will spend his whole \$1,000,000 all at once. The portion of Al's deposit that Al's bank must keep around is called the **required reserve ratio**. If the required reserve ratio is 10% (or .1) Al's bank only has to keep .1x\$1,000,000 as reserve on his deposit. Thus, Al's bank only needs to keep \$100,000 on hand to back up his deposit. The \$100,000 that the bank must keep is called the **required reserves** of the bank.

The reserves that Al's bank actually has (its **actual reserves**) exceed its required reserves. The difference between a bank's actual reserves and its required reserves is called the bank's **excess reserves**. Excess reserves, as the name implies, are funds that the bank doesn't need to hang on to. One thing the bank could do with its excess reserves is lend them out (and earn interest on the loan in the future). In the case of Al's bank, its excess reserves are \$1,000,000 - \$100,000 = \$900,000

So, Al's bank can safely lend out \$900,000 without violating the requirements to back up Al's deposit.

Next, Bugs happens to walk by Al's bank. Bugs sees the sign in the bank, claiming that the bank *really* wants to lend money at low low interest rates. Bugs applies for a

vault cash- currency belonging to a bank. This currency is not considered money, but rather serves as reserves for bank deposits.

bank reserves- funds used to back up the money in bank depositors' accounts. Bank reserves can either be in the form of currency belonging to the bank or deposits that the bank has in the Federal Reserve.

liability- something owed. Bank depositors' accounts are liabilities to the bank, since they represent money the banks owe to the depositors.

required reserve ratio- the proportion or percentage of a bank's deposit liabilities that it must keep as reserve funds, to comply with law and regulations

required reserves- the dollar amount of reserve funds that a bank must keep, according to regulation, to ensure the safety of deposits entrusted to it.

actual reserves- another name for the bank reserves that a bank possesses. It is the total of vault cash plus deposits the bank has itself made in special reserve accounts at the Federal Reserve Bank or its authorized banks.

excess reserves- the dollar amount by which actual reserves exceed required reserves. These are reserves that a bank owns, but that it is not legally required to keep.

loan, and Al's bank loans \$900,000 to Bugs. When the bank makes the loan to Bugs, it does something else magical; the bank creates an account for Bugs with \$900,000 in it.

Bugs spends the \$900,000 to buy a business from Porky. Bugs might write the check himself (on his new account), or the bank might write one for him, based on the account. Either way, Porky gets a check for \$900,000, which Porky deposits in his account at his bank. Notice that the total amount of money created by the genie and the bank is now \$1,900,000, since Al still has his account with \$1,000,000, and Porky now has \$900,000 more in his account. And, bank accounts are money.

At this point, Al's bank and Porky's bank have to square things. They use the "banker's bank," which is the **Federal Reserve Bank**, known affectionately as "**the Fed**." The Fed (or a bank acting on the Fed's behalf) "**clears**" all checks. This involves moving reserves around whenever a check is written at one bank and deposited in another. Since banks know that this is going to happen, they keep some of their reserves in special accounts at the Fed, in addition to the reserves they keep in their vaults. Thus, a bank's actual reserves consist of the bank's Fed deposits as well as vault cash.

In this case, when Porky deposits the check with his bank, Porky's bank sends the check in to the Fed. The Fed takes \$900,000 out of Al's (and Bugs's) bank's account at the Fed and puts it into the Fed account of Porky's bank. This reduces the actual reserves of Al's and Bugs's bank, but increases the actual reserves of Porky's bank by \$900,000. Remember, Al's bank had \$900,000 excess reserves before, so it can afford this loss of reserves at the Fed.

Now, the magic moves to Porky's bank. Porky's bank received \$900,000 more reserves at the Fed. However, it now has to keep some reserves to back up Porky's new \$900,000 deposit. If the required reserve ratio is 10% Porky's bank only has to keep $.1 \times \$900,000$ as reserve on Porky's deposit, so Porky's bank only needs to keep \$90,000 on hand to back up his deposit. Porky's bank has an increase of \$90,000 in required reserves, but received \$900,000 more in actual reserves, giving it excess reserves of

$$\$900,000 - \$90,000 = \$810,000$$

Porky's bank has \$810,000 more reserves than it needs. Thus, it will make a loan of \$810,000 to Daffy when he comes in to borrow money for a house. Porky's bank creates an account with \$810,000 in it so that it can make the loan to Daffy.

Elmer sells the house to Daffy, in exchange for a check for \$810,000 (probably written by and sent to Elmer by Daffy's bank). Elmer deposits the check in his account at his bank. Notice that the total amount of money created by the genie and the two banks is now \$2,710,000; Al still has \$1,000,000 in his account, Porky has \$900,000 more in his account, and Elmer now has \$810,000 more in his account.

The Fed takes \$810,000 out of Porky's and Daffy's bank's account at the Fed and puts it into the Fed account of Elmer's bank. This reduces the actual reserves of Porky's and Daffy's bank, but increases the actual reserves of Elmer's bank by \$810,000.

If the required reserve ratio is 10% Elmer's bank only has to keep $.1 \times \$810,000$ as

Federal Reserve Bank- (sometimes called "**the Fed**") the bank established by the government to oversee private banks, keep deposits of reserves of private banks, and handle the transfers of funds required when checks are written and deposited.

check clearing- the process of moving reserve funds from one bank to another (and from one depositor's account to another depositor's account) when a check is written and deposited or cashed.

reserve on his deposit. Elmer's bank only needs to keep \$81,000 on hand to back up his deposit. Elmer's bank received \$810,000 more in actual reserves, so Elmer's bank has excess reserves of $\$810,000 - \$81,000 = \$729,000$

Elmer's bank can then create a loan, creating \$729,000 more new money, bringing the total up to \$3,439,000 since Al met the genie.

This process keeps going, with banks getting deposits and reserves. The reserves each bank gets will exceed the amount it needs to back up the deposits, so each bank will make a loan and, in so doing, create additional bank deposits (all of which are money). Notice that the genie's magic created \$1,000,000, but the banks created much more than that.

Now, you might be thinking that this is a nice story, but you want to know the *truth* about where our money comes from. **Well, the story you have just read is true. Only the names have been changed to protect the exposition.** The Fed is the genie.

How does money creation really happen?

The process of money creation in modern societies is carried out by banks.

Each bank creates some new money by creating new loans, and creating new bank deposits (which are a form of money). The basis for all these loans is that the banks start with some excess reserves (more than needed to back up the bank account deposits). The process of money creation by banks is called "**bank expansion**" (or sometimes, "**deposit expansion**").

Each bank will probably only be able to make loans and create new deposits in an amount equal to its own excess reserves. However all of the banks in society, which we refer to as the **banking system**, can create an amount of money that is many times the amount of new money they start with. This multiple, called the "**multiplier**" is determined by the required reserve ratio, here called "r." The maximum value of the multiplier, called the "**potential multiplier**" is $\frac{1}{r}$.

If we want to figure out how much money the banks create from the time the first loan is made until the banks run out of excess reserves, we get what we can call the "**bank expansion multiplier**." Since the bank expansion is produced because of excess reserves and creating new loans, the total amount of new loans and deposits produced by banks is $\frac{\text{initial Excess Reserves}}{r}$

How much, altogether will all of the banks (the "**banking system**") be able to

bank expansion, deposit expansion- the act of creating new bank deposits by creating loans. This is performed by private banks, under the regulation of the Fed.

banking system- all banks, savings and loans, and credit unions

multiplier- the number that is multiplied by the total excess reserves held by all banks to determine the amount of loans or money that can be created

potential multiplier- the largest value of the multiplier if all excess reserves in the banking system are converted to loans and deposits. Its value is $1/r$, where r is the required reserve ratio.

bank expansion multiplier- the multiplier when it is applied to excess reserves to determine the amount of loans that the banking system can generate.

make (maximum) if they start with \$1,000,000 worth of new money (\$900,000 excess reserves) and if the required reserve ratio is 10%? In this example, since the first bank had \$900,000 in excess reserves to loan that amount would be (potentially)

$$\$900,000 / .1 = \$9,000,000 \text{ created by banks}$$

If we want to discover how much total money is created by the whole process (including the part originally created by the genie), we can apply the multiplier to the amount of new money originally created (by the genie in our story). If we do this, we can call the result the "**money multiplier**," which would be

$$\frac{\text{new money}}{r} = \frac{\text{new Actual Reserves}}{r}$$

In this example, the genie created \$1,000,000 in new money, so the maximum total amount of money created by the genie and the banks (altogether) is

$$\$1,000,000 / .1 = \$10,000,000$$

Again, the genie made \$1,000,000 of this, and the banks did the rest.

To add some more reality, we can remember the following.

Two factors may reduce the bank expansion:

Normally, people keep some of their money in the form of cash, perhaps to use for everyday purchases or to keep for emergencies. The proportion of money that people want to hold as cash rather than bank deposits is called the "**desired currency ratio**." This will be a factor reducing the actual multiplier. As people pull cash out of the banks, the "**cash drain**" or "**cash leakage**," will reduce the amount of reserves banks retain as the process goes on. If the desired currency ratio goes up, the multiplier will get smaller.

Often, banks hold on to excess reserves without making loans on them (if they are afraid that depositors will be likely to come after their deposits, for example). Banks may make fewer or smaller loans because of this. When this is so, the multiplier will be smaller than its potential maximum. The portion of bank reserves that banks wish to retain as excess reserves is called the **excess reserve ratio**.

Is it safe?

When people discover that each dollar that they place in a bank account is only backed up by a few pennies, they tend to panic. **Don't... Please.**

Even though each dollar of bank deposits is only backed up by a small fraction of reserves, that system is based on a time-tested theory about how people behave. Specifically, people don't spend all of the money in their bank accounts all at once. The system works and the bank deposits are safe, as long as people do not panic and try to withdraw all of their money. If they were to do so, they would discover that the bank doesn't actually have the money, but has lent most of it out. As long as bank depositors don't worry about their banks' inability to give all of them all of their deposits back, the

money multiplier- the multiplier when it is applied to the actual reserves of the banking system to determine the maximum amount of bank deposits that could be created

desired currency ratio- the proportion of people's money that they desire to hold as currency

cash drain, cash leakage- the reduction of bank deposits that occurs as people remove funds from the banking system in the form of currency. Cash drain will tend to lower the multiplier, in practice.

inability does not matter. The banks will have enough funds to cover the people who do need to remove some of their money some of the time. Depositors have nothing to fear but fear itself.

Application: Bank assets and bank expansion

Suppose the Fines-Nearcome bank has the following assets and liabilities:

Assets (owed to bank)		Liabilities (owed by bank)	
vault cash	120,000	checking deposits	1,400,000
deposit at Fed	80,000	net equity	400,000
loans outstanding	1,500,000		
U.S. bonds	100,000		

From the above, we can find the actual reserves of this bank. Actual reserves are vault cash plus deposits at the Fed, so for this bank, those total $120,000 + 80,000 = \$200,000$. Notice that no other assets of the bank count as reserves, even though they represent payments owed to the bank. The bank's bonds and loans are not reserves.

If we know the required reserve ratio, we can use the above information to determine whether this bank can make any loans, whether the whole banking system can generate new deposits, and how large the amount of new deposits might be. Suppose the required reserve ratio is 10%. The bank's required reserves are based on its deposit liabilities only (in this case, checking deposits). For this bank, the required reserves would be 10% of \$1,400,000 or $.1 \times \$1,400,000 = \$140,000$. Notice that no asset of the bank enters into figuring required reserves, since the purpose of required reserves is to back up the money the bank OWES to others.

Since this bank has actual reserves of \$200,000, but required reserves of \$140,000, it has excess reserves of $\$200,000 - \$140,000 = \$60,000$. The bank could thus safely part with \$60,000 of reserves and still be legal. If the bank makes a loan of \$60,000, and that money is spent and deposited in some other bank, this bank will lose reserves (probably out of its Fed deposit). Its new situation will look like

Assets (owed to bank)		Liabilities (owed by bank)	
vault cash	120,000	checking deposits	1,400,000
deposit at Fed	20,000	net equity	400,000
loans outstanding	1,560,000		
U.S. bonds	100,000		

Actual reserves are now $120,000 + 20,000 = \$140,000$, which is just enough to cover the required reserves, which are still 10% of the \$1,400,000 deposits.

While this bank can only make a loan of \$60,000, the entire banking system might produce as much as $\$60,000 \div .1$ or \$600,000 in new loans because of these excess reserves. The maximum amount of new loans that might be created by all banks is the excess reserves divided by the required reserve ratio. In reality, the banks might create less if there is cash drain or if the banks voluntarily hold excess reserves.

Who or what controls the bank expansion process?

As we have seen, our money is directly created by banks. However, the ability of banks to create money is indirectly governed by the Federal Reserve Bank, or the Fed. The Fed is a bank, and it is sometimes called the "bankers' bank," because of its role in being a depository of bank reserves, and its function as a clearinghouse for transactions between banks. It is the **central bank** of the United States, established and chartered by the Federal government to maintain and supervise the banking system. Other countries have similar central banks, such as the Bank of England, or the Bank of Japan.

The Fed is run by a board of seven governors, each of who are appointed by the

central bank- a bank established by a government to oversee private banks and regulate their creation of bank deposits. In the United States, the central bank is the Federal Reserve Bank.

President and approved by the Congress to serve for fourteen-year terms. The Chairman and Vice Chairman of the Board of Governors are also appointed by the President, from the Board of Governors, for renewable four-year terms. The Board of Governors is an agency of the U.S. government, but the day-to-day decisions and operations of the Fed are beyond the control of the Congress and the President.

Since the Fed is a bank, it does make money. Some of the money goes to pay the employees of the Fed and for its operations (only the seven Board members are actually employees of the federal government). The rest of the money that the Fed makes belongs to the U.S. Treasury, the department of the government that collects taxes, borrows money for the government, and arranges for financing of government operations.

The Federal Reserve System is made of twelve regional Reserve Banks, each with its own President and Board of Directors. In addition, the Fed has other banks that act on its behalf to serve as clearinghouses for transactions between private banks.

How does the Fed control the bank expansion process?

The Fed can control the amount of money (the "money supply") in the country in three ways. These are called the **"tools of the Fed."**

First, the Fed sets the required reserve ratio (so the Fed controls the multiplier)

Second, the Fed lends reserves to banks, so it can influence the reserves with which banks can make loans. The Fed charges banks a special interest rate called the **discount rate** on borrowed reserves. The discount rate is the only interest rate directly set by the Fed, and only banks can get it. By lowering the discount rate, the amount of reserves of banks can be increased, if banks want to borrow reserves.

Third, and most important, the Fed acts like the genie in our story by doing **open market operations (OMOs)**. OMOs are when the Fed buys (or sells) bonds from the public. When the Fed buys a bond, it creates new money out of thin air with which to do it. The Fed doesn't create cash (as the genie did), but instead writes a check. When the check is deposited by a bond seller, the money supply immediately rises; the bank account of the bond seller is money. Then, when the check clears, the Fed gives the bond seller's bank new reserves in the amount of the check. Neither the money in the bond seller's account nor the bank reserves existed before the purchase. The Fed simply creates them.

The Fed has a special committee, called the Federal Open Market Committee (FOMC), which plans purchases and sales of bonds by the Fed. The FOMC is composed of the seven Governors of the Board, and five of the twelve Reserve Bank presidents.

tools of the Fed- the methods the Fed can use to control bank reserves and bank expansion. These include the required reserve ratio, the discount rate, and open market operations.

discount rate (sometimes called the **rediscount rate**)- the interest rate charged by the Fed to banks that wish to borrow reserves from the Fed. This is the only interest rate that the Fed actually sets. The Federal Funds Rate, which is the interest rate that banks charge each other when they borrow reserves from each other, is tied to the discount rate.

open market operations- the buying and selling of U.S. government bonds by the Fed.

How can the Fed increase the money supply (or the growth rate of the money supply)?

1. **reduce the required reserve ratio.** Generally, the Fed doesn't like to do this, since it affects the multiplier and thus is a very powerful tool. However, the Fed might use this tool to offset increases in the desired currency ratio or increases in the excess reserves held by banks.

2. **reduce the discount rate.** This will increase bank reserves only if banks are willing to borrow reserves, perhaps because they have lots of potential borrowers they are unable to grant loans to. However, since this tool depends on the banks, it is sometimes not very effective (it is like a dog's leash; letting it out will let the dog go where it wants to, but pushing on it can't make the dog go in a particular direction that it doesn't want to go).

3. **buy bonds on the open market.** Buying bonds will directly increase the amount of money in existence, and will additionally increase bank reserves by the same amount as the bond purchase.

How can the Fed decrease the money supply (or the growth rate of the money supply)?

1. **increase the required reserve ratio.** Generally, the Fed doesn't like to do this, since it affects the multiplier and thus is a very powerful tool. However, the Fed might use this tool to offset decreases in the desired currency ratio or decreases in the excess reserves held by banks.

2. **increase the discount rate.** This will reduce the ability or willingness of banks to borrow reserves. It will only have an effect if banks were contemplating making more loans than they have the reserves to make.

3. **sell bonds on the open market.** Selling bonds will directly decrease the amount of money in existence. In addition, the sale will decrease bank reserves by the same amount as the bond sale.

What makes our money valuable?

The money we use is not backed up by gold, silver, or anything else tangible. Most of our money is bank deposits, and only a tiny portion of those bank deposits are backed up by something. But, the something backing up our bank accounts is either other bank deposits or cash. The cash itself is not backed up by anything, and if you try to take it to the government to redeem it for gold or silver, the government will likely send you to the nearest jeweler. In fact, if you look at your \$100, \$50, \$20, \$10, \$5, or \$1 bills, you will see that all of them say "Federal Reserve Note." This means that the cash itself only represents bank deposits that were placed at the Fed at one time.

Our money is valuable, not because of what backs it up, but because we believe, it is valuable. As long as people trade to get money because they know that they, in turn, can trade the money for whatever they want, people will continue to use it. Even though it is not backed up by any tangible item, it can be used to buy tangible items, and that is enough to make it valuable.

Notice, our money is not created by the Treasury. The Treasury Department is responsible for acquiring money so that the government can operate (the I.R.S. is part of the Treasury Department). The Treasury does print currency (bills) for the Fed. Thus, the Secret Service, a division of the Treasury, is in charge of catching counterfeiters.

Questions for Review and Practice

1. What is a liquid asset?
2. What determines whether a financial asset is included in the M1 money supply?
3. Could money perform its functions better if there were twice as much of it? Why or why not?
4. Central banks, like the Fed, limit the amount of money created. Is the scarcity of money the cause of poverty? If the Fed created more money, would poverty be eliminated? Explain
5. If banks continue to hold reserves that are only a small fraction of the deposits of their customers, are the deposits safe? How does this work?
6. If you withdraw \$100 cash from your checking account, what will happen to your bank's actual reserves? What happens to its required reserves? What happens to its excess reserves?
7. For each of the following, determine whether the event will increase the money supply, decrease the money supply, or leave the money supply unchanged.
 - A. A reduction in the discount rate
 - B. An increase in the reserve requirements
 - C. Sale by the U.S. Treasury of \$100 million of newly issued bonds to a commercial bank
 - D. Sale by the U.S. Treasury of \$100 million of newly issued bonds to a private investor
 - E. Sale by the U.S. Treasury of \$100 million of newly issued bonds to the Fed.
 - F. Sale by the Fed of \$200 million of U.S. securities to a private investor
 - G. Purchase by the Fed of \$100 million of U.S. securities from a commercial bank
 - H. Purchase by the Fed of \$100 million of U.S. securities from a private investor
8. A presidential candidate criticized budget deficits, saying that they cause inflation. He reasons that when the government spends more than it collects in taxes (a budget deficit), it simply prints more money. Because of the greater amount of money in existence, every dollar is worth less and will buy less. Thus, prices go up, and inflation occurs. Is he correct? If not, what is wrong with his argument?
9. If the Fed does not take any action to counteract the event, what would eventually happen if the general public decided to hold more currency and decrease their checking deposits by the same amount?
10. If the Fed wants to expand the money supply, why is it more likely to do so by purchasing bonds rather than by lowering reserve requirements?

- 11 Which of the following statements are true and which are false?
- A. All money we use is printed and issued by the U.S. Treasury.
 - B. When you deposit currency in a commercial bank, cash goes out of circulation, and so the money supply declines.
 - C. If the Treasury would create more money, Americans would have a higher standard of living.
 - D. Money is valuable because of what backs it up--gold in some countries, and government bonds in the United States.
 - E. If new reserves are created in the banking system, the money supply will increase by several times the amount of the new reserves.
- 12 Suppose that the Fed buys \$100,000 worth of bonds from Mr. Gates. Mr. Gates deposits the payment in the First Really Cool National Bank.
- A. How will this purchase (alone) affect the money supply?
 - B. How will the purchase and subsequent bank expansion affect the money supply?
 - C. If the reserve requirement ratio is 20 percent, what is the maximum amount of additional loans that the Really Cool Bank will be able to extend as the result of Gate's deposit?
 - D. If the reserve requirement ratio is 20 percent, what is the maximum amount of additional bank deposits that might be created as the result of bank expansion and the Fed's action?
13. Suppose that the reserve requirement is 10 percent and the balance sheet of the Really Nice Bank looks like the accompanying example.

Assets		Liabilities	
Vault Cash	20,000	Checking deposits	200,000
Deposits at Fed	30,000	Net worth	15,000
Securities	45,000		
Loans	120,000		

- A. What are the actual reserves of the Really Nice Bank?
 - B. What are the required reserves of the Really Nice Bank?
 - C. What are the excess reserves of the Really Nice Bank?
 - D. What is the maximum loan that the bank could extend (safely)?
14. In the 1930s and the 1980s, there were major failures of many large and small banking institutions. What were the differences between the failures in the 1980s and the failures in the 1930s?

Chapter 13

How does money affect the economy?

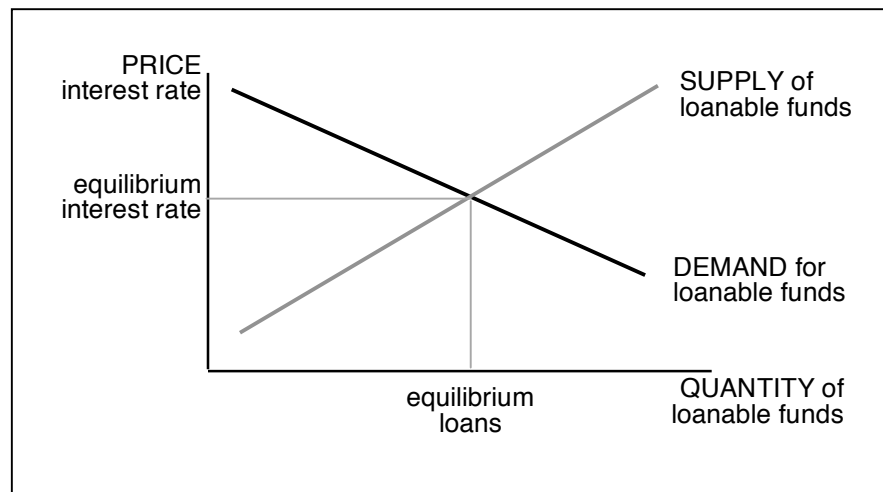
In the previous chapter, we explored where our money comes from, and how the supply of money is largely controlled by the Fed. In this chapter, we will see how changes in the money supply, or more accurately, changes in the growth rate of the money supply, affect the entire economy. Money may not make the world go around, but it sure makes the economy go up and down.

Before we start to understand how money affects the economy, it is worth noting that the Fed can only change three things - the reserve ratio, the discount rate, and open market operations. While these three tools greatly influence the growth rate of the money supply, the Fed's control on the money supply is not as simple or as direct as simply twisting a knob, pulling a lever, or hitting a key on a keyboard. As mentioned in chapter 10, banks' willingness to make loans, and their desire to keep more reserves than they might be required to keep, will also influence the growth of the money supply. So, too, will the desire of the public to hold their money as currency rather than bank deposits. The Fed can estimate the effects of these factors on its actions, but cannot control them.

How does growth in the money supply affect interest rates?

Ultimately, an interest rate is merely the price in a market for loans or loanable funds, which we unimaginatively call the loanable funds market. We discussed this in chapter 9. By the way, the picture is not really much different if the interest rate we are talking about is a real interest rate or a nominal interest rate.

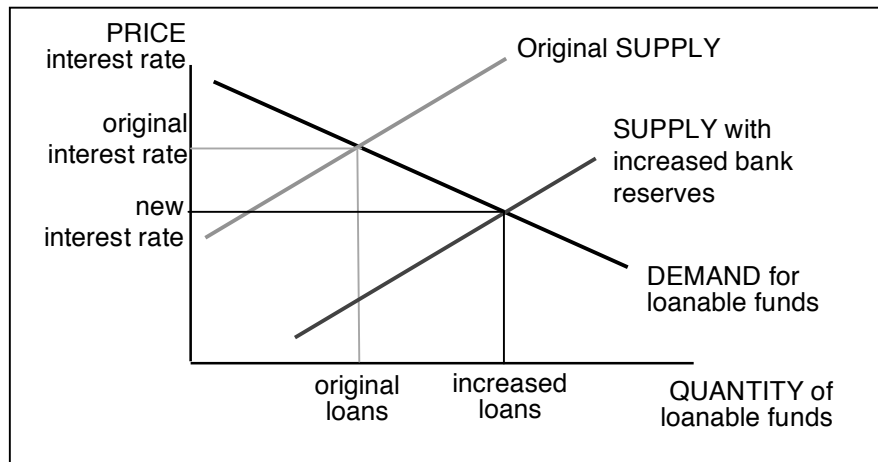
Since supply and demand for loans are really doing the heavy interest rate making, the **Fed does not set interest rates**, but rather *influences* them. The Fed can set one sort of interest rate, the discount rate, but it is ultimately the willingness of lenders to make loans, as well as the demand for those loans,



that determine the interest rate. Also, the Fed generally changes the reserves available to banks through open market operations, not by changing the discount rate.

Supply in the loanable funds market can be influenced by things that the Fed does. As we discussed in chapter 9, most of the loanable funds supply comes from people who save and deposit their savings in banks. Banks then create loans, using the deposits as the source of reserves, as we discussed in chapter 10. The Fed can act to augment the "raw materials" the banks have to work with, by increasing bank reserves. We also discussed this in chapter 10. The increased reserves of banks allow them to make more loans. As banks increase their loaning activity, the supply of loanable funds increases. As the supply of loanable funds increases, the real interest rate will most

likely start to fall, to induce borrowers to take out the increased amount of loans available.

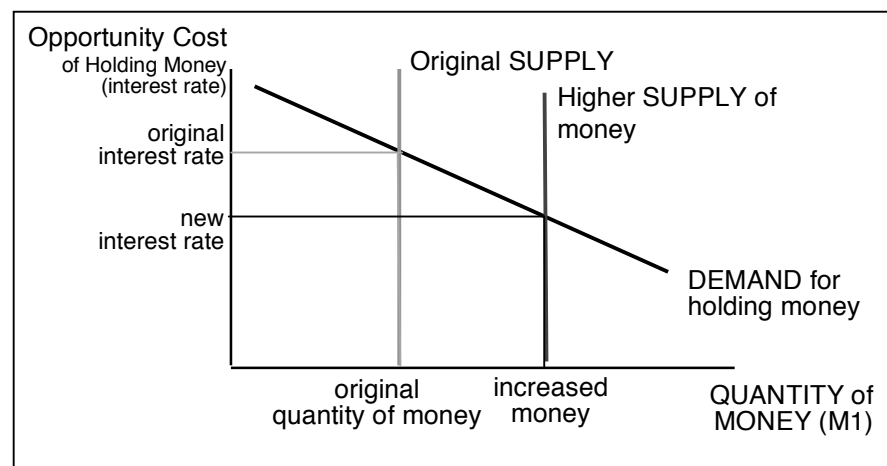


As the banks increase their lending, and as more loans are taken out by borrowers at the lower interest rates, the amount of money increases. The process that creates new money (bank expansion) also lowers interest rates.

Of course, the opposite happens when the Fed reduces the money supply, or its growth rate.

We can also view the link between money

supply growth and interest rates in another way. People have a **demand for money** itself. People desire to hold some portion of their incomes and wealth as money to meet their everyday expenses, either as cash or as checking account deposits. However, holding money in forms that don't pay interest, or pay very little interest, has an opportunity cost. That opportunity cost is the (higher) interest rate that could be earned by making some other investment, such as buying an interest-paying bond, rather than keeping cash or large checking account deposits. If we think of the interest rate as the price of holding money, then the demand for money is the relationship between the



interest rate and the quantity of money that people desire to hold. The higher the interest rate paid by non-money investments, the less money people will be willing to hold. The **supply of money** in this view is independent of the interest rate, and is just the amount of money that is around. So, we get a "market" as pictured to the left.

At a higher supply of money, people will find themselves with more money than they desire to hold at the current interest rate (the original interest rate on the diagram), so they will invest in bonds and other investments. When more bonds are purchased, the prices of bonds rise, thus lowering their return or implicit interest rate. Similarly, when other investments are made, the prices of those other investments will be driven up. At a higher price to buy into any investment, the return (rate of interest implicitly paid by the investment) will start to decline.

demand for money- the relationship between the opportunity cost of holding money (the interest rate) and the quantity of money people desire to hold.

supply of money- the amount of money in circulation

What is monetary policy?

Because of its effect on real interest rate, and spending overall, changes in the growth rate of the amount of money (or the money supply, as it is also known), will affect aggregate demand, and thus the economy. When the Fed attempts to change the economy by increasing or decreasing the growth rate of the money supply, it is called **monetary policy**.

If the Fed wishes to reduce unemployment and increase the growth of real GDP, it will increase the growth rate of the money supply in an effort to reduce real interest rates. Such an action is called **expansionary monetary policy**. Sometimes, increasing the growth rate of the money supply is also called a **"loose" monetary policy**.

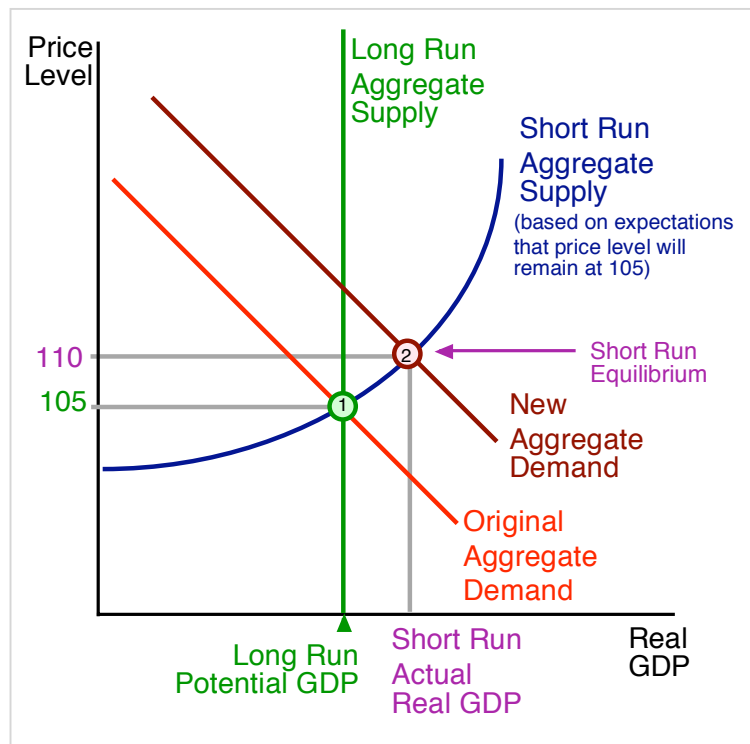
If the Fed wishes to reduce inflation, it will decrease the growth of the money supply to increase real interest rates. Such an action is called **restrictive monetary policy**, or a **"tight" monetary policy**.

What happens with expansionary monetary policy?

If the economy starts at a situation of long run equilibrium (point 1 on the diagram), when the Fed increases the money supply, banks will increase their lending activity. When the supply of loans goes up, the real interest rate will fall. As the interest rate falls, aggregate demand will increase (move to the right). The following short run equilibrium results.

In this short run equilibrium, which is shown as point (2):

1. the price level is higher than what was expected (it's 110 instead of 105)
2. the price level is higher than in the (previous) long run equilibrium
3. as a result of the higher price level, producers will produce more output in the short run than in the previous long run equilibrium, since resource costs will not keep up with the higher price level for products (see below)
4. output (real GDP) will be higher than in long run equilibrium (and higher than the potential, sustainable, full employment level).



monetary policy- using changes in the growth rate of the money supply to influence the economy.

expansionary monetary policy- increasing the growth rate of the money supply in an attempt to increase real GDP growth and reduce unemployment. Also called a **"loose" monetary policy** or **"loose" money policy**.

restrictive monetary policy- reducing the growth rate in the money supply, in an attempt to control inflation or slow economic growth. Also called a **"tight" policy**.

5. employment is greater than full employment
6. unemployment is lower than the natural rate (this can occur temporarily)
7. cyclical unemployment is negative (which can happen temporarily)
8. the real values of wages and resource prices will be lower than their long run equilibrium levels (due to the higher than expected price level)
9. real interest rates will be lower than long run equilibrium values (due to Fed action)

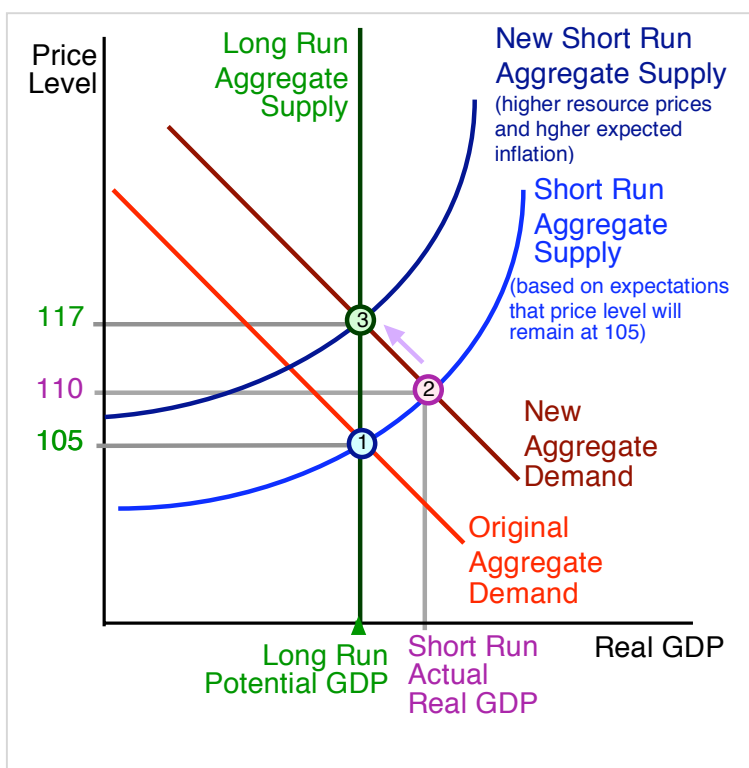
What happens in the long run?

This short run equilibrium will affect the resource market. As the aggregate demand begins to move rightward, producers expand their production in response, and thus increase demand for resources. Real wages and resource prices will be bid up, decreasing short run aggregate supply. As this occurs, the price level will rise, raising the real interest rate back to the long run equilibrium level.

Eventually, a new long run equilibrium will be established, reflecting the restored real wages and resource prices.

At the final long run equilibrium (3),

1. the price level is as expected (it's 117 now, and that's consistent with expectations)
2. the price level is higher than in the (previous) long run equilibrium



3. even though the price level is higher than the previous equilibrium, producers do not want to produce more than the long run potential GDP, since resource prices have caught up with product prices.

4. output (real GDP) will be the potential, sustainable, full employment level.

5. employment is equal to full employment

6. unemployment is at the natural rate

7. cyclical unemployment is zero

8. real wages return to their original level, even though nominal wages are higher than before.

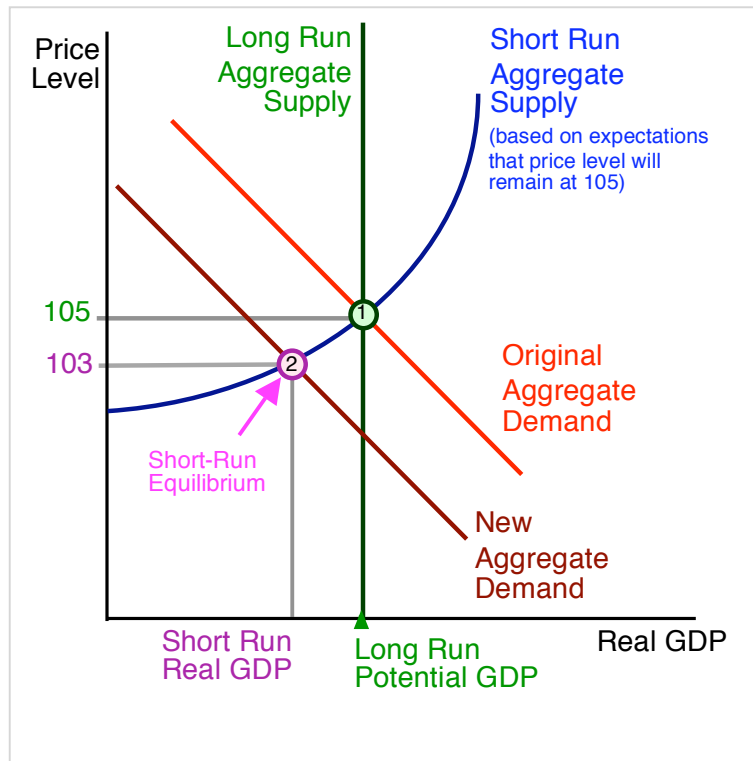
9. real interest rates will rise back to their original level, as the economy slides up the aggregate demand curve to the new long run equilibrium.

What happens with restrictive monetary policy?

Suppose the economy is in long run equilibrium (point 1). Then the Fed acts to reduce the money supply. This will lead to banks issuing fewer loans, lowering the supply of loanable funds, which will raise the real interest rate. As a result, the aggregate demand curve will fall (move to the left).

In this short run equilibrium, which is shown as point (2):

1. the price level is lower than what was expected (it's 103 instead of 105)
2. the price level is lower than in the (previous) long run equilibrium
3. as a result of the lower price level, producers will produce less output in the short run than in the previous long run equilibrium, since resource costs will not fall along with the falling price level for products (see below)
4. output (real GDP) will be lower than in long run equilibrium (and lower than the potential, sustainable, full employment level).
5. employment is less than full employment
6. unemployment is higher than the natural rate (this can occur temporarily)
7. cyclical unemployment is positive
8. the real values of wages and resource prices will be higher than their long run equilibrium levels (due to the lower than expected price level)
9. real interest rates will be higher than long run equilibrium values (due to the Fed's action)



What happens in the long run?

Once again, the short run equilibrium will affect the resource market; only these effects are the reverse of those that occur when the aggregate demand increases.

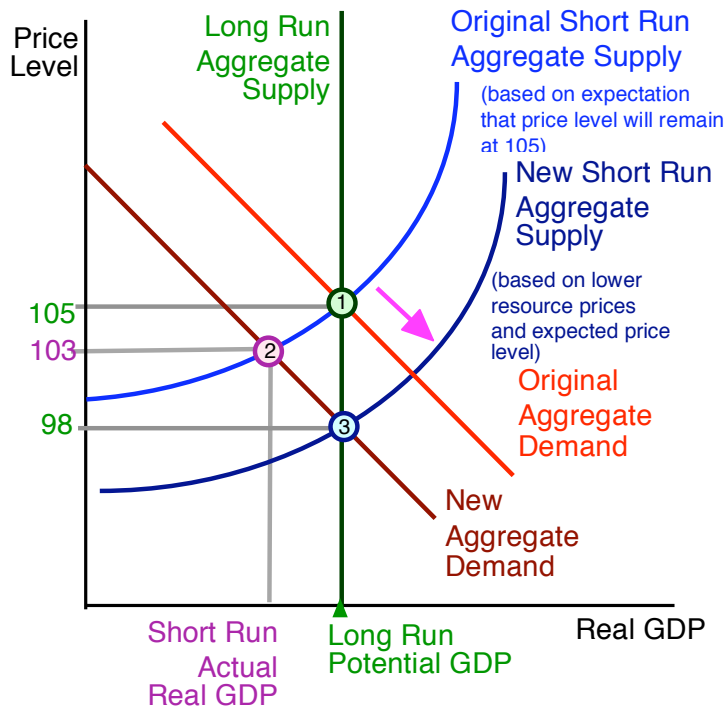
As the aggregate demand begins to move left, producers reduce their production in response, and thus reduce demand for resources. Eventually, resource prices will start to fall in real terms, although it may take quite a long time for this to happen, since people do not like to have their salaries or wages cut.

The fall in real resource prices will cause the short run aggregate supply to rise (move to the right). It will also result in less unemployment of resources (a return to full employment).

Eventually, a new long run equilibrium will be established, reflecting the restored real wages and resource prices.

At the final long run equilibrium (3),

1. the price level is as expected (it's 98 now, and that's consistent with expectations)
2. the price level is lower than in the (previous) long run equilibrium



3. even though the price level is lower than the previous equilibrium, producers do not want to produce less than the long run potential GDP, since resource prices have fallen by the same proportion as product prices.
4. output (real GDP) will be the potential, sustainable, full employment level.
5. employment is equal to full employment
6. unemployment is at the natural rate
7. cyclical unemployment is zero
8. real wages return to their original level, even though nominal wages are lower than before.
9. real interest rates will fall back to their original level, as the economy slides down the aggregate demand curve to the new long run equilibrium.

Is there another way to view the effects of the money supply?

Mathematically speaking, the effect of the money supply on the economy can be summarized by the formula

$$M \times V = P \times Q$$

in which M is the money supply, V is **velocity** (the number of times each dollar is spent on GDP), P is the price level (or the ratio of the current year's prices to the base year), and Q is real GDP.

The above equation, called the "**equation of exchange**," must always be true. The first part, $M \times V$, is spending. The second part, $P \times Q$ is nominal GDP. They have to be equal because spending on GDP has to equal GDP.

velocity (of money)- the number of times in a year that each dollars is spent on something that counts in GDP

equation of exchange- the formula showing the relationship between the money supply, velocity, the price level and real GDP. Specifically,
 $M \times V = P \times Q$

In terms of changes or growth rates (also called percentage changes or $\% \Delta$ for short), this formula means that

$$\% \Delta M + \% \Delta V = \% \Delta P + \% \Delta Q$$

or, the growth in the money supply plus the growth in velocity equals inflation plus the growth in real GDP.

This is the **growth rate version of the equation of exchange**, which also always is true.

Since velocity is an important part of the equation, and since we haven't discussed it much, here are a few details about what determines it:

Other things equal, velocity will increase (people will spend each dollar more times) if

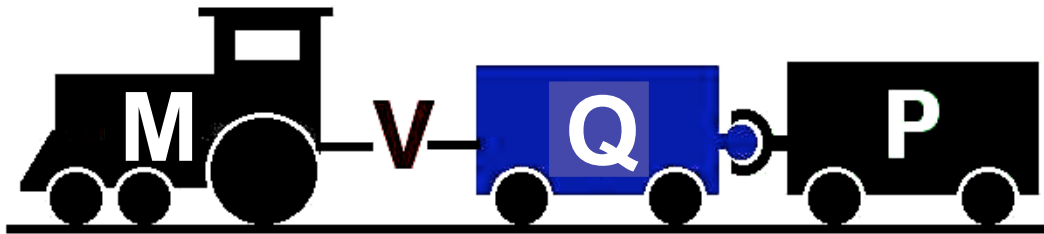
interest rates on non-money investments increase (people hold less money)

expected inflation increases (it's more costly to hold onto money)

people decrease their demand to hold wealth as money

The usefulness of the equation of exchange formula can be expanded by realizing that the changes in the growth rates follow a pattern over time. The pattern can be seen in the aggregate demand/aggregate supply model, but the pattern also can be seen if you think of the economy as sort of a train.

In this "money train," the locomotive is the money supply. Velocity acts as a shock absorber, and the cars in the train are real GDP and the price level, in terms of which car moves first:



When the growth rate of the money supply is changed, the first effect is that velocity's growth rate changes in the opposite direction (to absorb the shock) for a few months. Then, velocity springs back, pulling real output along (in the same direction as the change in M's growth rate) about six months to a year later. Prices move very little in this time. As real output catches up to the speed of M, eventually the price level is pulled along, 18 months to three years after the change in M. In the period that prices are catching up to the rest of the train, real output may stop moving or even appear to move backwards in comparison to the rest of the train.

While we are adding up numbers involving real and nominal values, remember that we have previously done this with interest rates:

$$\text{nominal interest} = \text{inflation} + \text{real interest}$$

Real interest rates fall as the money supply increases (and more loans are made) but will rise as the price level rises (since the demand for loans will rise with higher prices).

growth rate equation of exchange- the relationship between the growth rates of the money supply, velocity, the price index and real GDP

Using the view of the equation of exchange, the sequence of changes when monetary policy is undertaken is something like the following (with some overlaps):

Initially, M growth changes

Immediately,

velocity changes (in the opposite direction from the M growth change)

real interest rates change (in the opposite direction from the M growth change)

In the short run,

velocity starts to change back (even goes in the direction of the M growth change)

real GDP changes (in the same direction as M growth change)

real wages change (opposite direction from M)

price level changes somewhat (same direction as M)

As the self-correcting mechanism takes hold,

price level changes (same direction as M)

real interest return to original levels

real wages return to original levels

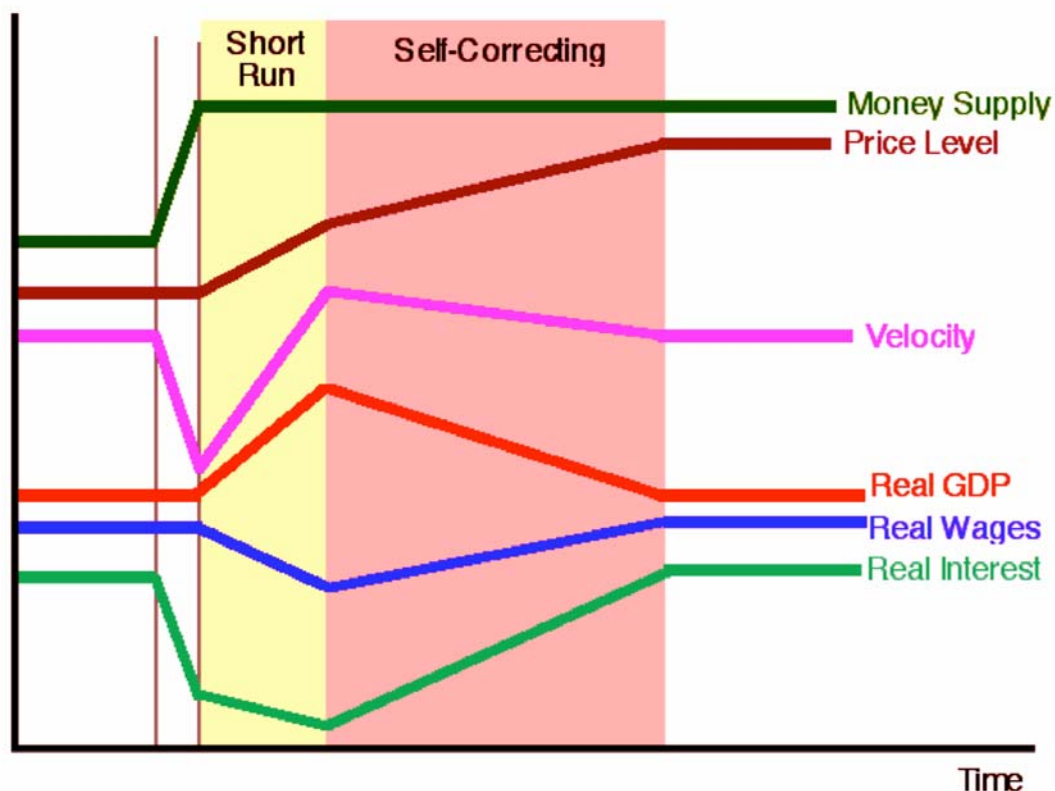
real GDP returns to original level

In the long run,

all real values have returned to original levels; only the price level and nominal values have changed permanently.

All of this is assuming that no other changes occur as the economy settles back to a long run equilibrium.

Here is a diagram showing the effects of a one-time increase in the money supply over time

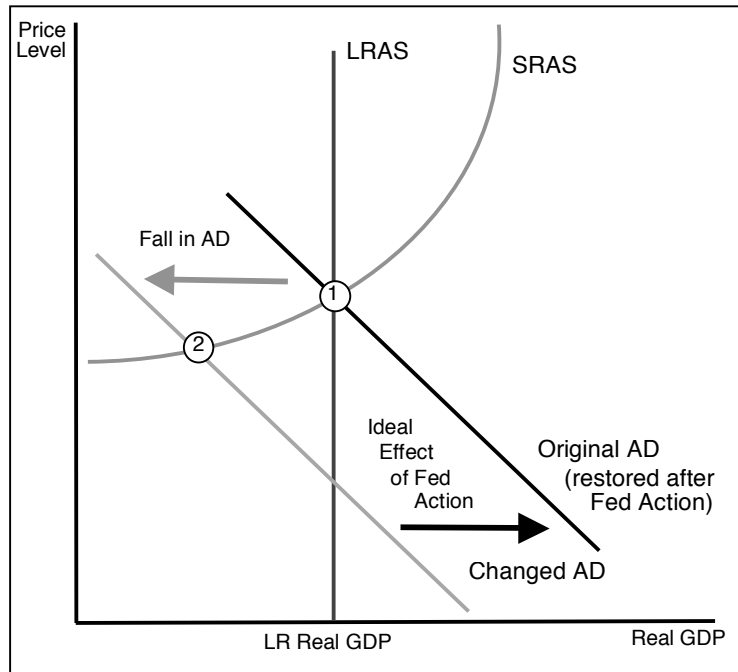


Can monetary policy fix a broken economy?

Thus far, we have shown the effects that monetary policy can have on an economy that starts at long run equilibrium. Understanding those basic short run and long run effects will help us grasp how monetary policy might be used to change the economy when it is not in long run equilibrium. The use of monetary policy to speed up a slow economy or to circumvent high inflation is a controversial topic, and requires consideration of things such as time lags and expectations.

Is it true that timing is everything?

Many people desire that the Fed would use monetary policy to **stabilize** the economy. This means that the Fed would act to counteract changes in aggregate demand, and keep the economy in a more or less permanent state of long run equilibrium. Such policy is known as **activist monetary policy**, and its proponents are sometimes called **activists**. When the aggregate demand is falling, due to any of the factors mentioned in chapter 9, activist policy would require that the Fed increase the growth rate of the money supply. This would increase consumer spending and move aggregate demand back to the right. In the figure at the right, the economy might remain at point 1 instead of moving to point 2, or may go to point 2 and quickly return to point 1. Most activists would also favor trying to control the high inflation that accompanies higher aggregate demand by having the Fed reduce the growth rate in the money supply when aggregate demand increases. By doing so, the Fed would reduce spending and send the aggregate demand curve back to the left, where it started.



One practical problem with using monetary policy to correct the economy is that it is difficult to know that aggregate demand is changing until real GDP growth or unemployment have started to change. The delay in recognizing that action is needed is sometimes called the **recognition lag**. If the Fed takes action only after it is clear that a

stabilizing the economy- counteracting the changes in the economy's aggregate demand and supply in order to maintain full employment, steady growth, and low inflation.

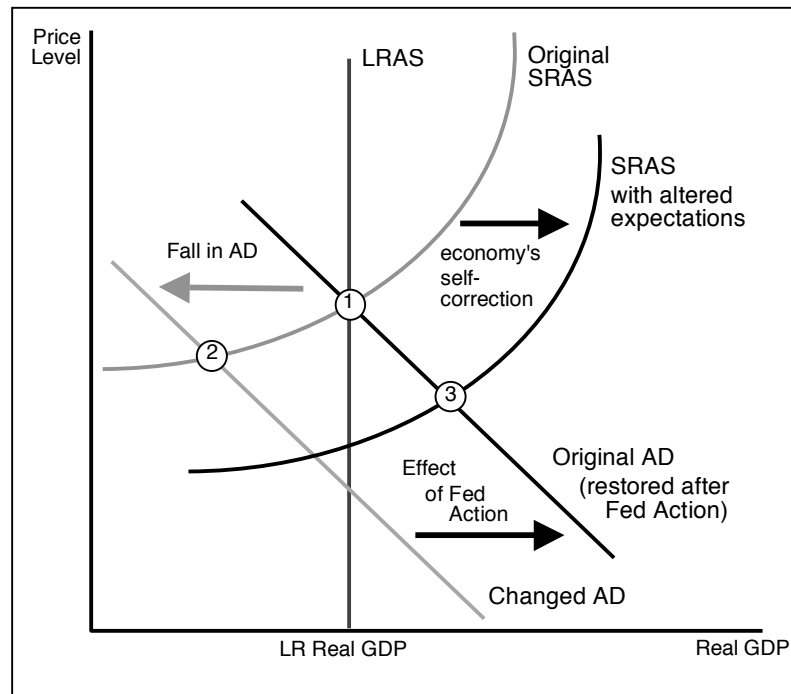
activist monetary policy- a policy of counteracting the ups and downs in the economy to maintain stability of prices, unemployment, and economic growth.

activists- economists or policy makers who favor an activist monetary policy

recognition lag- the delay in realizing that policy is needed to correct a change in the economy.

change has occurred in the economy, the action may be too late, or may make the situation less stable.

For example, suppose that there is a decrease in aggregate demand, moving the



economy from long run equilibrium point 1 to short run equilibrium point 2 in the diagram shown in the figure to the left. As aggregate demand starts to fall, real GDP growth will start to fall, and unemployment will start to rise. After the officials at the Fed notice this, the Fed might try to hasten the return to long run equilibrium by using monetary policy to move the aggregate demand curve back to the right, attempting to return the economy to long run equilibrium point 1. However, the higher unemployment and slow growth in the economy will also trigger the self correcting mechanism, and declining resource prices will start to move the short run aggregate supply to the right. Thus, it is quite possible for the new short run equilibrium to end up

overshooting the long run equilibrium. The result would be a short run equilibrium at point 3. This would lead to a less-stable economy with wild fluctuations in real GDP and unemployment.

Notice, if the Fed is to correct for fluctuations in the economy, it must act before the slowdown in real GDP occurs, and before unemployment increases trigger the self-correcting mechanism. Similarly, if the Fed is to act to slow the economy, and prevent inflation due to increases in aggregate demand, it must do so before the changes in aggregate demand are felt in the economy.

People who worry that the timing of policy may interfere with the self-correcting mechanism and keep the economy from reaching long run equilibrium (without overshooting it) say we should not use monetary policy to counteract events in the economy. The policy they favor is called **non-activist monetary policy**, sometimes called **monetarist policy**. Monetarist economists stress that the lags involved in making monetary policy are long and variable, so the chances of overshooting long run equilibrium are great. Monetarists favor a steady growth in the money supply consistent with the average growth of the economy. This steady growth is called the **monetary rule**,

non-activist monetary policy- a monetary policy which does not call for correcting fluctuations in the economy, due to the likelihood of over-correction

monetarist policy- the policy of maintaining steady growth rate in the money supply sufficient to keep up with overall growth in real GDP without inducing inflation. Usually the growth rate in the money supply associated with this policy is 3% to 5%.

monetary rule- steady growth in the money supply favored by monetarists.

and it suggests that the money supply should grow at between 3 and 5 percent. They claim that this will prevent the sort of over-correction we have described, and will also lead to low or no inflation over time.

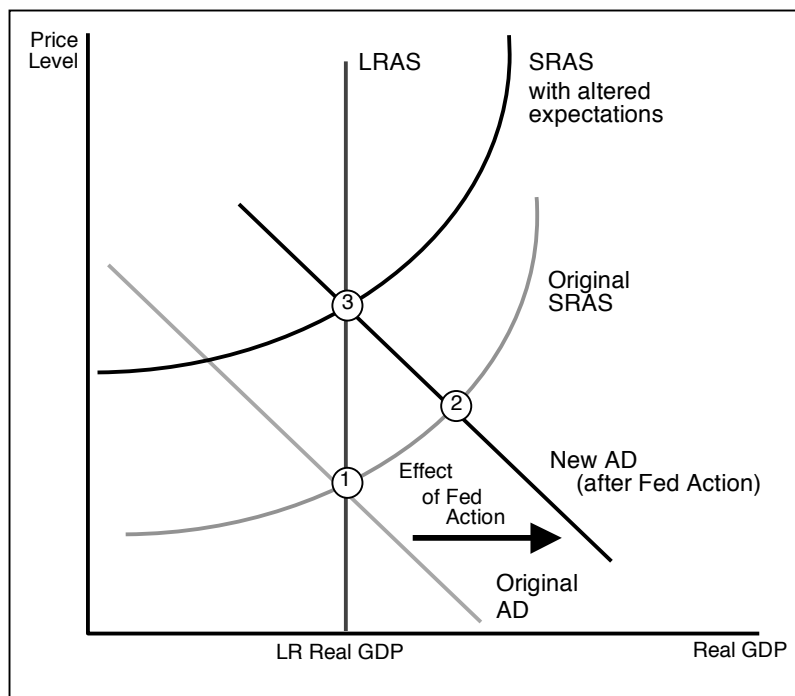
How much do expectations matter?

You may remember from our discussions in chapter 9 that the aggregate demand curve and the short run aggregate supply curve are partly determined by the expectations of decision makers concerning inflation and the price level. Indeed, the short run equilibrium is based on resource sellers and others incorrectly anticipating the inflation rate and price level. This means that if monetary policy is to have even short run effects, the monetary policy's effects on inflation have to be unanticipated. That is, at least some of the effects of money supply growth on inflation has to come as a surprise to decision makers, and they must fail to account for it in their decisions.

People will experience some unanticipated inflation if they expect the price level and the inflation rate to be similar to what they were in the recent past. When people behave this way, we say they have **adaptive expectations**. With these kind of expectations, monetary policy can be effective, causing changes in the short run real GDP, real wages, real interest rates, and the unemployment rate. Indeed, since chapter 9, we assumed that decision makers had adaptive expectations that took time to change.

However, if people more or less fully account for inflation in making their decisions (if inflation is anticipated), then there is no short run increase in real GDP at all, and that no other real changes result from monetary policy. In effect, the economy gets to the long run equilibrium right away.

On the figure to the right, an increase in aggregate demand created by an increase in money supply growth would lead to a short run equilibrium indicated at point 2, but only if the short run aggregate supply does not change. However, if decision makers can anticipate the inflation that will result from the increased supply of money, the aggregate demand curve will quickly move to the position shown, "with altered expectations." The economy moves to the long run equilibrium point (3 on the diagram) almost immediately, without a stopover at point 2. If all changes in the price level are acted upon immediately, then we say the **policy is anticipated** (or **fully an-**



adaptive expectations- the theory that people base their expectations of inflation upon the inflation rates and price levels of the recent past.

anticipated).

Fully anticipated inflation does not require incredible foresight or sophistication on the part of decision makers. In labor contracts, the effects of inflation could be anticipated through automatic cost of living adjustments, raising people's salaries in step with inflation automatically. Adjustable rate loans, with interest rates changing automatically with inflation, are another method for people to anticipate inflation, even if they are not exactly sophisticated about the effects of policy.

If people make decisions with understanding and anticipation about how policy will affect inflation, then we say they have **rational expectations**. With these kinds of expectations, all policy effects are anticipated and nothing real changes with monetary policy. Only the price level will change. This conclusion is called the **policy ineffectiveness theorem**. While the evidence is still inconclusive, it seems that the rational expectations effects do exist. To the extent that monetary policy is predictable, its real effects are greatly lessened.

Notice, whether you believe that people have adaptive expectations or that they have rational expectations, the long run effect of monetary policy is higher prices. In the long run, no real variables, such as real GDP, will change. The only difference between the two views of expectations is how long it will take to reach the long run.

Why does this matter?

In macroeconomics, our understanding of the economy comes from studying the past. One event from which we have learned a great deal is the Great Depression of 1930-1941. One thing we learned from the Depression is that monetary policy matters.

You may have heard that the stock market crash of 1929 caused the Great Depression. In fact, you probably read it in some history book. Well, unfortunately, economists are not historians and historians are not economists. Since the stock market crash came in October of 1929, just a few months before the Depression started, many people around at the time (and no, that does not include me) thought that they were related. In a way they were, but not in the way people thought.

In 1929, new Fed Chairman Adolf Miller announced that he thought that stocks were overvalued, and that the Fed would take action to remedy the situation, partly by raising the discount rate. Fear that the Fed would cut the money supply in the months ahead set off a panic that people who bought stock with borrowed funds would be forced to sell (as indeed they would), and that the economy as a whole would slow down in the following years (as indeed happened). This caused the stock market to crash in October 1929. The crash resulted from fear of the coming events; it was not the cause of them.

fully anticipated policy- when the effects of policy on inflation are anticipated, so that any inflation that occurs as a result of policy is immediately factored into decisions concerning salaries and interest rates.

rational expectations- the theory that the inflationary effect of policy is anticipated by decision makers, and thus is immediately included in their decisions. The rational expectations theory would predict that monetary policy has no effects on real variables such as real GDP, even in the short run.

policy ineffectiveness theorem- the conclusion (consistent with rational expectations) that monetary policy will have no real effects on the economy, even in the short run.

After the 1929 crash, Fed chairman Miller seemed to have changed his mind, and did not do as he had threatened. As a result, the stock market rebounded to early 1929 levels by the middle of 1930. However, in the middle of 1930, the Fed chairman's promises were kept, and the Fed's monetary policies became **very** restrictive. The Fed actually *reduced* the money supply, using all three of its "tools" we discussed in the last chapter. The reduction in the money supply moved the aggregate demand curve to the left, as shown on page 141.

Why didn't the self- correcting mechanism work?

Tax increases in 1932 may have slowed down the process that normally would have restored long run equilibrium, since those who did have income had to pay a lot more of it in taxes, and had a lot less to spend. But the self-correcting mechanism was short-circuited by the Fed, which kept a lid on reserves.

Remember how banks work. Even though each dollar of bank deposits is only backed up by a small fraction of reserves. The system works and the bank deposits are safe, as long as people do not panic and try to withdraw all of their money. By 1933, a few banks discovered that they could not meet their required reserve requirements. When this news spread, people did panic. Their attempts to take all of their money out of the banks, called **bank runs**, caused the collapse of many banks, even those that would have had enough reserves otherwise. The depositors' money was not, of course, actually in the banks. The banks had kept a fraction of it to back up deposits and had loaned the rest out. As long as depositors were content to leave their deposits in the banks, all was well. However, when a large number of depositors started to pull their deposits out, they had to be paid with the few reserves that were backing up everyone's deposits, and the banks were then in trouble. The Fed refused to lend reserves to banks, and it did not increase reserves by buying bonds, so more banks failed. With them, went nearly one-third of the money supply.

Gradually, from 1934 to 1936, people adjusted to the lower money supply, and the economy inched back towards long run equilibrium. Then, in 1937 and 1938, the Fed struck again. It raised reserve requirements, in an attempt to weed out the remaining weak banks. It slowed down the meager growth in bank reserves, which had been building up since 1934. These actions effectively counteracted the self-correcting mechanism that had started to restore real GDP to long run equilibrium. The Depression went on for three more years.

One good web site to see some of this is at the San Francisco Fed:

<http://www.frbsf.org/econsrch/wklyltr/wklyltr99/e199-10.html>

Could it happen again?

Well, some people think it almost did.

In 1987, new Fed Chairman Alan Greenspan announced that he thought that stocks were overvalued, and that the Fed would take action to remedy the situation, partly by raising the discount rate. Fear that the Fed would cut the money supply in the months ahead set off a panic that the economy as a whole would slow down in the following years. This caused the stock market to crash in October 1987.

Just a day after the 1987 crash, Fed chairman Greenspan announced "The Federal Reserve, consistent with its responsibilities as the nation's central bank, affirmed today its readiness to serve as a source of liquidity to support the economic and financial system." In other words, he backed off. Unlike the Fed of 1929 and 1930, the Fed chairman of 1987 and 1988 really did not change his mind, and never put into place the restrictive monetary policy he hinted at.

Apparently, the Fed can learn from studying the past as well.

Questions for Review and Practice

1. What effect will each of the following have on the quantity of M1 money people want to hold, *ceteris paribus*?
 - A. An increase in the interest rate on checking deposits
 - B. An increase in the expected rate of inflation
 - C. An increase in income
 - D. An increase in the differential interest rate between money market mutual funds and checking deposits
 - E. An increase in bond prices
2. Why does expansionary monetary policy often produce increases in real output, at least in the short run?
3. How will an unanticipated increase in the money supply affect the real interest rate, real output, and employment in the short run? How will the effect differ if the policy is anticipated?
4. If the Fed begins a more restrictive or tight monetary policy, it will usually sell bonds in the open market. Which of the following is likely to increase (in the short run)?
 - A. The reserves available to banks
 - B. Household spending on consumer durables
 - C. The exchange rate value of the dollar
 - D. Net exports
 - E. The prices of stocks and real assets like apartment or office buildings
 - F. Real interest rates
 - G. Real GDP
 - H. Unemployment
5. Suppose the President pressures the Fed to expand the money supply more rapidly so that interest rates can be reduced. What is the likely effect, assuming the expansion is not anticipated?
6. Countries in which the money supply growth is rapid tend to have higher interest rates than other countries. Why is this so?
7. Suppose there are long and somewhat unpredictable time lags between a change in monetary policy and the policy's impact on output, employment, and prices. How will such lags affect the usefulness of monetary policy as a method of stabilizing the ups and downs in the economy?
8. Why do periods of high interest rates and periods of high inflation often occur together?
9. What are the differences between adaptive expectations and rational expectations? Which view of expectations would allow monetary policy to be effective in changing real variables in the economy?
10. Why do many nonactivists favor a monetary rule, such as expansion of the money supply at a constant annual rate? What is a major practical problem with a monetary rule (such as requiring a 3% to 5% growth in the money supply)?
11. During the Great Depression, what happened to the economy's self-correcting mechanism?

Chapter 14

Does Government Affect the Economy?

Those poor politicians! They are like the youngest child in a large family. Even though they sometimes do stupid things that they ought to get blamed for, they often get blamed for things that are not even their fault. When the unemployment rate is high, causing wage earners and their families to suffer, those in office get blamed. When the growth of real GDP is low, causing businesses to hemorrhage red ink, those in office get blamed. When inflation is rampant, causing people to lose their life savings to swelling prices, those in office get blamed. Often, the policies of government, especially the Fed, are to blame for short run ups and downs in the economy. Probably more often, the true blame rests on forces outside of anyone's control. Still, it is the elected officials who are held responsible, and who are expected to fix the economy's ills.

And yet, elected officials have little control over things that actually affect the economy, such as natural disasters, changes in resource prices, changes in consumer wealth, changes in the exchange rates, or changes in the real interest rate. The Fed has a bit of control over interest rates, in the short run, and may even be able to offset some of the other changes through monetary policy, but the Fed is not under the control of elected officials!

So, when the economy is in trouble, those in political office are tempted to try something, anything, to remedy the situation and remain in office or redeem their popularity. Since they cannot control the Fed, they turn to the one thing they can control: the government budget.

What is fiscal policy?

When the government uses its spending or taxing policy to influence the national economy, it is called (in general) **fiscal policy**. In the United States, government spending and tax policy is under the control of the Congress, who passes the government budget, subject to the approval of the President.

The government spends money to buy goods and services, as well as making transfers of income. The income or revenue of the government consists mostly of taxes collected by the government (along with a few fees the government charges). If the government spends more money in a year than it collects in taxes (and fees), the government is said to be running a government **budget deficit**. When this happens, the government must borrow the funds to pay for its extra spending by selling bonds. If the government spends less money in a year than it collects in taxes, the government is running a government **budget surplus**. If the government spends exactly as much money in a year as it collects in taxes, the government has a **balanced government budget**. The sum of all past years' government deficits, less any surpluses, is called the

fiscal policy- using government spending and taxing to influence the economy

budget deficit- when the government's expenditures are greater than the government's income from taxes and fees.

budget surplus- when the government collects more in taxes and fees than it spends

balanced budget- when the government's income from taxes and fees equals the government's expenditures.

national debt. It consists of all the money the government owes everyone who has bought government bonds in the past.

How did the government function long ago?

Prior to the Great Depression of the 1930's, the prevailing view among economists, politicians, and the public was that the government decided what sorts of things it needed to spend money on, and then tried to work out a way to collect enough taxes to pay for the spending. If the government had a deficit in one year, due to a war, for example, it would borrow the money (by selling bonds) to pay for the difference. As soon as possible, the government would pay back the borrowing by collecting extra money, running a surplus for a while.

The economy as a whole was sort of left to do its own thing, as far as the government was concerned. The thinking was that, if the economy got into trouble, it would eventually correct itself as prices adjusted to restore long run equilibrium. Economists assured the people in government that this would happen, due to an idea called **Say's Law**. Say's Law says that prices of goods and resources will very quickly change if too much (or too little) stuff is being made in the economy, restoring the economy to full employment.

What happened to those ideas?

During the 1930's, Say's Law did not seem to be working. Unemployment was high, the economy (real GDP) was shrinking, and there seemed to be no end in sight. One president, Herbert Hoover, was voted out of office because of his inability to fix the economy.

An English economist, John Maynard Keynes (pronounced "canes") believed that he knew the reason that the economy was stalled, and thought that he had a solution. His theory was that prices, interest rates, and wages are not very flexible, especially in the downward direction. He called wages and prices "sticky." Since sellers of goods and resources don't like decreases in the prices of the things they sell they are reluctant to accept lower price or wages. Because price changes are necessary to restore long run equilibrium, short run equilibrium may last a long time if there is a recession or depression. Given a very long time, prices and wages would change to restore long run equilibrium, but, in Keynes's words, "in the long run, we are all dead."

Keynes believed that other things could return the economy to long run equilibrium. These involve increasing aggregate demand (AD) through government action, rather than waiting for the self-correcting mechanism to move short run aggregate supply.

The key to Keynes's idea is the role that **income** plays in the spending of consumers. Keynes theorized that people with more income would spend more also. They probably would not spend all their increased income (they would save some) but surely, they would spend most of it. The spending by these people would create income for other people, who, in turn, would increase *their* spending. This increased spending

national debt- the amount that the government owes, due to its past borrowing during periods of deficits. The government owes this to holders of government bonds, including banks, foreign investors, U.S. investors, and the Fed.

Say's Law- the concept that product prices, wages, and interest rates are flexible enough to bring about general equilibrium in all markets. Long-term oversupply of goods or resources would thus not occur.

would then increase the income of yet more people, and so on. Increasing the incomes of some people in the economy would thus have an effect over time that is much larger than the initial increase in income. He called this effect the "**multiplier effect**," and it is much like the multiplier concept in bank expansion.

Keynes suggested that that government could start a process of income growth by injecting new income into the economy through **autonomous spending**. Autonomous spending is spending which does not depend on people's income, which is why the government can do it when consumers and businesses might be unwilling to spend. However, autonomous spending, by increasing consumers' incomes, will trigger additional spending and income creation. The additional spending caused by the increased income is called **induced spending**. Keynes's multiplier effect theory would predict that any increase in autonomous spending would lead to much larger increases in induced spending, raising incomes, and increasing purchases throughout the economy.

Tax cuts might also work to induce spending. Cutting taxes while raising government spending is even better than just increases in government autonomous spending or tax cuts alone. However, during this process, the government can't raise taxes while it increases spending, since that would reduce people's incomes, and break the cycle leading to induced spending. Keynes's conclusion was that **government deficits stimulate the economy**. This view of spending and fiscal policy is called **Keynesian**, after Keynes.

Keynesian theory does not necessarily predict that tax cuts or government spending increases can produce long run changes in the economy. For example, if the economy is already in long run equilibrium, and the government wishes use fiscal policy to increase real GDP growth, the effects will only be short-lived. In the long run, resource prices will change to restore long run equilibrium. Also, real interest rates will change as this occurs. However, the Keynesian model predicts that if the economy is in a short run equilibrium that is not desired by government officials, long run equilibrium might be **restored** faster using fiscal policy, rather than waiting for the self-correcting mechanism.

What was the Keynesian prescription?

The Keynesian view is that government deficits and surpluses should be used to counteract changes in the economy. Such a strategy is called **countercyclical**. If the

multiplier effect- the idea that an increase in some people's income would increase their spending, setting off a chain reaction of increased incomes and spending by other people. This would create income and spending that is many times larger than the original increase in income.

autonomous spending- spending that occurs on its own and is not caused by increases in people's incomes.

induced spending- spending that occurs as a result of increases in consumers' incomes.

Keynesian theory- the economic theory that government deficits created by increased government spending and reduced taxes can stimulate the economy

countercyclical policy- increasing the government deficit when economic growth is slow or unemployment is high, and decreasing the deficit or creating a government surplus when inflation is high or when unemployment is low.

economy has high unemployment (low real GDP growth) and low inflation (or deflation), the way to solve the problem is to increase aggregate demand by **expansionary fiscal policy** (increased government spending, G or cuts in taxes, T). Government deficits should be run when the economy is sluggish, to stimulate real GDP growth. On the other hand, if the economy has lots of inflation, we need to cut back aggregate demand by using **restrictive fiscal policy**, involving higher taxes and reduced government spending.

So, did that cure the Depression?

During the Depression, there is little doubt that the government programs inspired by the Keynesian philosophy alleviated much of the suffering caused by the economy's problems. Government initiatives provided many people with jobs, security, and hope that they otherwise would not have had. However, the policy was not enough to end the Depression. Growth of the economy remained slow. In fact, despite the increasing deficit, and huge increases in spending during the early 1930's, the Depression continued, and even deepened in 1937 and 1938.

However, although the government spending was not the economic panacea it was touted to be, it was very popular. Politically, the policy was successful, not only because some individuals were helped, but also because the nation's leaders were seen to be doing something to solve the economy's problems, even if the things they were doing were not really helping.

The Great Depression is not the only case we have to study to determine whether fiscal policy is effective or not. Since then, fiscal policy has been attempted many times in almost every industrial market economy. The overwhelming majority of economists believe that any effects that it has are temporary. Much evidence now exists that fiscal policy is not an effective way to increase economic growth, and does not restore long run equilibrium any faster than the self-correcting mechanism can. Certainly, compared to monetary policy, fiscal policy is a dud.

Then, what became of fiscal policy?

The idea that government might do something to cure the economy's woes became a persistent one. Politicians were reluctant to discard any idea that would help the economy out of trouble, or at least make it look like they were trying to get the economy out of trouble. So, like anyone who is desperate to fix a problem, they wholeheartedly embraced the only tool they had. Even so, they encountered problems.

Changes in the government budget take time: it takes time to recognize that policy is needed, it takes time for Congress and the President to authorize spending or taxing changes, and then it takes time to actually spend the money or give the tax cuts, for example. These **policy lags** will make stabilizing the economy more difficult, especially if the timing of the fiscal policy is incorrect, and the effects of the fiscal policy are multiplied. By the time the full impact of the policy is felt in the economy, the self-correcting mechanism may already be working, and the long run equilibrium may thus

expansionary fiscal policy- increasing government spending or reducing taxes (or both) in order to increase real GDP growth and reduce unemployment.

restrictive fiscal policy- decreasing government spending or increasing taxes (or both) in order to reduce inflation.

policy lags- delays in recognizing that policy is needed and delays in implementing the policy.

be overshot. You may remember from chapter 11 that this was a concern with monetary policy as well.

Because of the lags between events in the economy and action by elected officials, permanent government programs have been set up to produce fiscal policy changes automatically. Programs that increase spending (or reduce taxes) when there is a recession and reduce spending (or increase taxes) when the economy is tending to inflation, without any action taken by the President or Congress, are called **automatic stabilizers**. The programs automatically create the needed countercyclical fiscal stimulus or dampening as the conditions in the economy dictate. For example, unemployment benefits raise government spending as unemployment rates increase, and thus are expansionary when the economy needs a stimulus. Similarly, the progressive income tax structure increases tax revenues when people's incomes are rising, and thus is restrictive during periods of rapid economic growth.

Thus, countercyclical fiscal policy is now embedded in the very fabric of our laws and institutions.

Why doesn't fiscal policy work?

There are at least two theories as to why fiscal policy has little or no effect on the economy.

What is crowding out?

First, expansionary fiscal policy requires a deficit. A deficit requires the government to borrow, and the bigger the fiscal stimulus attempted, the more borrowing the government must do. The government's borrowing will raise interest rates, and also absorbs funds that otherwise might be borrowed in the loanable funds market by the private sector (consumers and businesses). The higher interest rate and reductions in funds available for private borrowing create a **crowding-out effect**. Higher government spending may temporarily increase consumers' incomes and spending, thus increasing aggregate demand. But, when the government starts to borrow the funds it needs to continue its activities, the reduced opportunities for private borrowing and spending by consumers and business will offset the increases in aggregate demand. Ultimately, aggregate demand (AD) will not increase by much, if at all.

What is New Classical economics?

Some evidence for crowding-out exists, such as higher interest rates for a period of time following expansionary fiscal policy. However, with the passage of time, another effect seems to occur. Some economists have found evidence that increased government spending and deficits are offset by reductions in private spending, but that this can occur without interest rates going up.

This effect is the focus of a branch of economics called **New Classical econom-**

automatic stabilizers- government programs that automatically raise deficits when the economy is growing slowly or when unemployment is high, and lower deficits (or create surpluses) when unemployment is low or economic growth is robust. Automatic stabilizers do not require congress or the president to take any special action when fiscal policy is needed.

crowding-out effect- government deficits that are intended to increase spending result in higher interest rates and reduced spending by consumers and business

ics, which emphasizes the role that expectations play in people's spending decisions. New Classical economists have concluded that when government increases spending without raising taxes, after a few years, **nothing in the economy changes**. The explanation for this is that people know that increased spending will eventually lead to higher taxes in the future (or reduced future government spending). These expectations induce people to cut their current spending, so that they can face the higher future taxes without suffering a reduction in their standard of living. Consumers may also reason that increased government spending now will mean the government will be less able to afford programs like Social Security in the future. Thus, they will increase their saving now, reducing their consumption, in order to better provide for their own needs at retirement, rather than relying on the government. This will largely offset the current effect of increased government spending. Also, interest rates don't change, since increased government borrowing is offset by increased private saving, due to the decreased private spending.

Similarly, giving consumers a temporary increase in income through a tax cut will simply increase consumers' saving, since they will anticipate higher future taxes, and will want to be in a position to pay them. Tax cuts, and the deficits they create, will not increase aggregate demand any more than increases in government spending.

Does that mean that changing taxes or spending is a waste of time?

There is one modern view of fiscal policy that predicts genuine and long-lasting effects from fiscal policy. That is the **supply side** view of fiscal policy. Supply side economists believe that reductions in **marginal tax rates** encourage resource suppliers to increase the supply of resources to the economy. This is believed to move the long run aggregate supply and the short run aggregate supply to the right, increasing real GDP. There seems to be some evidence that this does occur; reductions in tax rates tend to be followed by periods of real GDP growth.

As the name implies, the supply side view of fiscal policy does not focus on the possible aggregate demand effects of fiscal policy, as the Keynesian view does. The Keynesian view would hold that any tax reduction would increase spending and thus increase aggregate demand (by giving consumers more wealth). To a Keynesian, a tax cut is a tax cut. The supply side view is that only changes in *marginal* tax rates alter the supply of resources, and thus will have any effect on the economy. Supply siders believe that simply giving taxpayers a lump of money (such as a bigger deduction for dependents) will not have any effect on the economy.

It should also be noted that the supply side view is the only theory of fiscal policy that allows for government taxing or spending decisions to affect the economy *permanently*, in the long run. Even Keynesian theory allows for the return to the original long run equilibrium eventually.

New Classical economics- the school of economic thought that holds that fiscal policy has no effect on aggregate demand or interest rates, since anticipation of future tax implications of the policy will cause people to offset government action with their decisions.

supply side economics- the view that changes in marginal tax rates can influence the economy, by altering long run and short run aggregate supply.

What are the views of fiscal policy?

To summarize:

Keynesian view: increased deficits (more government spending without tax increases, or tax cuts without spending cuts) will increase aggregate demand

Crowding out view: increased deficits will not increase aggregate demand, because of the offsetting effects of rising interest rates.

New Classical view: increased deficits will not increase aggregate demand, because of anticipated future taxing and spending changes. Also, there is no effect on interest rates, due to spending and saving changes by consumers.

Supply-side view: changes in **tax rates** may increase aggregate supply (especially in the long run). The Laffer curve says that increased growth in GDP may lead to increased tax revenues to the government, even though tax rates are reduced.

So, who's right?

The problem with assessing the effects of fiscal policy on the economy is that many things are happening at the same time. Monetary policy and other changes that are taking place might mask the effects we see. Even so, there are some conclusions we can draw from the recent past.

First, if fiscal policy has *any* effects, they only occur in the very short run (less than one year). However, it is possible that there are no effects of fiscal policy at all. The very rapid economic growth of the late 1990's occurred while the government was running a large and growing budget surplus, which Keynesian theory would not have predicted. Similarly, the slow growth of the early 1990's and early 2000's came during and after periods of increasing deficits.

Second, there does seem to be some crowding-out effect that offsets the effects of fiscal policy within a year's time. Interest rates do seem to be reactive to deficits, at least for a while.

Third, the effect of fiscal policy on real interest rates also seems short-lived. Real interest rates seem to bounce back to their long-term levels pretty quickly, even during time when the government deficit is increasing. This seems to bear out the New Classical view.

Finally, periods of rapid real GDP growth have followed about two years after the tax rate cuts of the early 1960's, the early 1980's, and (perhaps) the early 2000's. This is consistent with the supply side view.

Thus, there seems to be a kernel of truth in the supply side view, the New Classical view, and the crowding-out view. There may even be a bit of very short run validity to the Keynesian view, but there is much evidence on the other side.

Questions for Review and Practice

1. What is the Keynesian view of fiscal policy? What are its central assumptions about the economy?
2. What is the crowding-out effect, and how does it change the predictions of the Keynesian model regarding fiscal policy? How does the new classical theory of fiscal policy differ from the crowding-out model?
3. What are the timing problems with using fiscal policy to stabilize the economy? How has the government adjusted to those problems?
4. What are automatic stabilizers? Give an example of one, and how it works.
5. How does the supply side view of fiscal policy differ from the various demand-side theories? Why would a supply-side economist prefer a tax reform plan that reduced tax rates rather than a plan that just gave every taxpayer a particular sum of money (as a rebate), even if the total effects on government revenues would be the same?
6. According to the Keynesian view, what fiscal policy actions should be taken if the unemployment rate is high and current GDP is well below the economy's sustainable output rate?
7. According to the Keynesian view, what fiscal policy actions should be taken if the unemployment rate is low and inflation is growing?
8. How would the Keynesian, crowding-out and New Classical perspective on fiscal policy each respond to the following proposal?
 “To achieve full employment and price stability, we run a budget deficit if output is at less than full employment. If inflation is a problem, we run a budget surplus.”
9. During the late 1990's, the government was running a budget surplus. Economic growth was strong, and there was very little inflation. Unemployment and real interest rates were falling. How could you explain this in terms of aggregate demand and aggregate supply? Which view(s) of fiscal policy is (are) supported by this evidence?
10. In the early 1980's, there was a large reduction in marginal tax rates. From 1983 to 1989, there was strong growth of the economy. At the same time, inflation fell, and then remained low, and unemployment was generally falling. How could you explain this in terms of aggregate demand and aggregate supply? Which view(s) of fiscal policy is (are) supported by this evidence?

Chapter 15

Why Do We Trade With Other Countries and How Does Trade Affect the Economy?

In chapters 3 and 4, we discovered that trade between individuals benefits each of them. Trade lowers the costs at which people can obtain items they desire and allows them to obtain things that they otherwise might not be able to. This is true whether the people doing the trading live across the street from one another or halfway around the world from each other. The biggest difference between international trade and local trade is how far the goods travel. That, and sometimes international trade involves people who "talk funny," but that could also be said about trade with people from Boston or Texas. The other issues that arise when traded goods cross national boundaries are the subject of this chapter.

Why trade with someone in another country?

We only trade with someone (across the street or around the world) if that person enables us to get a good at a lower cost than we could by making the good ourselves. Understanding trade thus requires understanding **opportunity cost**, which is the (most valuable) other thing that could be had or done instead. Trade between people occurs if they have different costs of making the goods they are trading. We refer to a producer who has a lower opportunity cost of producing a particular item as having a **comparative advantage** in that good's production. In Chapter 3, we thought mostly of the producer as an individual, but the producer can also be a business firm. If producer with a comparative advantage in a particular good's production resides in a different country, it is common to refer to the *country* as having a comparative advantage in producing the good (although the actual producer is usually an individual or business firm).

Trade between people living in different countries produces all of the efficiencies that any other kind of trade produces. To remind you of those results, here is a list:

- Trade based on comparative advantage leads a country to efficiency in production, which means more goods are produced using scarce resources.
- Trade reduces the costs to everyone of obtaining those things that they desire (because trade will occur only if it lowers the opportunity costs)
- Trade increases utility (creates value), and thus raises the "standard of living" or quality of life of those who trade.
- Trade benefits both parties (if no fraud occurs).
- Trade is productive (produces utility, even when no new goods are produced).
- Trade tends to move goods to the users who value them most.
- Trade tends to move resources into their highest-valued use.

opportunity cost -the highest-valued option that is not selected or the best thing that must be given up when a choice is made

comparative advantage -the ability to produce a good at a lower (or the lowest) marginal opportunity cost, when compared with other producers (resources)

Who is Helped and Hurt by International Trade?

Most people can readily understand one of the ways in which we benefit from international trade-- consumers can get goods at lower prices, and thus may be able to consume more. For example suppose American consumer Maria can buy a shirt from Ivan (who lives across the ocean) for \$10, but get an identical shirt from John (who lives across the street) for \$15. She would certainly be personally better off by getting the shirt from Ivan. In fact, Maria might use the \$5 she saves this way to buy more of all the other goods she buys.

There's little debate that *consumers (like Maria) are better off if they are able to buy goods at lower cost from other countries*. Presumably, the trade makes producers in the other countries (like Ivan) better off as well, otherwise, they wouldn't be willing to sell. However, some folks are concerned about the effect that consumers' decisions to buy from foreign producers have on domestic producers (like John, the other potential supplier and Maria's neighbor). Is a domestic producer harmed by a consumer's choice not to buy from him? Shouldn't a consumer be willing to sacrifice her own standard of living and her own hard-earned income to help the more costly American producer?

The idea that domestic producers are hurt by consumers' desire to obtain things at lowest cost is actually based on backward thinking. In our example, John might prefer that Maria pay him \$15 for a shirt rather than paying Ivan \$10 for one. But if Maria buys the shirt from Ivan instead, John still has other things he could do. He has alternative uses of his time. In fact, *the high price that he would charge for a shirt indicates what his alternatives are like* (and that they are more valuable than Ivan's). The \$15 price that John would charge for a shirt tells us the opportunity cost to him of making a shirt for Maria; each shirt John makes requires him to give up producing other goods or pursuing other activities for which he could get paid \$15. Maria the consumer will only choose to get her shirt from Ivan rather than from John if John has many more valuable and higher-paying other things he could be doing. *Consumers will find it worthwhile to buy from foreign producers only when domestic producers have high opportunity costs, and thus more valuable alternative uses of their time and other resources.*

It might be overstating things a bit to say that Maria is actually doing John a favor by buying her shirt from Ivan, thus forcing John into those high-paying alternative activities. In fact, John might be reluctant to make whatever adjustments are necessary to pursue those alternatives, and so might regard the transition as unpleasant. However, Maria would make the decision to buy from Ivan only if John has good alternatives to making shirts.

There's another way to show that it is inefficient to have John in our example make shirts. Compare what happens when (1) Maria buys a shirt from John for \$15, or (2) Maria buys a shirt from Ivan for \$10 but just gives John \$4. Even though option (2) means that Maria is paying John for doing nothing, **everyone** would still be better off with arrangement (2). Maria would save \$1, John would have \$4 plus all of his time free to make some other good (and sell it for close to \$15), and Ivan would get to sell a shirt!

How are Imports and Exports Related to Demand and Supply?

Trade with people from other regions or countries will affect the prices of goods. In fact, depending upon how easily trade can occur with other regions, and how cheap transportation is, the price of any good will tend to be the same everywhere. Once trade with other towns, regions or nations is possible, the overall or international supply and demand will actually set price rather than the supply and demand in a particular geographic area or regional market. Still, for any local area, whether it is a

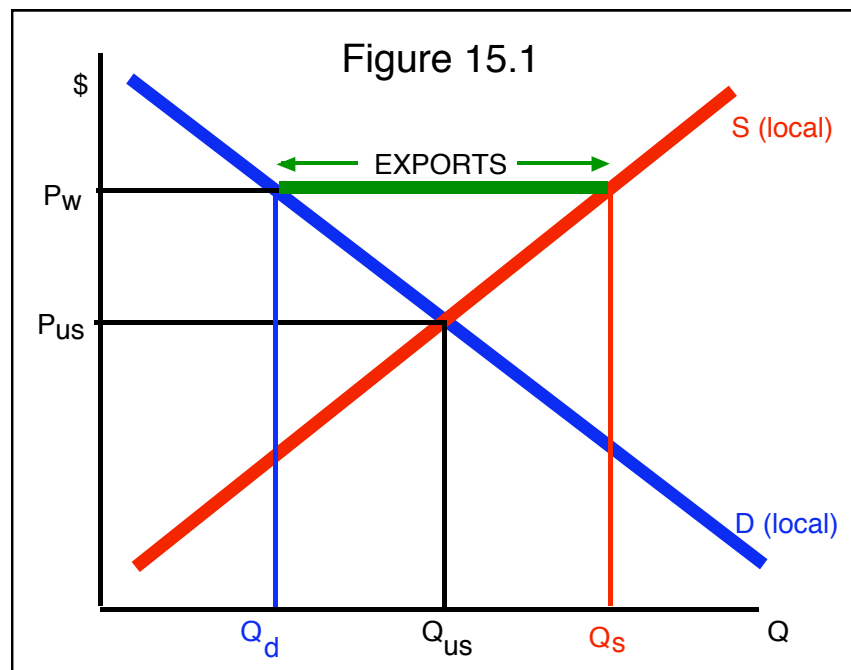
town, region, or country, the local or domestic market will determine whether a particular good will be exported from the region or imported into the region.

In general, if the world price for a particular good is greater than the price that would result from only local supply and demand, the good will be sold, on net, to the rest of the world. The higher world price indicates that the rest of the world values the good relatively more than the local consumers do, or else the rest of the world has a higher cost of producing the good than local producers do. Either way, the local producers will **export** the good to other parts of the world.

How much will we export?

The amount of a good that local producers will export is determined by the price of the good in the rest of the world, the local demand for the good, and the supply of the local producers. If the local demand and supply are as indicated in diagram 15.1, the local price would be P_{us} . If the price of the good in the rest of the world is P_w , then trade with the rest of the world will make P_w the effective local price as well, overriding the price that would otherwise exist locally (P_{us}).

At the price P_w , there would be a surplus in the local market, since the local quantity supplied at that price (Q_s in the diagram) would be greater than the quantity demanded locally (Q_d). That surplus would be the amount available for export from the local area. This amount is indicated by the space between the arrows labeled "EXPORTS" on the diagram.



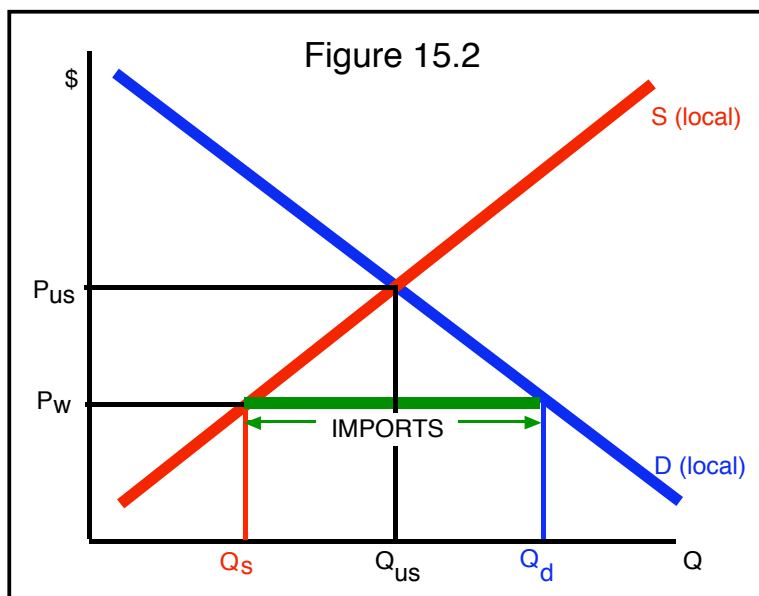
Often, companies and industries that export products will brag that their export activities are good for the country. In truth, while there is no doubt that exports are nice for the exporter, they may actually be not-so-nice for the rest of us. If you think about Figure 15.1, you might realize that local buyers of the good will be paying more for it than they would pay if the exports were not leaving the local market. Exporting a good raises the price that locals have to pay for it. Also, local buyers will be able to purchase less of the good (Q_d) than they would if only the local price and local market were considered. On the other hand, local producers will produce a greater quantity of product (Q_s), and be paid a higher price for it if trade outside the local area is possible.

export- the act of sending a good to buyers in other parts of the world. The goods being sold to other parts of the world or the amounts of a good which are sold to other parts of the world are called **exports**.

When will we import products from the rest of the world?

If the world price for a particular good is less than the price that would result from local supply and demand, the good will be bought, on net, from the rest of the world. Local consumers will find that they can obtain the good at lower cost if they **import** it from other parts of the world. This situation may occur because the local consumers place greater value on the good, for some reason, than do consumers in the rest of the world. Alternatively, the local producers may have a higher cost of producing the good than producers elsewhere in the world do.

The amount of a good that consumers will import is determined by the price of the good in the rest of the world, the local demand for the good, and the supply of the local producers. Suppose that the local demand and supply are shown in Figure 15.2, and that the local price would be P_{us} . If trade with the rest of the world is possible, then paying the world price, P_w , and importing the good would also be a possibility to local consumers.



At the price P_w , there would be a shortage in the local market; local suppliers would be willing and able to supply some quantity at that price (Q_s in the diagram). Even after that quantity is consumed by local buyers, there would be remaining quantity demanded locally (Q_d). That shortage would be the amount that buyers would be willing to import from outside the local area. This amount is indicated by the space between the arrows labeled "IMPORTS" on the diagram.

One effect of imports is that they always lower the price at which buyers can obtain the good, whether they buy from foreign or domestic producers. Also, buyers can obtain

more of the good than they would if they were restricted to buying from only the local suppliers. On the other hand, local producers will sell a smaller quantity of product (Q_s), and be paid a lower price than they would get if they had the local market all to themselves.

This is not complete. A full version of the chapter will be provided as a handout.

import- the act of bringing a good to buyers from other parts of the world. The goods being bought from other parts of the world or the amounts of a good which are brought in from other parts of the world are called **imports**.