CHAPTER 23

MONEY AND MARKETS; SUPPLY/ DEMAND; PRICES; AND VALUING IN THE ABSENCE OF A PRICE

23. 1. INTRODUCTION

We now begin a series of chapters focusing on island resource economics. Learning about economics helps us to understand why we do much of what we do in our modern society. Like ecology, the root of economics, 'eco' comes from the Ancient Greek word *oikos* meaning "house". *Nomos* is Greek for "law". Like ecology, the focus of this study goes beyond one's house and out into society and the environment in general.

Economics is a social science. Like the natural sciences, the social sciences follow the scientific method. Social scientists propose hypotheses, make and record careful observations, publish explanatory theories and seek critical peer review.

The central laws of economics were discovered by observing human social behavior, focusing particularly on the exchanging of wealth when obtaining that which is desired. One important focus of modern economics is its explanation of the concept of **value** based upon use and usefulness. This is not the only concept of value but it is one that can be studied scientifically.

To manage our natural resources wisely, we must understand the value of these resources. This value can sometimes be a money value. However, it may also be a comparison of the values of different ways to use a resource.

Sometimes it is extremely difficult to put a money value on natural resources. This is especially true when trying to put a value on natural habitats. To understand the values that natural resources can provide, we must first understand what it means to "value" something.

This section presents this understanding. It describes how money came into being, and how we can use this understanding to value resources in the economic marketplace.

Economics focuses on the exchange of wealth when obtaining that which is desired.

Items like a clean and healthy environment give us utility.

23. 1. 1. The Concept of Money

If I give you a dollar what would you have? The answer seems obvious at first, but think about it for a moment. Clearly you have something with which you can buy a **good** (such as a can of soda) or a **service** (such as paying a mechanic to fix your car).

But why does that little piece of greenish paper let you do this? Why do you need this paper dollar anyway? Couldn't you just trade your own work directly for the thing or service that you want?

23. 1. 2. Consumer Utility Theory

When we buy something, we do so with the intention of **consuming** that good or service or perhaps giving it to someone else to consume. In this sense we are the **end consumers** of goods and services.

However, we may buy something so that we can use it to make something else. In that case we are **intermediate consumers** of a **factor input**. In either case, we purchase the good or service for a reason. (Note: we will more fully define and explain these economic terms later in this chapter and in the two that follow.)

The reason we buy it is that we value it at least as much as the **price** that is being charged. The value we place on goods and services represents our **individual utility** level.

One of the most important concepts in economics is the concept of individual utility. Individual utility is the personal value we each place on an item.

For example, your classmate might really like sweet potatoes but you might not think they are as good as yellowfin tuna. Your value of sweet potatoes is less than your value for yellowfin tuna, because you feel you do not gain as much utility from sweet potatoes as you do from tuna.

So, **utility** is a measure of our own personal preferences for various consumption alternatives. It is not necessary that we be able to purchase goods or services for them to have utility.

Items like a clean and healthy environment, protected habitat areas, or even the fish we can catch in the sea give us utility, even though we do not actually pay for them directly. These types of goods and services are called **non-market goods and services**. Much individual utility can be gained from them.

Many of the decisions we make daily are made because of the utility we think we will gain from the decision. If you decide to take a different road than usual to work or school—because you think it will save you time—you do so because you value the utility of your time.

If that shortcut gives you more time to study for the next test, then perhaps you will do better traveling on it. The satisfaction from this will make you feel good. Feeling good gives us utility.

However, your classmate might not take the shortcut and might instead prefer to sit in traffic listening to music. This is because

that gives him or her more utility than rushing around to save a few minutes of time.

We each make many decisions based on how much individual utility is gained from each decision. Each person's individual utility is different from everyone else's.

Individual utility is what drives our decisions. It is the foundation of all free market exchanges of goods and services between people. How, then, do these exchanges take place? How has this process developed over historical time?

23. 1. 3. Barter

The earliest means of exchange was the method of **barter**. Barter occurs when a person has a good—or can provide a service—that another person wants. The other person offers a good or service he or she has in exchange for the good or service the first person has.

For example, if a friend of yours has a tuna and you have some papaya, you may be willing to trade some of your papaya for some of your friend's tuna. If the two of you can agree on how many papayas are needed to trade for the tuna—say two papayas for half a tuna—then you have established a **rate of exchange** between the two items. You have completed a **barter transaction**.

You are willing to do this because of the concept of individual utility we have just discussed. Simply put, the barter improves your utility and the utility of your friend. In ancient times, barter was conducted for almost every good and service.

However, it can take a lot of time and effort to reach a barter agreement. Also, the rate of exchange can vary, depending on what goods are available for trade. This leads to *uncertainty* over the actual rates of exchange between goods.

That uncertainty makes it difficult for people to plan what goods (for example, crop plants) to grow for trade, or what services to provide.

The time and effort, uncertainty, and planning difficulties associated with barter are all part of the **transaction costs** of the barter method. In an effort to reduce these transaction costs, people developed new means of exchange of goods and services.

23. 1. 4. Standards of Exchange and Currencies

In the barter economy, the exchange rate between goods must be established for each pair of goods. While it may seem simple to establish that rate for some items, it is very difficult for others, especially for small amounts.

Say for example, that an exchange rate was agreed to as one goat for one suckling pig. That seems simple enough, but what if you only want a quarter of a pig? Well, perhaps a quarter of a goat would be enough, but which quarter? You can see how this could become difficult. Wouldn't it be much easier to use one item as payment for all others?

Examples of barter items may include fruit such as papayas...

Fish such as tuna..

or even pigs

In Roman times, one means of exchange was common table salt.

Over time, many different items have been used to pay, as **currency**, for other items. In Roman times, one means of exchange was salt. Yes, common table salt.

In Roman times, salt was not so plentiful as it is today. It was made by evaporating sea water and collecting the salt left behind. Many areas were located far away from the seacoast, so salt was scarce.

This rarity of salt made it a good means of exchange. But this wasn't the only reason it was so valuable. In those early times, salt was one of the only ways of preserving food.

Salt served a dual purpose—of being a necessity for food preservation—as well as being a very valuable commodity that could serve as a kind of money.

In fact, at one time, Roman soldiers were actually paid in salt. Have you ever heard the phrase, "Are you worth your salt?" Payment in salt was the origin of that phrase. The term "**salary**" is also derived from payment made in salt. It is amazing that even today, hundreds of years after the use of salt as money ended, we still use the term "salary" to describe our work income.

Do not think the Romans were the only ones using salt for money. The ancient Chinese took this one step further. They actually created coins made from salt.

So, salt is one means of exchange, but there are many others. For example, on our neighboring island to the southwest—Yap,—the people developed a rather unique form of money made from large round quarried stones. The stones all came from the neighboring islands of Belau and were actually a form of tribute from Belau to Yap.

The people of Yap developed a rather unique form of money made from large round quarried stones.

These stones were traded among Yapese' heads of families for goods and services on their island. They were usually exchanged somewhat ceremonially -- for dowries for marriages, or for the work services of one chief's sons to help build another's new house, for example.

In many parts of the world, gold and silver were used extensively as money. In fact, until the 1960s, the United States dollar was still theoretically "backed" by all of the gold locked up in Fort Knox and other federal treasury reserves. This meant that a long time ago, one could get $1 worth of gold or silver for their dollar bills.

Obviously, using salt, gold, or even stones as money is not without problems. Salt in large quantities is quite heavy. It also cannot be allowed to get wet.

Gold and silver bars are very, very, heavy, and in very limited supply. The large round stones, while sufficient for exchange on Yap, could not easily be used on other islands. So, for these and other reasons, these kinds of money were eventually replaced with less precious metal *coins* and *paper money*.

23. 1. 5. The Purpose of Money

Money was created to make trade much easier. One only has to imagine trying to buy groceries by attempting to trade pigs and

papayas to see that using money is much easier. Money also makes trade much less uncertain, and much less costly. (Note: this lowers the transaction costs, mentioned above.)

When we go to buy our groceries, we know that they will take our money. But, if we bartered pigs for papayas, we could not be sure the store would take our pigs. What if twenty other people before us had already paid in pigs? The store might not want to take any more and we might not be able to purchase our papayas.

We might get awfully tired of pigs (—or papayas). But, with the invention of money, we can easily sell our pigs, or earn a salary by providing a service to others. We could then use the money we earn to buy all the goods and services we need.

So, the real purpose of money is to make it much easier to conduct personal and commercial business.

Using salt, gold, or even stones as money is not without problems. Salt in large quantities is quite heavy. It also cannot be allowed to get wet. Gold and silver bars are very, very, heavy.

23. 2. MARKET PRICE DETERMINATION

23. 2. 1. Consumer Demand

We have discussed the development of money as we know it today. We have seen that money reduces transactions costs and uncertainty, and makes buying things much easier.

With this understanding we can now begin to learn how the prices we pay for things are determined in our economy. Economists refer to this as **market price determination**.

Economic markets allow businesses to operate in an organized way between buyers and sellers. There are markets for virtually everything we buy. However, when economists talk about "markets," they are not talking about our local supermarket.

Economists refer to a **market** as the organizational structure under which prices for a particular good are determined by the **laws of supply and demand**.

Our goal in this section is to learn about the laws of supply and demand, and to see how they work together to determine prices in economic markets. We will first take up the concept of **consumer demand** and learn how it is determined.

Let us say we want to buy some rice. At any one time, we would buy only as much rice as we are willing to buy, and only at a price we can afford. There must also be a **willing seller**. Economists have observed that people would purchase different quantities of storable goods at different prices.

For example, if rice were a dollar a pound, we would not buy as much of it as we would if it were twenty cents per pound. Our demands for rice are the quantities that we are willing and able to purchase at each price and at a given time.

How do we make that decision? Obviously the price of rice is important. We refer to that price as a **market price**. It is the price that sellers charge for rice. When we go to the store, we look at the price on an item and decide to buy the item or not. We might then go to another store to try and get a "better deal."

Economic markets allow businesses to operate in an organized way between buyers and sellers.

But, we do not really have much control over what the market price is. This is because we are **individual competitive price takers**. What this means is that we take the market price as given to us, and we either buy the item or choose not to buy it at that price.

Grocery market prices are actually set in the broader economic market. We will soon learn how this takes place. But first, we need to understand the concept of **demand prices**.

[Editor's note: many people confuse the term "consumer demand", a noun, with the verb "demand". Consumers do not demand goods and services. Goods and services are supplied to meet an economic consumer demand. The difference is very important.

Consumer demand means a willingness and ability to spend money for something. It does *not* mean "demanding", which means ordering or requiring something. When a proposal is forwarded with a statement that it will meet "the demand", do not misunderstand this to mean that consumers are "demanding" it.]

23. 2. 2. Demand Prices

Demand prices are the relative values one places on having a little more or a little less of a good. These demand prices are really set by our personal budgets.

For example, would we be willing, and are we able, to pay the market price of $500 for a new brushcutter? If not, how much are we willing and able to pay?

Perhaps we can and will pay $450 for a new brushcutter. If so, our demand price for one new brushcutter is $450. Note that it is different from the market price of $500 by $50.

Our demand price could also be higher than the market price if our budget and our desire to have the brushcutter allows it. The prices we place on the item may differ from the market price. We will decide to purchase an item depending on what our demand price for the item is.

If our demand price is equal to or above the market price, we will buy the item. However, if our demand price is below the market price, we will not purchase it.

Substitution Effect

If we cannot afford to purchase an item we desire, what we will often do, instead, is attempt to substitute a different item which we can afford. So, perhaps a machete would be our substitution for the brushcutter. Or, maybe we might hire someone who owns a brushcutter to do the work for us, at, say, $50 per job.

Either way, we are using the principle of "**substitution effect**" to lower our cost of accomplishing the same or a similar goal. Now we are almost ready to define the law of demand. But first, we need one more concept. That is the concept of **opportunity cost**.

Opportunity Cost

When we consider buying a good, like a brushcutter, we also consider what other goods we could buy that would be substitutes for the brushcutter.

Our demand prices for the substitutes have to be adjusted somewhat to reflect the fact that they may not be perfect substitutes. That is, a machete is not quite as good as the more expensive brushcutter. When we compare the two, we must also add the cost of our labor to the overall cost of buying the machete. Using a machete is much more laborious than using a brushcutter. It takes much longer to do the same amount of work.

At some point we would have to decide whether the price we are willing to pay for the substitute good is better than the price of the original good. The difference in cost, including expense and labor, between the two items is called our *opportunity cost*.

In other words, when making a purchase, we must decide that the opportunity cost of buying an item is not high enough to make us want to buy a substitute item.

For example, if we want to buy a five-pound bag of rice and there are two brands to choose from, we must pick a brand. If we felt the quality of rice was exactly the same, except for the brand name, then we would have no preference between them, unless of course the price were different.

If brand A was 15 cents more than brand B, then the opportunity cost of choosing brand A would be the 15 cents we could save if we bought the cheaper brand. Since we felt the quality of rice was really the same, we would choose brand B to save a little money.

What this means is that, in every purchase decision, we try to reduce the opportunity cost of that decision to the lowest possible amount. By buying brand B, we would save 15 cents. Assuming this is the cheapest brand, then we may have actually reduced our opportunity costs to zero.

But, what if brands are not quite the same? If you felt that brand A were better than brand B, then you would have to decide whether the higher quality is worth the additional 15 cents. If you decided higher quality was more important to you, then you would pay the extra money.

If you did this, then what was your opportunity cost? You could have saved 15 cents by buying brand B. However, you decided that the additional utility you would get from brand A is worth at least 15 cents.

So, you have again reduced your opportunity costs to their smallest possible amount. This is because the individual utility you would get from brand A is at least as valuable as the extra 15 cents more you must pay.

The key point to all of this is that in every purchase decision we make we use opportunity cost. Opportunity costs help us decide which goods we choose to buy as well as how many we choose to buy.

Opportunity costs could be understood, then, as the opportunities we would gain or give up by spending or by saving, in this case the extra 15 cents, relative to our individual utility perceptions.

Our purchase decisions, and how we make them, are what defines the **law of demand**. You will note below that the law of demand is defined under the condition of holding all other conditions equal. This just means that we choose to ignore, for the moment, any other things that could affect a consumer's decision except for the opportunity costs.

The Law Of Demand Defined

The law of demand may be stated as follows: "All other factors being equal, consumers will purchase a greater amount of a good or service at a given point in time the lower its opportunity cost is and a lesser amount of a good or service during that same time the higher its opportunity cost is."

"Good" Consumption

To understand this better, we must consider what happens when we consume a good. Obviously we get utility from consuming the good, but will we get the same utility from consuming more and more of the good? For most goods, we will not get the same utility from consumption of more and more of the good.

An example of this is consuming a candy bar. The first one was "really yummy" and may make us want another. (Note that we consumed the first one already.) So, we buy another and eat it. But, after the second one, we might be feeling a little full and we may not want a third candy bar. However, if that third candy bar were a little less expensive, we might think it was a good enough deal to buy it.

Diminishing Returns

What is happening is that our utility is decreasing with each candy bar we eat. This is the well-known concept of **diminishing marginal utility**. ("Marginal" refers to "the edge" or the addition of one more at the end of a line, such as on a graph).

As our utility decreases, we will not be willing to pay as much for the next candy bar. What this means is that our relative demand price of additional candy bars is falling.

Now let us think about how this might look if we put it on a graph. (See figure 23.1) Let us say that we would be willing to buy four candy bars if the price is 50¢ each. If the price is higher, we will reconsider our budget and our opportunity cost of substitutes and redetermine the quantity we will buy.

Let us assume that at a price of 75¢ we will buy three candy bars, but if the price rises to a dollar, we will buy only two. If the price goes all the way up to $1.50, we will not buy any. Therefore, the $1.50 price is so high that we would not purchase any candy bars.

What happens if the price is lowered to 25¢? We might now buy four or five candy bars but probably not many more. We can only eat so many candy bars at one point in time.

Remember that here we are looking at our demand for only one point in time. We "assume", for the sake of our study, that storage of candy bars to consume later is not an option. In reality, of course,

we could save some for a later date. However, we need to simplify things to understand how demand works. So, we will assume that we will not want to buy or consume any more than four or five candy bars (and probably fewer than that). A friend might be willing to buy 5 candy bars at .50¢ cents each. He or she would have a different demand curve than ours. (See figure 23. 2.)

23. 2. 3. The Demand Curve

Now we can put this information about our demand prices together to form an **individual demand schedule**.

In the figures 23-1 and 23-2, we label the prices on the vertical axis and the quantities of candy bars on the horizontal axis.

By plotting these points and connecting the dots we can draw an **individual demand curve** for candy bars. This curve is a *picture* that shows us all of the quantities of candy bars we will purchase at each price.

Recall that the points on the curve take into consideration our opportunity costs and our ability to purchase the good, which is controlled by how much money we have.

Thus, this curve is affected by several things. Economists call these things the **determinants of demand**. The determinants (or factors) include our income, the relative prices of substitutes, and also the prices of other goods that might be consumed with candy bars as a complement to them.

For example, we may only want a candy bar if we can have a soft drink as well. In this case, we will have another demand curve for soft drinks, and the price we must pay for them will affect our demand curve for candy bars.

We now need to turn our attention to how to determine overall market demand for candy bars.

23. 2. 4. The Market Demand Curve

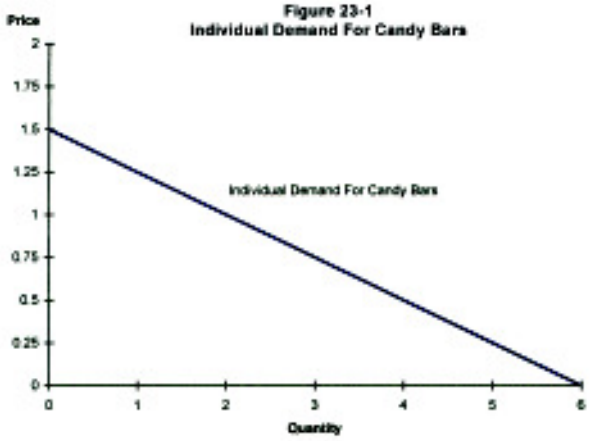
The **market demand curve**, like the individual demand curve, is a picture that shows us the total quantity of candy bars that all people who buy candy bars will buy at each price level.

To get this market demand curve, we simply add up the numbers of candy bars that each person will buy at each price. We then plot these points to get an overall market demand curve. Figure 23-3 shows how this can be done for two individuals who demand candy bars.

If there are a thousand individuals, we would have to add up demand curves for all of those people. While this may seem simple, actually calculating market demand requires very sophisticated statistical techniques.

Now that we know what an individual demand curve is and how a market demand curve can be calculated, we need to understand two very different kinds of changes in demand.

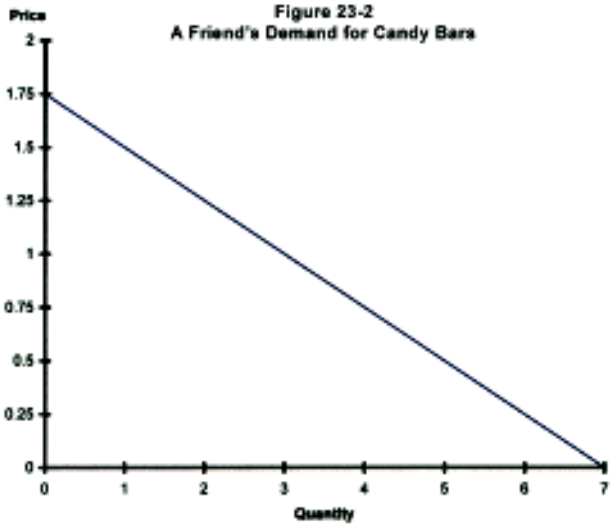
Figure 23-1
Individual Demand For Candy Bars

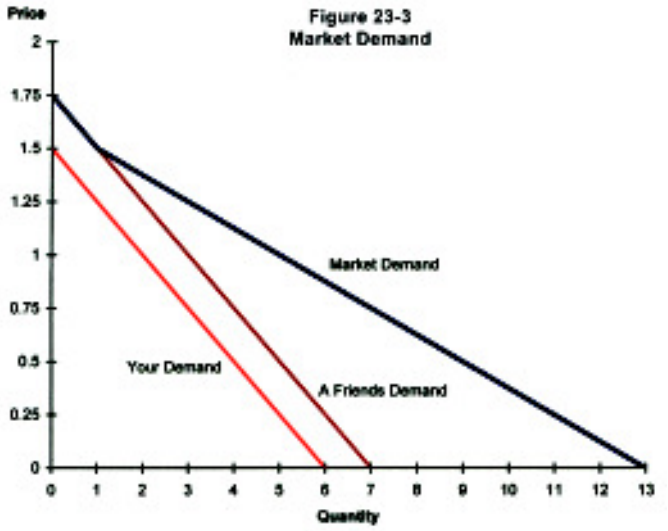


Candy Bar Demand

price	quantity
$1.50	0
$1.00	2
$.75	3
$.25	5

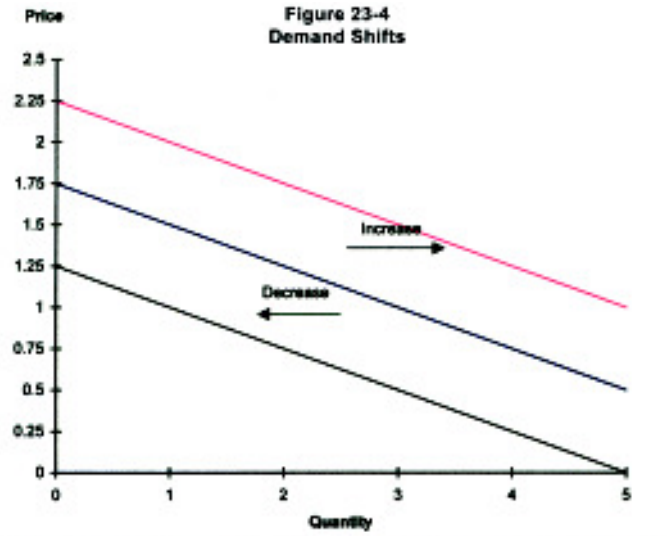
Figure 23-2
A Friend's Demand for Candy Bars





Market Demand Calculation

Price	Your Demand		Friend's Demand		Market Demand
$1.75	0	+	0	=	0
$1.50	0	+	1	=	1
$1.25	1	+	2	=	3
$1.00	2	+	3	=	5
$0.75	3	+	4	=	7
$0.50	4	+	5	=	9
$0.25	5	+	6	=	11



When changes in demand determinants cause an increase in demand the entire demand curve shifts upward and to the right. At every price, you will now buy more of the good than you did before the increase in demand. If determinants cause a decrease in demand, the entire curve shifts downward and to the left. At every price, you will now buy less of the good than you did before the decrease in demand.

The first change in demand is what we call a *change in the quantity of demand*. We have seen that we change the number of candy bars we will buy when the price changes. That change is a change in quantity of demand and it is caused by a price change.

The second kind of change in demand is called a *shift in demand*. A shift in demand moves the demand curve to the right if, at each price, we want to purchase more of the good.

This is called an increase in demand. If the demand curve shifts to the left, it means that we are willing to buy fewer of the good at each price. There are several things that can cause demand to shift. These things are known as the *determinants of demand*.

23. 2. 5. Determinants of Demand

There are many determinants of demand that can cause the curves to shift. When a demand curve shifts, the entire curve moves to the right (increase in demand) or to the left (decrease in demand).

What would cause our demand curve to shift? Well, it could be that we just do not want the good anymore. In other words, our tastes and preferences for the good can change. This can either increase demand if we now want more of the good, or decrease demand if we now want less of the it.

Our demand curve can also be affected by changes in the relative prices of substitutes and complements. If substitute prices fall, we will reduce our demand by substituting other goods. Or, if our income changes, we may change our demand for a good.

The key point to remember when we begin to discuss market prices is that demand curves can and do shift. When demand curves shift, the price that is determined in the market can change. Figure 23-4 shows how these shifts take place.

23. 3. PRODUCER SUPPLY

The demand curves tell us what consumers are willing to pay for various quantities of a good. However, to understand how market prices are determined, we must first learn about what producers are willing to supply to the market.

Supply is the output of a good that producers are willing and able to provide under the operating conditions present at a given point in time. Always keep in mind that producers will only supply goods if doing so is *profitable*. So, the supply of a producer is very dependent upon on prices. The relationship between amounts supplied and prices follows the **law of supply**.

The law of supply may be stated as follows: "If all other factors are equal, as prices increase, producers will increase the quantity supplied of a good or service; as prices decrease, producers will decrease the quantity supplied of a good or service."

Look back at the law of demand for a moment. Notice that the relationship between quantity supplied and prices is the opposite of the relationship between quantity demanded and prices. We saw previously that the demand curve slopes downward. This means that quantity demanded increases as price decreases.

The law of supply tells us that supply behaves in the opposite way. The supply curve will slope upward with quantity supplied increasing as prices increase. This makes good sense because producers make more profit if the sale price is higher. They would therefore be willing to produce more to make more profit.

However, the price they actually get for the good is determined by the relationship between supply and demand and we will see how that happens shortly.

23. 3. 1. The Production Process

Producers of a good combine raw materials, labor, and capital (mostly in the form of equipment) to produce a good. Each of these elements costs something. The producer must make careful decisions about how to combine them to produce the good at the lowest cost. This is called **cost minimization** in economics.

You may have noticed already that economists often think of concepts in terms of opposites. So, the opposite of cost minimization is **profit maximization**. If we think about it, it makes sense that when the cost of producing a good is reduced to its lowest possible level, the profit earned is the greatest that it can be.

Thus, cost minimization and profit maximization are really the same thing. This is a very important point in economics and it is sometimes referred to as the **duality rule**.

Producers will minimize costs and produce goods in order to maximize their profits. Thus, if the cost of producing a good is minimized but the price increases, the producer can make more money by producing more of the good. So, an increased selling price is an incentive for increased production.

23. 3. 2. The Supply Curve

An individual producer of candy bars will offer increasing quantities of candy bars as their price increases. For our example, we will assume that a fictitious Saipan Candy Company will only start to provide candy bars at 50¢ per candy bar.

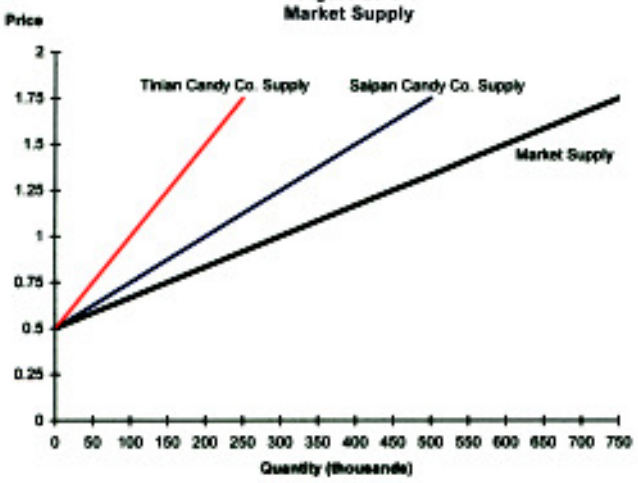
This means that they have decided it is not profitable to make candy bars at any price lower than 50¢. In our example they would produce 50,000 candy bars at this price.

Now, if the price goes up to 75¢, they will increase output to 100,000 candy bars. If price goes up to $1 they will produce 200,000 candy bars, and if price is $1.25 they will produce 300,000. Note that this assumes that production costs are constant. Can you tell why?

If we plot these points, as done in figure 23-6, we can see the upward sloping supply curve for candy bars supplied by the Saipan Candy Company.

But, what about the candy bars supplied by its fictitious competitor, the Tinian Candy Company? They would have a similar supply curve. However, it would not have to be exactly the same, because their costs might be different.

Figure 23-6
Market Supply



Market Supply Calculation

Price	Tinian Candy Co.		Saipan Candy Co.		Market Supply
$1.75	250	+	500	=	750
$1.50	200	+	400	=	600
$1.25	150	+	300	=	450
$1.00	100	+	200	=	300
$0.75	50	+	100	=	150
$0.50	0	+	0	=	0

To get the **market supply curve** we need to combine all the supply curves together. What this means is that we add up all of the quantities supplied at each price by each producer. We then plot the total quantity at each price in a graph and that shows us the market supply curve.

Figure 23-6 shows how the market supply curve is created by adding up the supplies of each producer. Only two producers are shown in the example for simplicity. It is likely that there will be many producers in some markets. Determining market supply can be quite difficult for this reason.

We now see how both market supply and demand behave so we are almost ready to put them together to show how market prices are determined. First, however, we need to discuss the "**determinants of supply**" curve.

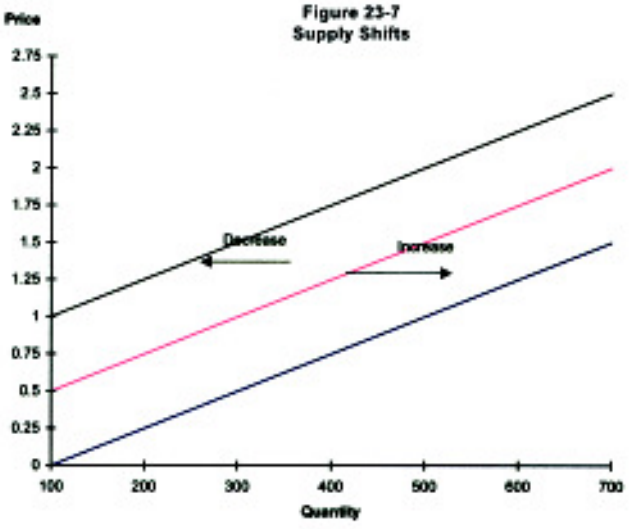
23. 3. 3. Determinants of Supply

Recall that demand curves can shift due to changes in demand determinants. Supply curves can also shift, but the determinants are quite different. As we have seen above, the supply curve is determined by cost-minimizing behavior by producers.

Anything that affects costs of production can cause a shift in supply. An increased price of raw materials, labor, or even machinery could all decrease supply because they raise the cost of production, the *per unit cost*.

When their costs are increased, the supplier will make less profit. Decreased profits will cause producers to decrease supply and the supply curve shifts to the left. However, if the costs of production are lowered, the opposite is true and supply will increase or shift to the right. Figure 23-7 shows how these shifts can take place.

Figure 23-7
Supply Shifts



When changes in supply determinants cause an increase in supply the entire supply curve shifts downward and to the right. At every price, suppliers will now supply more of the good than they did before the increase in supply. If determinants cause a decrease in supply, the entire curve shifts upward and to the left. At every price, suppliers will now supply less of the good than they did before the decrease in supply.

23. 3. 4. The Supply and Demand Model

Economists rely on economic models in order to analyze economic problems. A model, in its simplest form, is nothing more than a graph that helps us explain how processes work. Thus, the graph showing supply and demand together is called the **supply and demand model**.

We can use this model to show how a market price for a good is determined in what economists call a **market equilibrium**. Figure 23-8 shows how an equilibrium between supply and demand is reached.

At a price of $1.75, the total market quantity demanded will only be 2 million candy bars. At this high price, producers would be willing to sell a lot of candy bars, so that total market quantity supplied would be 6 million. This means that there are more candy bars supplied than demanded. Economists call this a *supply surplus*.

What it means is that if producers made 6 million candy bars, only 2 million would be bought by consumers. The 4 million left over could not be sold at $1.75 each, so they represent a surplus production.

If this happened, what would the producer do to sell off the surplus? Well, at a price of $1.50, consumers will purchase 3 million candy bars. If the producer lowers price to $1.50 then, 3 million candy bars will be sold.

But, there will still be too many candy bars because the producer will produce 5 million candy bars at this price. What if the producer lowers the price to $1.25?

At that price, consumers are willing to purchase 4 million candy bars which is the exact quantity that producers are willing to sell. At that price, the market is in equilibrium. This market equilibrium is what determines the market price of a good.

Now consider what happens if producers think the price will be lower than this equilibrium price. If the price were 75¢, then producers would produce only 2 million candy bars. At this low price, consumers want 6 million candy bars.

Thus, the quantity supplied is less than the quantity demanded. This is called a *shortage* because the production falls short of the quantity demanded.

In such cases, consumers who really want more candy bars would be willing to pay a little more. If they do so, they *bid up* the price and this will induce producers to produce more candy bars.

This *bidding up process* will continue until the equilibrium point is reached again. The market price is once again determined where the supply and demand curves cross each other. Again this point is called the market equilibrium, and it is what determines the market price.

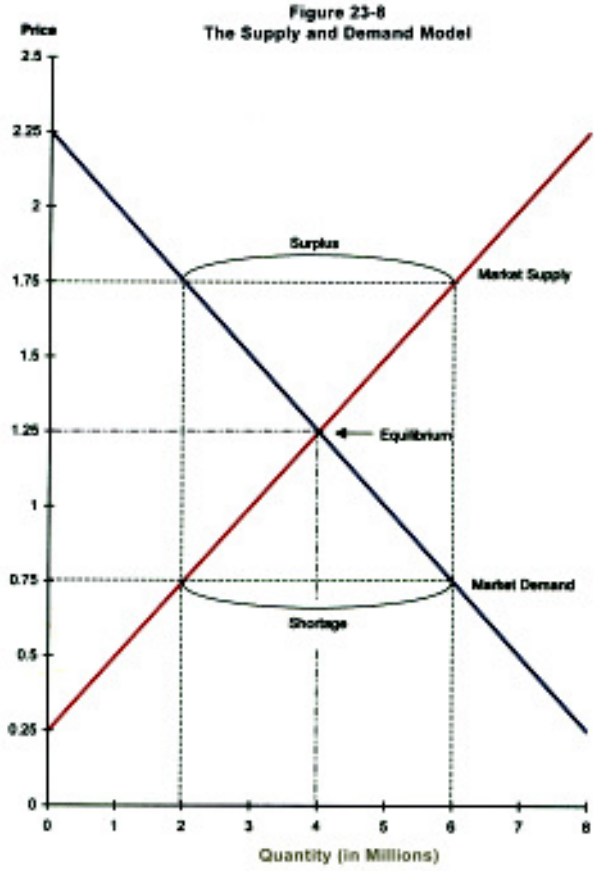
Now we understand how the market price determination process works. Consumer demand adds up to create a market demand, and producer supplies add up to create a market supply. The interaction of these two curves eventually finds an equilibrium through a **price adjustment** process caused by either a surplus or a shortage.

The price adjustment will lower prices if there is surplus production and raise prices if there is a shortage. Eventually, the market will reach equilibrium at the market price.

It is important to keep in mind that this is a very simplified model of reality. In reality, market equilibrium changes frequently as quantities of demands and supplies shift.

Even though it is quite a simple model, the supply and demand model is a very important concept in economics because it shows us how the market price determination process works.

Figure 23-8
The Supply and Demand Model



23. 4. NATURAL RESOURCE VALUATION

23. 4. 1. Price Determined Value

One way to determine what a natural resource is worth is to use the market price. For resources like minerals or timber, the market price is determined by the laws of supply and demand.

So the value of the resource could be said to be the quantity produced, multiplied by the price. This would be known as a **revenue value** of the resource. This value is commonly used for products that have a well established market-clearing process and well-established market prices.

23. 4. 2. Valuation in the Absence of Prices

In some cases, natural resources have value, but it might be very difficult to put a price on the value of the resource. A good example of this is the value of recreation. When we go to the beach, most often we do not pay a fee to swim in the water but we do get value in the form of utility from swimming in clean water.

Or, if we go fishing, we gain utility from catching and eating fish but often we do not pay a set price for that enjoyment. In such cases, economists must attempt to place a value on a resource by using methods other than price.

Travel Cost Method

Sometimes we can use the cost that a person must pay to get to a recreation site as an indication of the value. This is known as the **travel cost method**. We can estimate consumer demand using the travel cost and calculate the **consumer surplus welfare measures**.

Direct Expenditure Method

Another way to get an idea of these values is to add up the total amount of money people spend in using these resources. Things like the cost of fishing gear, boats, fuel, and anything else purchased for the fishing trip can be added up. This is called the **direct expenditure method**.

Multiplier Method

We can even study the entire economy and figure out how the direct expenditures affect the economy. This is called the **multiplier method**. A person studying this might trace all of the possible uses made from a new dollar entering a community's economy; for example, one spent by a visiting tourist. They would also determine how many times it was likely to be passed amongst the community's members, thus multiplying its effective value.

Contingent Valuation Method

Finally, we can simply ask people what they would be willing to pay to use the resource. This method is known as the **contingent valuation method** and, while it seems simple, it is actually one of the more difficult methods to do correctly.

The actual methods used to estimate the non-market value of a resource are complex and sometimes highly mathematical. However, behind all of these methods is the concept of utility.

When economists look at non-market values, they are really trying to estimate how much utility a person gets from their use of a resource, even though an actual market price does not exist.

This utility could be from recreation, clean air and water, landscape and wildlife viewing, or from a long list of other possible individual utilities people get from their use of these natural resources. There are also *non-use utilities*. Sometimes these are called **exist-**

ence value because people get some utility from knowing that a resource exists even if they do not use it.

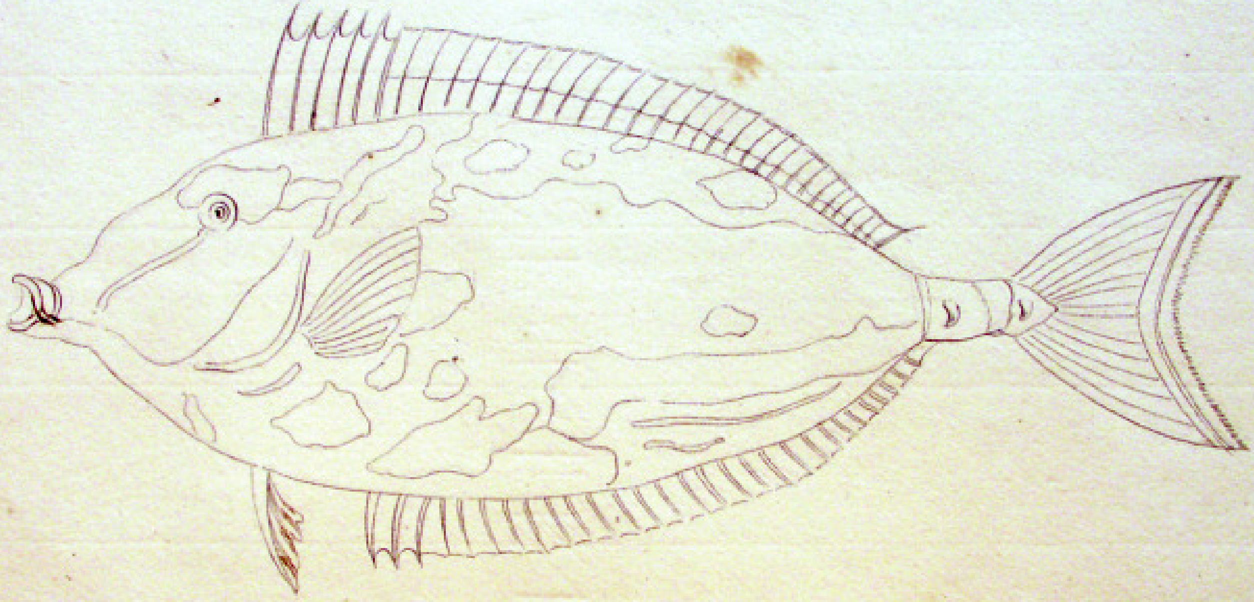
A good example of this is one's understanding, appreciating, and having a sense of stewardship for the earth's endangered species. Many people give money to organizations that help protect habitats and species all over the world. They do this because they gain utility from existence value, even though they may never actually see the endangered species in their wild habitat.

23. 4. 3. 2005 Coastal Resource Management Economic Study; Our Coral Reef

In the year 2005, the CNMI's Coastal Resources Management Office, in the conjunction with the Division of Fish and Wildlife and Environmental Quality, conducted a major resource valuation study of the CNMI's coral reefs. We encourage you to obtain and analyze this report. You may be truly suprised at the findings it made and the very, very high estimated value that these non-priced resources provide to our commonwealth.

Guham, 1819.-/.

Voyage de l'Uranie; Poissons, pl. 11.



J. Arago fecit 1819

Ébauche peinte dans mon cahier, n° 2.