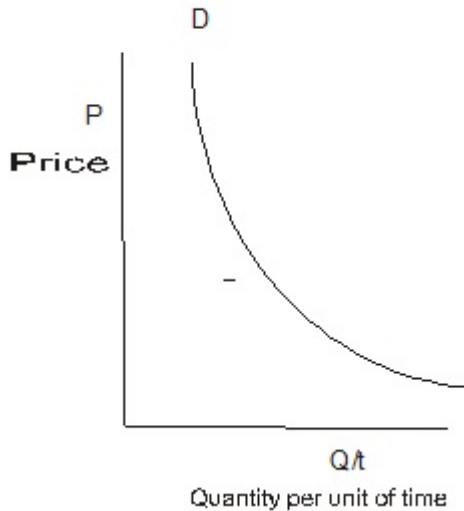


**MACROECONOMICS 201**  
**Spring 2020**  
**NOTES 3**  
**AN INTRODUCTION TO**  
**SUPPLY AND DEMAND CURVES**

Readings: see Notes 1

Supply and demand schedules are **basic tools** of economic analysis. Although these concepts may seem imposing, they are based on simple, intuitive, and common-sense assumptions.

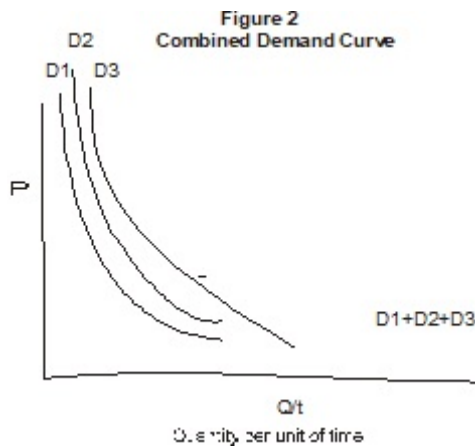
**Figure 1**  
**individual Demand Curve**



**1. What is a demand schedule?**

A. A demand schedule is based on the obvious assumption that people, both individually and collectively, will buy more of an item if the price of the item is reduced. Let us begin by illustrating an individual demand schedule (figure 1). **Always** put price on the vertical axis and **quantity per unit of time (q/t)** on the horizontal axis. We will see why this is important shortly. This schedule shows how much of a particular item you would buy as the price, **and nothing else**, changes. If the price goes down, you buy more, if it goes up, you buy less - just common sense.

B. Now, picture demand schedules for several individuals, D1, D2, and D3 (figure 2).

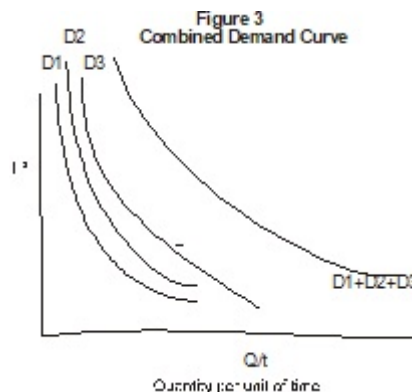


C. Then, sum these several demand schedules **horizontally** so it shows how much will be purchased by **the combined** demand of the several individuals (in this case, 3 persons, (figure 3) at each price. **Note** that the addition **must** be horizontal.

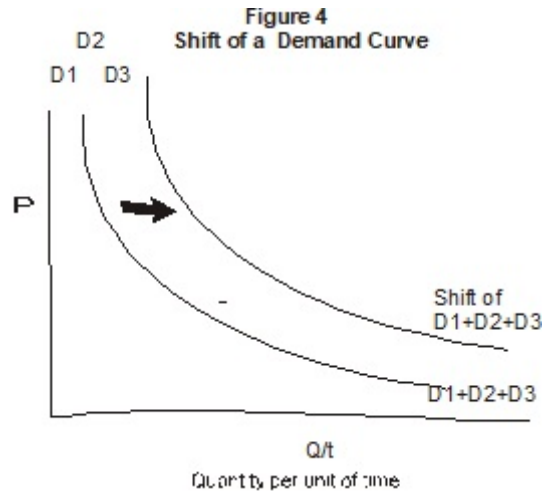
We now have a combined schedule which will show how much of the item will be purchased in the aggregate by these individuals as prices fall. If we move down the demand curve, i.e., the price is lowered and people consume more, this is termed a **movement along**

**the curve** ( $Q = f(P)$ ), an important concept and a term which you **must** burn into your memory. Price is the only variable that changes.

D. The absolute underlying assumption of these demand schedules is **ceteris paribus**, a latin term which means **all other things equal**, e.g., income does not change, tastes do not change, etc. But suppose your income rises.

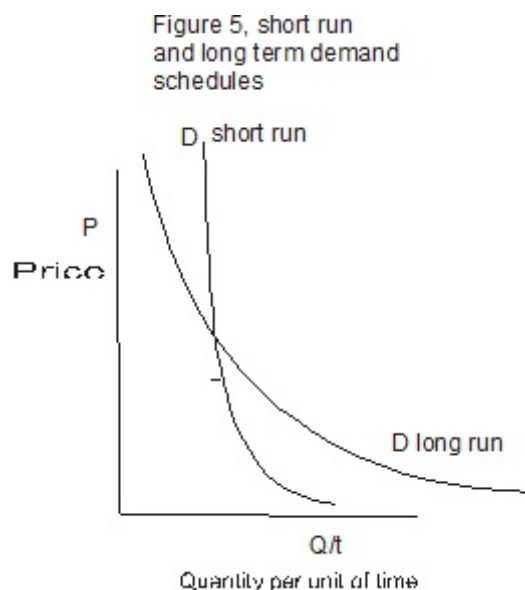


This often will make you more willing to purchase more of the item at a **specific** price. Your individual demand curve **shifts to the right**, e.g., you might be willing to eat more McDonald's meals (figure 4) **even if the price at McDonalds does not change**. This **shift of a demand schedule** caused by **any** changes **other than price** must be carefully distinguished from a **movement along the schedule caused by changes in price only**. Changes that might **shift** the demand curve are a change in tastes (i.e., you prefer some other product), an improved product, or perhaps a warning about the product (pesticides on fruit, disease in beef cows, learning of adverse side effects of medicines), development of new products, change in income (suppose you lose your job) etc. Basically, **a shift of the demand curve means that you will purchase more or less at a given price because the principle of *ceteris paribus* was violated**.



E. Now imagine that we have demand schedules for many people (say everyone in this class) for a particular product and add them *horizontally* (just as in figure 3). Then we have an aggregate demand schedule for the entire class for a particular product. Go one step further and imagine we add, horizontally of course, the demand schedules for the item for everyone in the State. Then we have a demand schedule for this product for everyone in the State (i.e., it would show how purchases of the product in the State would change as the price changed, i.e., moving along the curve). Never, **ever** forget the assumption of *ceteris paribus*.

It is important to emphasize that demand schedules are *situation specific*. They are usually for a specific product, or for a specific group of people, or a particular location. For example, you could measure the demand curve for gasoline at a particular service station, or for a particular brand of gas in the city, or the total demand for gas for the entire nation, or for all women, etc. Demand curves are **basic tools** of economic analysis, ones that you will see again and again in this course and elsewhere.



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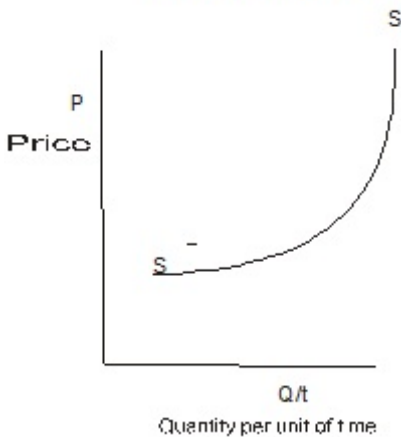
F. You remember our emphasis on  $q/t$ . Consider a nationwide demand schedule for gas. Now suppose the price of gas increases by 50% tomorrow. How much would you reduce your purchases of gas in the next month? Probably not much, you still need to get to work, to class, to the mall, and other places. But, now think of a much longer period. Would you take steps to reduce your purchases of gas, e.g., buy a more fuel efficient car, use alternative transportation, car pool? Certainly some people would. Over a short period the demand schedule for gas shows a much

smaller change for a given change in price than over the long run. You can envision the long run demand curve as a much flatter curve (figure 5). Think of it this way. If the price of gas was very cheap, your next car would probably be a gas guzzling, high horsepower, monstrosity that simulates your living room and that would *increase* your purchases of gas. But if the price of gas gets high, say \$5 per gallon, the next car for many people, and perhaps you, would probably be a high milage midget vehicle that would *decrease* purchases of gas resulting in the long term demand curve shown in figure 5.

G. Almost always, it is assumed that a demand schedules fall downward and to the right, i.e., that people buy more as the price declines. Economists like to talk about possible cases where the demand schedule shows that people buy more, the higher the price of the item being considered. The usual example given is snob appeal, i.e., people buy more when price rises just to have something expensive, or perhaps they panic ,e.g., people worry that price will rise even higher (e.g., the recent housing bubble). Cases of *backward bending* demand schedules are rare, and not particularly important. Even the two possible explanations that I just presented are flawed but save that for a course in microeconomics where the flaw may, or may not, be pointed out.

H. One final comment. You will sometimes see the term “demand schedule” used and sometimes “demand curve.” They mean the same thing.

Figure 6  
supply curve, one vendor



### 3. What is a supply curve/schedule:

A. A supply schedule uses a similar logic to a demand schedule in that it shows the amount of a good or service that will be sold at different prices. As should be *intuited*, a producer/seller must eventually cover all costs of production and sales, and will normally try to make as much profit as possible. We should also expect that the producer/seller will, in the interest of maximizing profit, sell goods/services at the highest price possible as long as it covers his or her cost of the last item produced. You can call this greed or rational self interest, it is pretty much the same thing.

Moreover, It shouldn't be hard to imagine that if the producer can get a *higher* price, the producer will probably try to produce and sell *additional* items (even if the cost of producing these additional items is higher than before), as long as the price of the additional items is less than their cost.. He will do this, perhaps, by asking employees to work overtime, or hiring more workers, perhaps utilizing unused productive capacity, etc. As long as the *additional* costs that he or she incurs by offering additional goods are covered by the higher revenues generated by the *additional* goods, he will probably try to produce more. Using the same  $p$  and  $q/t$  relationship as before, we can assume/intuit that supply curve rises upwards and to the right as prices rise. Remember, *always* put  $p$  on the vertical axis and  $q/t$  on the horizontal axis (figure 6). In microeconomics you will learn that the supply curve is basically a cost curve under certain conditions,, i.e., perfect competition, but do not worry about this now.

It is worth emphasizing that as the price of a good or service rises, the prices of all of that particular commodity will usually rise, not just the additional units sold. This means that the

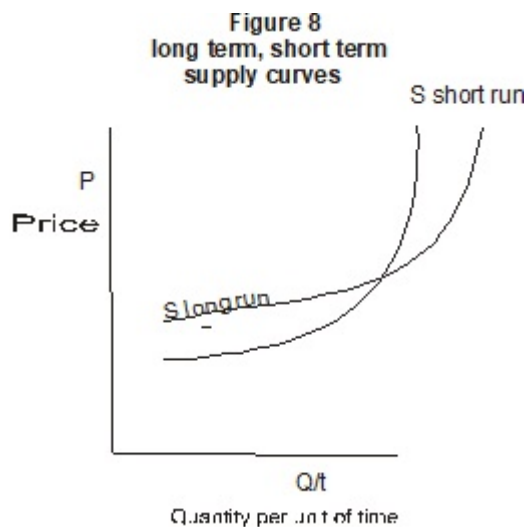
vendor would get not only the higher price from the additional sale, but also the increase in price multiplied by all of the previous units sold. You will learn more about this in microeconomics.

Two points need to be emphasized.

- First, note that I draw the supply curve relatively flat at lower prices. This is because at low prices, many producers will have excess capacity and will be happy to produce significantly more without a large price increase. Eventually, however, as prices rise, producers will run up against limits to their capacity to produce and will increasingly raise price and output in response to higher consumer demand. At some point, higher prices may result in very little increased output. Consider a barber shop. When customers are scarce, the barbers will be willing to provide haircuts to all customer at the regular price, but if the number of customers becomes larger than the barbers can accommodate, expect rising prices.
- Second, note that I do not draw the supply curve all the way to the Y axis. This is because at some point, producers will not even be able to cover their costs and will begin to give up and stop all production. For example, what do you think the owner of the barber shop would do if he could not clear enough to cover rent and other expenses?

These are points that are usually not always emphasized at this point in discussing supply and demand curves, but are important for our later discussion.

B. Hopefully, there are multiple producer/sellers (a necessary condition for competition) of the identical good (another necessary condition for perfect competition), each with a different supply curve (perhaps one has more machinery than another or is somewhat more efficient). Then, just as in the case of a demand curve, we add the supply curve of each producer **horizontally** and derive a supply curve that shows the total amount of the good that will be produced or offered for sale at different prices (figure 7).



C. As in the case of demand curves, supply curves *always* assume *ceteris paribus*. And, just as in the case of demand curves, one must distinguish between a *movement* along the curve, which occurs when the price changes, and a *shift* of the curve which can occur for a variety of reasons, e.g., improving production methods (automation which shifts the supply curve to the right by making production at every level of output less expensive), more expensive resources such as energy (which raises the cost of producing the item at every level of output and shifts the supply curve to the left), etc. Remember, a *shift of a supply curve to the right means that more will be produced at a given price and the opposite is true if the supply curve shifts to the left*. Any shift also means that *ceteris paribus*

has been violated.

D. In the short run supply curves may curve steeply up to the right. In the long run, producers can add more capacity, e.g., they may find more oil wells, so the long run producers will produce more at high prices. Also in the long run, producers can reduce capacity if the price is too low. Over a long period of time, the supply curve may look as illustrated in figure 8., This again points out the importance of measuring quantity *per unit of time*. This should help you understand why the cost of gasoline decreased drastically, (unfortunately) after the discovery of fracking methods that greatly increased the amount of oil produced above a certain price.

E. The shape of the supply curve (particularly in the short run) will partly depend upon the condition of the economy, a little detail that economists usually overlook when explaining supply and demand curves. If there are substantial unemployed resources easily acquired at current prices, the supply curve will have a longer flatter portion than if there are few unemployed resources. But as the economy expands and uses up existing resources, the supply curve of a producer is likely to turn up sharply as producers have to pay more for workers and materials, a point that we will discuss further later. In other words, the shape of the supply curves for many companies, at a particular point in time, will depend upon how fully employed the economy's resources are. This has important implications for macroeconomics as it determines whether expansionary policies will increase output or cause inflation.

#### 4. How are supply and demand curves used to demonstrate how an equilibrium price and quantity produced is reached?

*Optional Complicated Introduction: We have a complication. A basic rule in decision making is that one should undertake an activity only if the marginal (or additional) benefits exceed the marginal (additional) costs. In a world in which there are many producers and sellers (perfect competition), the supply curve is basically a marginal cost curve which shows the **additional** costs incurred as **additional** production is undertaken. The demand curve shows the additional benefits, i.e., additional revenues to sellers from selling the additional units produced. Logically, a firm would expand output as long as the additional benefits **to the buyer (i.e., the additional revenues to the seller)** were greater than the additional costs **to the producer**.*

*Let us anticipate, somewhat, the microeconomics course that you may someday take. In that course, you will be taught that the demand curve shows the **average** revenue that a firm will receive by producing/selling products for different levels of production. For many firms, however, the marginal revenue, however, will often be less than average revenues. This is because of the downward slope of the demand curve for these large producers. In perfect competition, each producer is such a small share of the market that it appears that they can sell as much as they wish at the existing market price. In the case of larger producers, in order to sell additional goods, these large producers will need to reduce their price, not only for the additional goods, but also for all goods they would have expected to sell at the original higher price. For example, if a producer was selling 10 units at \$10 per unit, the total revenue would be \$100. But now suppose, the producer wished to sell an additional unit and to do so, had to reduce the price to \$9.75 per unit. In this situation, total revenue would be \$107.25 ( $9.75 \times 11$ ) and marginal revenue on the last unit sold would be only \$7.25 ( $107.25 - 100$ ). In consequence, the additional products will only be produced if the marginal cost of the additional units is at \$7.25 or less and not the \$9.75 selling price. In other words, the marginal*

gain from selling the additional unit (\$7.25) is considerably less than the average price (\$9.75). This results from having to reduce the price on all 11 units in order to sell the additional unit. In this situation, the demand curve still exists, but the marginal revenue curve, which is the basis for a firm's decision making, lies below the demand curve. In consequence, conventional supply and demand analysis, which assumes perfect competition, beloved by all economists, does not work when a firm faces a downward sloping demand curve, which probably typifies the vast majority of production in the economy.

Most economists, and the text, avoid this problem by emphasizing that the initial supply and demand analysis that they teach is valid only when the firm does not face a downward sloping demand curve. This situation is described as perfect competition. Unfortunately, this rarely occurs, although most economists will illustrate the possibility by the example of agriculture. Many farmers, being a tiny share of the market, attempt to produce as much as possible, and then must sell at whatever price is determined by the market. In effect, they, as individuals, face a perfectly horizontal demand schedule. However, the **industry**, being comprised of **many** small producers, will have a declining demand curve as production is increased (but each **producer** is too small to have an impact on the market price).

It is problematic that having taught conventional supply and demand analysis, some economists use examples which are based on products manufactured by firms that clearly face declining demand curves.

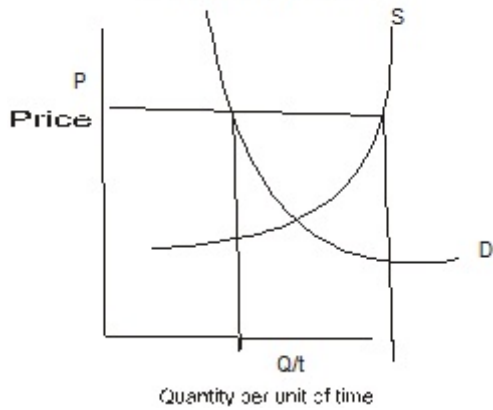
I have long been uncomfortable with this situation. We either teach supply and demand analysis that has limited applicability to most products, and/or we use this tool inappropriately. At the same time, these analyses are extremely important to economic theory and practice and must be taught. So, my approach is as follows.

For all enterprises for which there is a downward sloping demand curve, there is also a downward sloping marginal revenue curve which is dependent upon the demand curve. If, in the case of firms facing a declining demand curve, we use their marginal revenue curve to compare with the supply curve (marginal cost curve), our procedures and conclusions will be consistent with supply and demand analyses of firms facing perfectly horizontal demand curves and can be applied to almost any private product or service. In the following figures, the D beside the demand curve will represent either the demand curve or the marginal revenue curve. This may be further explained when you take microeconomics where you will be taught about monopolistic competition, oligopoly, and monopolies as well as perfect competition.

Another way of looking at this issue is that we can use supply and demand curves to show price changes, and quantity sold changes even if it does not show the precise amount of the changes

A: Despite the complications in the optional material given above, most economists use supply and demand curve to explain prices and quantities produced and sold as follows. For a given product, put the corresponding supply and demand curves **on the same graph**. You will see that they intersect (figure 9). Now, suppose the price is somehow set above the point where they intersect, as shown on figure 9. Since producers cannot sell all that they would produce at that price, inventories will begin to build up. In consequence, producers will begin to cut back on output, or lower prices, or more likely both. In effect, they will be moving down (leftwards) the

Figure 9  
Supply and Demand  
Price above equilibrium

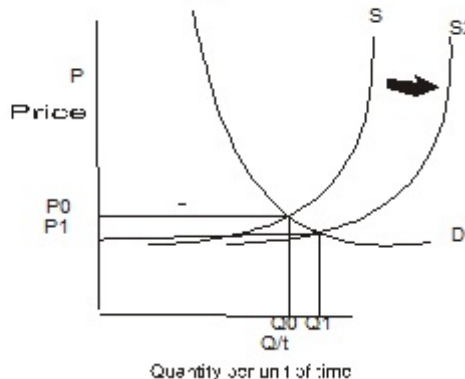


increases.

C. Clearly, *only* at the price that exists at the *intersection* of the supply and demand curves will the amount that producers are willing to supply and the amount that consumers are willing to buy be equal. (figure 11). *This is the equilibrium point, i.e., the point at which the amount that producers are willing to provide just matches the amount consumers are willing to purchase.* Despite the reservations expressed above, this approach, with a little modification, works perfectly well in the real world.

D. Suppose the industry adopts a new technology and becomes more efficient. The supply curve will shift to the right at each price. At the new equilibrium, it is likely that *price will fall, and output rise* (figure 12). Think of the dramatic declines in the prices of computers and tv set in recent years.

Figure 12  
Supply and Demand  
Supply Curve Shift



supply curve. At the same time, consumers are likely to buy more, as price decreases, moving down the demand curve.

B. Now suppose that price is set below the intersection point (figure 10). Then buyers try to obtain more of the good than suppliers are willing to sell/produce at that price. Producers will begin to raise prices and increase output, moving up their supply curve, and buyers will buy less, moving up their demand curve as price

Figure 10  
Supply and Demand  
Price below equilibrium

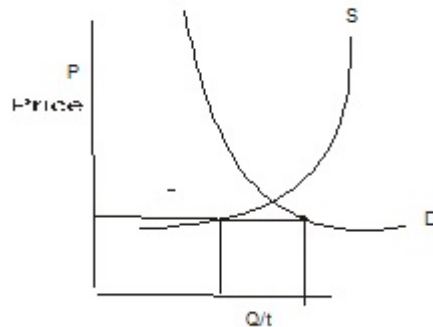
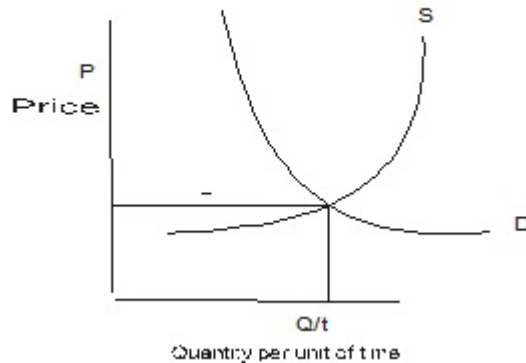


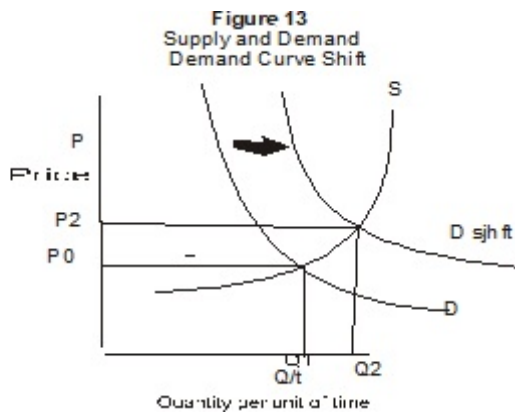
Figure 11  
Supply and Demand  
Price and quantity equilibrium



E. Alternatively, what happens if people decide they want more of a particular good at a given price? Obviously, the demand curve shifts to the right, *price and the amount produced* increases (figure 13).

**How does this process work in the real world?**

This process of determining an equilibrium price and quantity produced looks neat, but when you think about it, do you think anyone really knows the exact shape of either a supply or demand curve? We make assumptions about how we expect them to look,



but few people/analysts have ever actually created an empirical demand curve in which they have great confidence, despite repeated efforts.

In addition, does the economy really operate as these assumed curves predict. In fact, although, no one knows the exact shape of these curves, there is ample evidence that the economy operates pretty much as predicted by these curves. Lower the price of a good and usually people will buy more - consider computers. Raise the price of the good and people almost always will buy less - consider

gasoline. This happens because people make *decisions at the margin*, i.e., they decide if they should they buy a little more or a little less as price changes. If price goes down you will buy more, and if price goes up you will usually buy less, just as predicted. The important thing is that since decisions are inevitably made on marginal changes, you do not need to know exactly what these curves look like in total in order for us predict the effects of changes in price on sales and production. You need only know what changes you want to make at the present time for marginal changes in price, and then, *only* when the changes are actually made. When price changes are made, you will behave exactly as you would if you knew your demand curve. In effect, when you adjust your purchases, you will move along your demand curve, whether you know it or not. Ask yourself if you are in a store buying groceries, and the store suddenly announces a lower price on a good that you enjoy, do you then consider whether to buy few additional units of that item.

S

Because producers are always trying to increase sales, most are always looking for ways to produce their products at a lower price, so they can undercut their competition, or to develop new products in order, to displace the products of their competitors. Whatever advantage they derive is short lived, however, as competitors quickly try to copy their production methods and products. When this process works well, it is what give capitalism its dynamic qualities. Remember our discussion of decentralized planning (and Adam Smith).

**Question:** How does OPEC affect the amount of oil produced and its price? OPEC is a cartel of major oil producers which meets periodically to determine the amount of oil to produce. If OPEC decided to restrict oil production, this has the same effect as shifting the supply curve to the left. This will cause prices to rise, the OPEC countries to probably get richer, and will curtail consumption of products which depend upon oil (of which there are many).

Note that although we talk about shifting the supply curve to the left, this is the same as shifting the supply curve upward. If shifted upward, it means that it will require a higher price to produce the same amount. If shifted leftward, it means that at a given price, less will be produced. And this can be confusing unless you think deeply about it while looking at the graph.

## 6. Does the economy ever actually achieve these equilibrium values?

Not really. Economic systems are very complex, especially those of the last few hundred



years. Products, tastes, technologies are constantly changing and it can be safely assumed that supply and demand schedules, if they could be measured, are jumping around also. Perhaps it is fair to say that the economy is always *tending* toward these equilibrium values, but that the equilibrium values themselves keep changing.

### **7. Do differences in the nature and size of businesses affect supply and demand curves:**

Absolutely. When you take microeconomics (economics 202) you will learn about monopolies, oligopolies, monopolistic competition and other variations that affect the shapes of supply and demand curves. In particular, you will learn that price will sometimes equal the marginal costs of the last unit of output, but more often, price will be above the marginal cost of the last unit of output, as described in the optional material above.

*In fact, the text, and every other text that I have used, indicates that the above analysis is valid only in the limited case of perfect competition, a situation that is rarely encountered, as noted above. Nonetheless, in the real world, economists apply supply and demand analysis to a wide variety of products. And it works. But for now, we have learned all we need of supply and demand curves to continue our study of macroeconomics.*

### **8. What will be helpful in understanding the supply and demand schedules?**

It might be helpful to remember the acronym **SIPS**. The S stands for slope - you must determine how rapidly the slope of demand and supply curves change **as price changes**. The P stands for position - you must determine how far to the right the two curves are located on the chart. The second S stands for shift. It is critical to understand the factors which can cause these curves to shift to the right or left, particularly for public policy as will become apparent as the course proceeds. And finally, the I stands for independence. One of the hardest things for students to understand is that the position and shape of one curve does not influence the position and shape of the other curve in the short run. This is one of the most misunderstood concepts by beginning students. If I ask, for example, if companies would raise production of a product they were producing for sale if the price of the product temporarily/arbitrarily rose, students will frequently look perplexed and wonder why they would produce more if the demand curve indicated that they could not sell the increased production. In one sense, they are correct. In the real world, they would not. But in the hypothetical world of supply and demand analysis, the question is *not whether they could sell more, but whether they would produce more if they thought they could sell more if the price rose. Look at it from the other side. When you buy something, you generally consider only the price, not what a store had to pay for the product.*

**Remember, supply and demand schedules are independent of each other in the short run.**

### **9. What problems exist in the private sector:**

Our supply and demand curves may make it appear as if little interference by government is needed or desired in the market place. Actually, as previously discussed, the government interferes *massively* in the private sector. For example, there are rules governing wage and labor standards (Department of Labor), workplace safety (OSHA), worker pensions, the release of noxious chemicals and smoke, unemployment compensation, building licenses, etc. etc. In

these and many other ways the government intercedes into the private economy. The reasons for the intervention are obvious. For all the benefits of the capitalism, there are many areas where capitalism simply does not work well, and in some cases, capitalism may make bad situations worse. Without government interference, many children would lack any education, much critical research would not be done, people would lack medical care, disabled and aged citizens would lack food and shelter, terrorists would run amok, etc.etc.etc.

One problem is that, as presently constituted, the private sector does not always operate in ways that lead to *better products and/or lower costs*. One major recent example is the disastrous subprime loan crisis in the U.S. that was a major factor in the great recession. The incentive for mortgage originators was to place a mortgage which they often would sell off to large investment organizations, such as Bear Stearns, or Fannie Mae, or Freddie Mac. Since the original person responsible for the loan has then made a profit, and is *no longer accountable* for the safety of the loan, there was an incentive for them to connive with borrowers to inflate property assessments (in order to increase the size of the commission) and to lie about the incomes of the borrowers. In addition, it is clear that there was often no effort to fully inform borrowers that received adjustable rate mortgages of the risk of sharply increased monthly payments if the interest rate increased. Moreover, in some cases people were victimized who were incapable of fully understanding the consequences of taking out these loans. No wonder these greedy and unscrupulous people, many of whom I assume are now basking in the Caribbean, left this country in such disastrous straits back in 2008. (To be discussed in notes 10.

I want to emphasize that capitalism/private property, as an economic system, is justified primarily to the extent that producers have incentives to produce improved goods, or to produce goods at a lower price. They are led to do this by the prospect of increasing their income/profits. Capitalism works through the incentive of greed which is characteristic of most people, no matter how much they deny it. This is the “invisible hand” described by Adam Smith that leads producers to make decisions that ultimately are best for the economy even though they usually make these decisions on the basis of greed and not the welfare of consumers, workers, or the country. Adam Smith assumed that, in order to increase earnings, producers would have an incentive to produce a better product, or a less expensive product of the same quality, thus ultimately serving the public interest, even though the public interest would *rarely* concern the producers.

People complain about how greedy private businesses are. Of course they are greedy. This is why many continually innovate and produce better products and/or lower prices. This happy outcome is most likely to occur when consumers are well informed, when the product is standard, or differences easily identifiable, when price is clearly stated, and when there are many producers of the product so that competition is vigorous, e.g., as is obviously the case in the production of gasoline, tv sets, stereos, etc. (even if these companies are not perfectly competitive). For capitalism to work, there must be competition.

It does not work well when people can increase their profits by convincing people to buy inferior, and sometimes dangerous products by misleading advertising, or outright lying. And it does not work well, when people do not have to stand behind their merchandise and their allegations. And it does not work well if private companies cannot make a profit as when providing special education to handicapped children or providing job training to people with severe disabilities, etc. An interesting instance of market failure occurs when people are conned by unscrupulous home improvement workers.

The list of *problems* not addressed, or created, by the private sector is endless. The important point is that these problems *create a need for government intervention*. In fact, government intervention *is sometimes essential to save capitalism from its own excesses*. In consequence, capitalism modified by government intervention is often termed “*welfare capitalism*,” i.e., capitalism modified by government programs for the welfare/benefit of the nation and its population. Many aspects of this intervention will be studied in this course. The critical question is *how much* intervention is needed. Politicians constantly haggle and harangue over this issue and countries have even confronted each other with great antagonism over philosophic differences on these matters. These debates will continue throughout your lifetimes.

However, it must be noted that as nasty as capitalism can be with its incentives based on greed, it has so far been the *only* system that seems to work well. Countries that wholly abandoned capitalism, e.g., the U.S.S.R. and Eastern Europe, either failed, or, like China, began making a transition to capitalistic incentives. Some countries that fall in between the two extremes, e.g., some Western European countries, appear to have fallen into the doldrums.

## 10. What are reasons for a public sector?

In this section, we will specifically identify the more important reason why modern economies must intervene in private markets to ensure that the economy operates in ways that serve the best interests of the population. The above issues identifying a need for government action are specific and obvious. One could easily identify many other specific instances where public action, even in a predominantly capitalistic economy is essential. Governments may act in three ways: (1) directly providing goods or services that the private sector would not provide, or would not provide efficiently (public schools), (2) contracting with private sector to provide these goods or services (charter schools), or (3) carrying out oversight and control through regulations/standards to assure that the private and public sectors focus on making profits by producing a better or cheaper product, e.g., common core education standards. Note that most areas that require public intervention could use any or all of these three methods, although effectiveness may differ. (This obviously has the potential for great controversy) It should be emphasized that private companies should not be allowed to enhance profits by deceptive advertising, unsafe products, or other nefarious means. In many instances, government intervention is needed, not to interfere with or destroy capitalism, but to ensure that the market operates effectively and efficiently. Many economists categorize reasons for having a public sector as follows: The following should explain most of the rationale for a public sector.

### 10a. External Benefits, External Costs:

At first glance, it would appear that a market system, governed by supply and demand relationships would generally lead to an optimal level of production at the lowest possible price. The equilibrium price would be set at a level that would equalize the cost of the last (marginal) unit produced with the value placed on that unit by the last buyer. More would not be produced because additional potential customers would be unwilling to pay enough to cover the potential cost, and suppliers would be unwilling to take a loss. However, this happy outcome requires four critical assumptions: (1) that the market be characterized by vigorous competition; (2) that suppliers bear the *full cost* of production and distribution reflected in their supply curves; (3) that purchasers enjoy the entire value/benefits of the good or service as reflected in their demand curves; and (4) that the private markets can make a profits on all of the activities and products that

society place high value on

The issue of perfect competition must be delayed until a more advanced course. Suffice it to say even if the market is not characterized by a technical definition of perfect competition, as long as competition is vigorous among firms, it may well come close to achieving optimal results which may describe many, perhaps most markets in the U.S. However the issue of who bears costs of production and who enjoys the benefits must be examined closely.

**External benefits:** This occurs when a good or service creates benefits, part of which are received by someone *other* than the person paying for it. In effect, the demand curve reflects only benefits received by the purchaser, and does not include socially valuable benefits received by others. These are benefits that cannot be packaged and sold with the good, at least not without public action. . In consequence buyers of the good will buy at less than an optimal quantity. This is because the consumer receives only part of the total benefits of the good or service. . As examples:

National Defense: Consider one frequently cited example - national defense. Some people want more and some want less, but once provided, all must share equally, whether they want it or not. In fact, there is no way for any individual to be excluded from the protection provided by national defense since all who live in the U.S. are protected under the umbrella of the armed forces. Since no one can be excluded, there is no reason for any individual to volunteer to pay for national defense (you cannot selectively protect citizens, if you protect one, you protect all). This was the original classic example of an activity that gave rise to almost 100 percent external benefits and, in consequence, had to be supported by coerced tax revenues. In other words, if a single consumer paid for national defense, obviously impossible, the total benefits would be much greater than received by the single consumer alone. But there would be little incentive for other persons to voluntarily contribute toward the expense of national defense.

Education: You have been told repeatedly (usually in excessively optimistic terms) that you should pay high tuition and book costs and take college courses in order to increase your earnings potential (which is true, *on average, but not necessarily true for all college graduates*). What has not been emphasized is that your increasing managerial and technical skills will also benefit the people for whom you work, or supervise, and other people who may benefit from your technical innovations, or the people you employ in the businesses you set up, and in other ways. These are external benefits that you as students will someday create, but which will accrue to others in the form of higher productivity and higher pay (and profits). Your higher earnings will also increase the taxes you pay which should be classified as a public (and external) benefit, not a private earnings benefit. Unfortunately, when discussing the social benefits of attending college, economists sometimes act as if the increases in students' earning power are the primary variable that should be taken into account, and not the very real benefits to others. In fact, one important rationale for subsidizing your college education is the external benefits to society in genera that the buyer will not receive and probably will not consider. Although I have not seen estimates of these external benefits, I believe that they are very large. I suspect that they would justify a ***much larger*** subsidy that we currently give for college education and other programs that enhance vocational skills. In theory, students consider only the increase in their earnings when deciding how much to invest in themselves, not the benefits that may accrue to others. Ask yourself, do you consider the benefits that your college education may bring to other when you9 decide to take college courses, or only the increased earnings that you will receive.

*Many, many* other examples could be given of external benefits arising from activities provided by private companies or individuals, e.g, being vaccinated or cured of a *contagious* disease has an obvious benefit to other people; improving the safety of automobiles clearly benefits people other than the owner/buyer of the automobile.

Government activity is needed to ensure that a socially optimal amount of a good or service with external benefits is produced and distributed. Do any of you believe that the education system in the U.S. is socially optimal.

**External costs:** This occurs when a producer creates a good or service some of whose costs are not borne by the company by the company or individuals carrying out the production activity and are not reflected in its supply curve.. External costs provide an incentive to *oversupply* a good or service because the cost borne by the supplier/producer understates the actual social cost of producing the good or service are greater than the benefit to the purchaser. Examples are:

**Pollution:** It is well known that industries were long in the habit of dumping dangerous substances in the environment through smoke stacks, or through waste pipes into rivers, or by dumping dangerous substances in landfills. These substances have had large negative consequences, e.g., on peoples' health, the environment, paint on homes and cars, etc. These are examples of external *costs*, i.e., consequences of activities which cause some unlucky people to incur a part of the cost of these activities rather *than the enterprise that creates these costs*. When the government issues regulations concerning how these pollutants must be reduced, or imposes a tax on the pollution, this is called *internalizing the cost*, i.e., making the producer accept more of the actual or true costs of production, and shifts the supply curve for those products to the *left (or upward)*. Failure to consider the external cost created by a good or service will lead to over producing and/or over distributing the good or service.

**Reckless Driving:** It should be obvious that a reckless driver, although he or she might gain some benefit from their recklessness (probably imagined), imposes a heavy cost on other people who may suffer bodily or financial harm. This is an external cost, and one that justifies laws governing safe driving.

**Externalities:** External benefits and costs are sometimes collectively called externalities so do not get confused if you see this term. Obviously, externalities usually lead to an undeniable need for public action. Unfortunately, quantifying the size of the external benefits or costs is difficult and can lead to sharp policy differences.

#### **10b. Activities that are good for people, sometimes called merit wants:**

Governments undertake a wide range of activities on the grounds that they are good for people and that more people should have access to these activities that would be provided by the private sector on a fee for service basis, e.g., public parks, zoos, museums, health care, income support, education, minimum wage legislation. Note that people *could be excluded* from these activities, e.g., you could charge admission to the zoo (and exclude those people not willing or not able to pay), but visits to zoos are usually considered good for people. You could say the same about good health care, good education, good playgrounds. Often, specific government actions

can have multiple justifications (e.g., being both good for people, and creating an external benefit or reducing an external cost). For example, education *subsidies* can be *justified* both by external benefits, and the benefits for the recipient. When you think about it, enabling all citizens to have access to parks, education, and other services may create an external benefit if it makes some of the citizenry feel good that these services are readily available to all citizens.

**10c. Law and order:** No entity other than the government can be trusted to administer our systems of police protection and courts without which the country would break down.

**10d. Efficiency:** Governments maintain roads and bridges when private enterprise could not do so efficiently, e.g., imagine charging tolls for using urban or suburban roads (not an impossibility).

**10e. Prevention of monopoly pricing:** The private market does not work well when one enterprise becomes so dominant that it eliminates competition, e.g., the old AT and T. Microsoft is under deep suspicion in some countries because it dominates the market. As another example, governments usually regulate private utilities, e.g. electric companies, water companies, etc., since they, *de facto*, have a monopoly since it is usually not cost-effective to maintain more than one physical grid in a jurisdiction (e.g., one set of telephone lines, one set of water pipes).<sup>1</sup> Of course, ways of enabling competitors to use the same grid are developing, e.g., competing companies can use telephone lines maintained by Verizon, or electrical transmission lines maintained by PEPCO. *You may wish to think about the possibility that a company that is too big to fail, as some of our current enterprises, particularly large banks, are considered (by some people) is almost the same as being a monopoly or a public utility and therefore potentially a candidate for government oversight and regulation.*<sup>2</sup>

**10f. Control of trade:** And, of course, governments exercise some control over trade, not only within their jurisdiction, but also among countries, and unfortunately, sometimes try to promote the self-interest of their country *vis-a-vis* other countries (discussed further in notes 14).

**10g. Activities to ensure that people are not sold defective or harmful products or products that are not as advertised.** The example of subprime loans comes up here. Another example is regulating the use of medicines and medical device to assure that they are effective and do not cause harm. You will read, sometimes, of products that are rushed to market in order to make money as soon as possible, and then subsequently are shown to cause harm to people.

**10h. And of course there are the macroeconomic goals of high employment, low inflation, steady growth, and a few others.**

**10i. Overview:** There are, of course, other reasons for the existence of a public sector, but these are the main reasons and should suffice to show that *we cannot exist without the public*

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<sup>1</sup>Governments are trying to introduce competition in these areas by forcing the owners of the grids to allow other companies to make use of them for a fee.

<sup>2</sup>The country is currently having a debate over the amount of risk that large banks can take when investing money that people deposit (this is an issue whose resolution depends upon social values and is likely to be controversial for many years).

*sector (even if we don't trust bureaucrats)*. There are, however, ongoing arguments over what activities should be undertaken by the government (e.g., Obamacare) , how they should be undertaken (e.g., should they be provided by the government such as public schooling, or should government tax people to pay private providers to provide them, e.g, charter schools, road construction), or should they be required to meet specific goals, e.g., no child left behind. In addition, there are questions as to which level of government should undertake them (state, local, or Federal), and how large these expenditures should be. The issue is not whether government services are needed, but how to make them both efficient and effective since most activities conducted by government agencies *are not* subject to market discipline.

**10j. How large should government be?** This is a complex issue that would require a full semester, or more to investigate. Even then, we would not come to a conclusive answer. This is an issue about which people seem to be deeply polarized, and continued confusing controversy, if not resolved, could well lead disastrous consequences, both in this country and world wide. One problem is that some politicians are dedicated to the notion that smaller is better, and try to force a reduction in government spending without any agreement on which programs should be reduced and little focus on improving efficiency and effectiveness..

Some politicians are trying to establish rigid criteria for what **proportion** of our GDP should be devoted to government. Usually they believe it should be much smaller percentage than at present without specifying which programs should be cut. **In my opinion**, this meat cleaver approach to determining the optimal level of public spending is likely to be mischievous and harmful to many people. A far better approach would be to examine each public program individually to see if the results of the program warrant its cost, if it could be improved in terms of outcomes, if it could be made more efficient, or if major changes are needed in the structure of the program I assure you that many, many changes are needed in the public sector.

I suspect a rigorous examination of public programs (not on the horizon) would result in major savings as well as significant improvement in program outcomes. How much this might shrink the public sector, if at all, cannot be predicted, but I suspect that most people would object less to taxation if they had confidence that their tax dollars were being efficiently and effectively spent. It is unfortunate that politicians often confuse the issue of large and small government, with the real issues of which services are needed and which are not, and how they should be provided. Although politicians continue to try to distinguish between socialism and capitalism, this is, in my opinion, a phony argument. We benefit from competitive private markets, but must have government programs and rules when the private sector does not achieve many social goals or tries to increase profits by methods other than a better or less expensive product.

## **11. What is meant by decisions at the margin:**

One of the most critical concepts in economics is that decisions about what goods to buy and how much, where to work and how many hours, what types of expenditures to make as a manager of a business and how much, are made **at the margin**. Consider, for example, the purchase of a car. The buyer has multiple choices, some of which are more expensive than others. He or she must decide if the *extra (marginal)* cost of buying a *more* expensive car is compensated by the *additional (marginal)* benefits that the car would confer. Some day, when you are running your own establishment, you will need to make decisions such as: Should a new worker be hired, and for which task)? Should your secretary's computer be exchanged for a newer model? Should

you increase production of a line of goods that you are selling? In each case, and in almost all activities of your life, decisions will be made at the margin. They will not be made on the basis of whether to continue to operate the business, but on a multitude of smaller decisions that affect profit and/or loss levels.

Another way to look at this issue is to note that when you decide to make a purchase, say apples, you intuitively, whether you know it or not, ask how many apples you wish to buy at the current price. When you do this, you are basically asking whether the *additional/marginal* cost of an additional apple is worth the pleasure (i.e. marginal benefits) that you will derive from this additional apple. In effect, you are assessing your position on your demand curve for apples.

As you make decisions at the margin, you will behave exactly in the ways predicted by supply and demand analysis, even though you probably have no idea of what your demand curve looks like. Making decisions at the margin is just like moving along the demand curve or the supply curve. For example, businesses do not typically ask whether they should produce at all, but whether they should produce a little more, or change the methods of production slightly in order to reduce costs. In each case, they are asking whether the gain from a change justifies the cost.

The concepts of marginal benefit and marginal costs are often troublesome to students. The concept of the “margin” has a special meaning in economics. It refers to a value, e.g. a cost, a benefit, etc., associated with the next unit of a variable (and not total consumption or use of the item). For example, the marginal benefit of purchasing one additional apple refers to the value placed on that single additional apple by its consumer. If the consumer had purchased 5 apples before the marginal 6<sup>th</sup> one, presumably each of the preceding five apples had a higher value to the purchaser than the sixth one.. That is why the demand curve for apples for an individual slopes downward to the right indicating that the purchaser usually values each additional apple less than the preceding ones. In this sense, the demand curve is also a benefits curve. Consider the following hypothetical example:

# Apples	Amount consumer will pay Per additional apple (Marginal benefit)	Cost per apple producers require to sell An additional apple (Marginal cost)
1	\$2.00	\$ .50
2	1.75	.60
3	1.50	.70
4	1.25	.90
5	1.00	1.00
6	.95	1.10

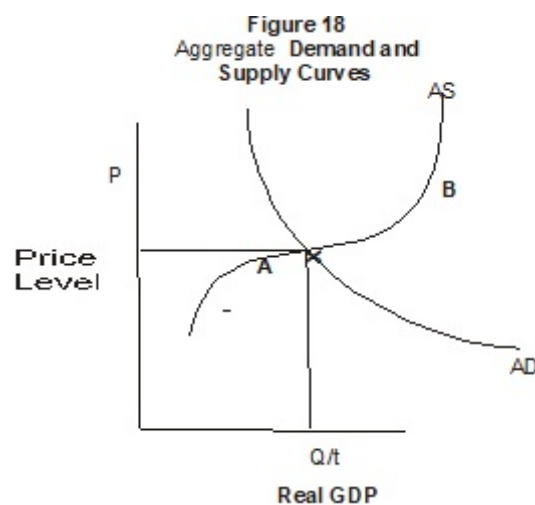
The consumer enjoyed the first apple so highly, that he would pay \$2.00 for it. That is the marginal benefit of the first apple must be \$2 or higher. He or she enjoyed the second apple less, and would pay only between \$1.75 and \$2.00 for it. We know he or she valued it less than \$2, since he would not buy a second apple at that price, and we know he must have valued it at \$1.75 or more, so the marginal benefit, i.e., the pleasure from the second apple alone must lie between \$1.75 and \$2.00. And so on.



In microeconomics you will encounter the concept of marginal cost. This is the amount of additional revenue that producers will require before producing an additional unit of the item being considered.<sup>3</sup> For example, in our hypothetical example, a producer will supply the first apple for a low price of \$.50, but would not supply the second apple unless he could get at least \$.60, and would not further supply the third apple unless he could get at least \$.70. \$.50 is the marginal cost of the first apple, \$.60 (or more precisely, somewhere between \$.50 and \$.60) is the marginal cost of the second apple, and \$.70 (actually between \$.60 and \$.70) is the marginal cost of the third apple. Presumably, each succeeding apple involves a higher cost (extra pickers, extra pesticides) in order to bring additional production to market and the producer must receive higher compensation to do so.

Be sure that you realize that in our very simplified example above, the only price that would be in equilibrium would be \$1 per apple. The buyer would pay that price for each of five apples that sellers would supply at that price. You might notice that *the sum of the marginal values* of the five apples is at least \$7.50. The difference between \$7.50+ and the \$5.00 that the consumer actually pays for the 5 apples is known as **consumers surplus**, a concept that is rarely fully understood but hopefully you will when you encounter it in microeconomics. The above represents the situation if there is perfect competition among apple producers. It becomes a little more complicated if there is some degree of monopoly, i.e., declining demand curve, but the basic principles do not change.

You might also notice that the producer received \$5 for the apples, but the sum of the marginal costs for the five apples was only \$3.70. The difference represents an amount over and above the cost of production which the producer receives. This is the producer's profit. Admittedly, this example is extremely simplified, but the same principles apply in all analyses of supply and demand curves. The above example is based on a trite marginal unit of one additional apple. In fact, in the real world, the marginal unit is the smallest decision unit possible. For example, a small grocery store would never consider whether or not to purchase one additional apple, more likely it would consider whether or not to buy an additional crate of apples.



### 11. What are *aggregate supply* and *aggregate demand* curves?

The text doesn't discuss these concepts until considerably later than the initial assigned readings. It will be helpful to introduce them here so that we can use them to illustrate basic concepts in inflation and unemployment.

Aggregate supply and aggregate demand curves are shown in figure 18. The vertical axis shows the *average price* of all goods and services (identified as the price level) and the horizontal axis shows the total amount of goods and services produced and sold labeled as *real* GDP in this

<sup>3</sup>Marginal costs, additional costs, incremental costs basically refer to the same concept. The same is true of marginal benefits, additional benefits, incremental benefits.

graph.

You may wonder why economists place such great emphasis on this graph when all they could know (at least hypothetically) are two variables, the average prices of goods and services in the economy and the size and composition of real gross domestic product. Think of it this way. We know that these two variables exist and assuming that we know them, we can, at least in theory, plot *one* point on the graph (figure 18), shown as X.

I have labeled the horizontal axis as *real GDP (discussed in notes 1)*. For the present remember that *real GDP* consists of all the actual goods and services that are produced. The least confusing way to think of this is to imagine that each point on the horizontal axis represents a lengthy column of all goods and service produced.

Now, suppose the price level decreases. Necessarily, some price of a good or a service somewhere has declined. As we have learned, from our discussion of demand curves, a lower price usually means that purchases of the good or service increase when its price decreases. It doesn't matter which good or service increases its sales and output. It is clear that the total amount of goods and services purchased, will increase as the price level declines so that the AD curve, like all other demand curves, slopes downward and to the right.

Now let us look at the AS curve. Starting at point X, if the price level increases, at least one price must have increased and those producers will have an incentive to produce more of the good or service they produce. We are left with a conventional supply curve which slopes upward and to the right.

To summarize: You begin with a single point, the existing price level (average price) and the existing level of real output. Logically, there must be a downward sloping aggregate demand curve and an upward sloping aggregate supply curve.

Since the AD and AS curves are ultimately based on the individual supply and demand curves for all goods and services, the AD and AS curves are constrained by the same assumptions that govern supply and demand curves for individual products. In particular, these curves are governed by the requirement of *ceteris paribus*. If anything changes, e.g., peoples' savings habits, their accumulated wealth, their tastes, factor prices (remember, these consist of interest rates, earnings, rents, profits) and many other variables, these curves will inevitably shift. For example, if interest rates are lowered, it will be less expensive for people to borrow to buy a house or car, and the aggregate demand curve will shift to the right, hopefully causing more output and more employment. We will discuss these issues further when we describe ways of reducing unemployment or inflation.

Consider the AS curve. As the real economy grows, and excess productive capacity, both in machines and worker, nears its limits (i.e., approaches the production possibility frontier - notes 2), prices begin rising ever faster as sellers are left with no other way to respond to increasing demand. At that point, the AS curve will veer sharply upward indicating that additional real output will be possible only if prices rise substantially.

On the other hand, as the real economy begins to decline significantly, and there are significant amounts of unused resources, particularly labor and capital, I draw the AS curve as

flattening out (as our earlier supply curve) as eager producers have no difficulty finding resources to enhance production (remember our earlier discussion on the shape of individual supply curves). At some point, however, as prices continue to decline, some companies will begin to not be able to cover costs and will simply end production which is represented by a steeply declining AS curve when prices fall below a critical level. Remember that factor prices, e.g., wages are assumed to be fixed. If wages levels rise, for example, the principle of ceteris paribus is violated, and the supply curve shifts upward (or to the left) reflecting a higher cost of production. The principle of ceteris paribus can be confusing unless you think (extensively) about the logic of these curves. We will discuss the AD and AS curves in much greater depth later in the course.

Now we can revert to conventional supply and demand analysis. Where the two curves cross represents the equilibrium level of output and the average price level. Two further important points:

- I label the vertical axis as the price level, and the horizontal axis as real GDP, but I want to emphasize that in these charts the price level refers to the average price of goods and services and is different from some other measures of the price level. I will explain in more depth later in notes 6.
- You might wonder why I have added points A and B to figure 18. The reason is that the extremes of these curves are meaningless. Short of a national catastrophe, you will never have occasion have to deal with values above or below these extremes. However, The AD curve between points A and B represent a rough approximation of the areas of the AS curve that we, as a country, have actually encountered, and probably will encounter again.

## 12. What is meant by real GDP in the AS graph? (Repetitive, but useful)

The exact definition of real GDP in chart 18 is that real GDP represents the total of all goods and services produced for that year in **physical, not monetary, terms**, i.e., the real economy as previously discussed. That much is clear. As you move to the right on the horizontal axis, the amount of **real GDP** rises. Once an equilibrium price level is determined, we can determine the **money value** of the amount of real GDP purchased that year by multiplying the number of real goods and services produced by the average price.

Later in the course (notes 6), we will want to show how we measure changes in the “real” value of GDP *varies from year to year*. Clearly, this involves adjusting for any effects of price changes. Briefly, but don’t worry about it yet) we value output in any given year by the prices prevailing in a base year. As we will see, this enables us to **crudely estimate** by how much real output changes (i.e., the actual change in the amount of physical goods and services from year to year).

In consequence, the definition of real GDP used in this (frequently used) graph is different from the definition of real GDP that you will sometimes see in tables that purport to show the **change** in real GDP over time. We will re-explain this in notes 6.

### Review Questions

1. What is a demand curve? Why does it usually slope downward?

2. Can you distinguish between a short-term and a long-term demand curve?
3. What is a supply curve? Why does it usually slope upward?
4. Can you distinguish between a short-term and a long-term supply curve?
5. What happens if the market price for toothpaste is above the equilibrium that would be established by the intersection of the demand and supply curves?
6. What is meant by the term “marginal benefit.”
7. What does the term *ceteris paribus* mean?
8. Identify one factor that could cause the short-term demand curve for flu medicine to shift to the right. What would be the likely effect on price and quantity sold. Would this cause a shift of, or a movement along, the short term supply curve?
9. Identify an external cost caused by a person’s excessive drinking?
10. Identify an external benefit resulting from being vaccinated?
11. Give at least two reasons why the public sector must provide some goods or services? Indicate why the private sector might not provide these services or would do so inefficiently?
12. What is meant by the “invisible hand that guides the economy?”
13. What is meant by aggregate demand?
14. What is meant by aggregate supply?
15. Would you expect the marginal cost of producing an automobile would rise or fall if people decided to purchase fewer automobiles?
16. What is meant by “decisions at the margin?” Suppose a person would consume one orange per day at a price of \$1 per orange, but would consume two oranges at a price of \$.75. What is the marginal benefit of the second orange?
17. Do you think that supply and demand curves can accurately forecast people’s behavior even though most people have never heard of supply and demand curves? What makes people behave according to these curves that they never heard of.
18. Why is it important to use quantity per unit of time on the horizontal axis for supply and demand curves?
20. Distinguish between a shift of a supply or demand curve and a movement along it.
21. If improving technology caused the price of computers to fall, what is likely to happen to the quantity sold? Would this represent a movement along a curve, or a shift of a curve, or both?

