9. Competitive Markets

In this chapter you will learn:
- Profit maximization outcome in equilibrium;
- Short run and long run adjustment;
- Shutdown versus bankruptcy;
- Who bears the burden of a tax;
- EPA regulations impact;
- Sports Markets.

9.1. Assumptions

The commodity being produced is homogeneous. This means that it is impossible for the consumer to tell the difference between one firm’s output and another firm’s output, e.g., coffee, wheat, tea, stocks sold by a brokerage firm, bestsellers sold by a book store. Information flows quickly across the participants of the market. If one firm is charging a higher price than other firms, consumers will quickly find this out and switch to the other firm with the lower price. If one firm is giving bigger discounts than other firms, consumers will switch to that firm. There is a large number of participants in the market. It is unclear how large "large" must be for a market to be competitive. In some markets there are only a few firms and yet the market seems "competitive." The main implication of these assumptions is that no individual firm has any market power.

Of course, some or all of these assumptions may be wrong. However, we cannot judge a model by its assumptions but only by the quality of its predictions, as noted earlier. The purpose of the model of pure competition is not that it gives us a completely correct view of the market place, but that it gives us a reasonably good benchmark to match up against the real world. If something doesn’t match up, this provides us with valuable information about what we need to study to understand the real world.

The market price is determined by the interaction of all of the buyers and sellers. The market participants must be able to observe prices and obtain information about the market quickly. Remember: Under perfect competition no one has any market power; each participant is a price taker.

9.2. Profit Maximization

As we have seen, a profit maximizing firm that takes price as given will choose its output level when maximizing profit where price equals marginal cost. Let \( p = \) price, \( MC = \) marginal cost, \( y = \) output. If economic profit is given by \( \pi = p y - C(y) \), a change in profit can only come about when the firm adjusts its output. Thus

\[
\Delta \pi = p \Delta y - (\Delta C/\Delta y) \Delta y = p \Delta y - MC \Delta y = (p - MC) \Delta y,
\]

where we have used our definition \( \Delta C/\Delta y = MC \). It follows that the effect of a change in output on profit is given by \( \Delta \pi/\Delta y = p - MC \). The firm will adjust its output until no more profit can be obtained, i.e., it will alter \( y \) until \( \Delta \pi = 0 \). At that point, \( p = MC \) will occur at the profit maximizing output level, \( y^* \).

First, the firm observes the going market price, say \( p^* \) in the figure above. Then, the firm chooses \( y^* \) accordingly. Geometrically, find \( p^* \), go across horizontally to the MC curve and then vertically down to find \( y^* \). This is the best output level for the firm, it can do no better for itself.
Second, the firm has to check to see if it is earning an economic profit at the margin. Note that if \( R = p_y \) is revenue and \( C = C(y) \) is total cost, \( \pi = R - C = p_y - C(y) \). Dividing through we obtain,

\[
\frac{\pi}{y} = p - \frac{C(y)}{y} = p - AC.
\]

Since \( AC = C(y)/y \). Therefore, the firm will be earning an economic profit at the margin if price is greater than average cost at \( y^* \). More generally, we have

1. \( \pi/y > 0 \) if \( p > AC \),
2. \( \pi/y < 0 \) if \( p < AC \),
3. \( \pi/y = 0 \) if \( p = AC \).

In the diagram price > \( AC \) at \( y^* \) by distance \( A - B \) so there is an economic profit being made.

There are always two things we need to check about the firm under competition. First, is it maximizing profit (Choose \( y^* \) where \( p = MC \)), and second, is it earning an economic profit at the margin (Compare \( p \) with \( AC \) at \( y^* \)). In the short run some inputs like capital are fixed. The firm will choose its output level to maximize short run profits. The same thing is true in the long run except that all inputs are variable in the long run.

Next, consider the case where price is low, as depicted in the following diagram. The firm observes price given by the horizontal line connecting point \( p^* \) with point \( A \) and chooses output to maximize profit, \( y^* \). Average cost for \( y^* \) is at point \( B \). Unfortunately, at point \( A \), the average cost at point \( B \) is greater than price (\( AC > p^* \) at \( y^* \)) so the firm is losing money on average in this case; it is earning negative economic profits. It still wants to maximize whatever "profit" it can get, which in this case means minimizing losses.
Some have criticized this theory of firm behavior as being unrealistic because it assumes firms always maximize profit. Milton Friedman, a Nobel Laureate, responded by arguing that this is an assumption of the theory and not a prediction. A theory can only be judged on the basis of its predictions and not by its assumptions, as we discussed in chapter one. As it turns out, the predictions of the model hold up fairly well.

9.3 Industry Equilibrium

A competitive industry will be in equilibrium if there is no incentive for resources to flow into the industry or flow out. Resource flows follow profit. Therefore, resources will flow into a sector if \( \pi/y > 0 \) and will flow out if \( \pi/y < 0 \). Equilibrium occurs where \( \pi/y = 0 \).

This is absolutely critical. Firms always seek higher economic profits. For example, GM expanded its operations significantly into Latin America and Europe by investing billions of dollars in building new factories to produce GM cars and trucks for sale in South America and Europe at the same time that it was shutting down facilities in the US in the 1980s and 1990s. And Japanese and Korean car companies have entered the US market and are building their cars locally in the US instead of building them at home and exporting them to the US. Firms will even enter a new market that is outside their immediate area of expertise in order to earn extra profits. For example, AT&T entered the desktop computer market in the 1980s and the State Farm Insurance Company is now selling mutual funds in the 2000s.

Examples:

1. In the late 1970s the US began deregulating the airline industry. In 1978 there were 11 major airline companies. There were large profits being made. As deregulation began new firms entered the industry. By 1984, there were 27 companies flying routes coast to coast.

2. Profits were negative in the steel industry and resources flowed out of the steel industry during the 1970s as the industry contracted.

3. The semiconductor industry, and more generally the computer industry has experienced huge profits that attracted much new investment and competition, e.g., Dell, Gateway, Apple.

4. Profits were negative in the consumer electronics manufacturing industry in the 1970s and most of that industry has completely collapsed in the US. Americans no longer produce television sets or VCR's by 1990 even though the original technology was primarily developed in the United States.

5. There were huge profits being made in e-commerce in the late 1990s and a large number of "dot-coms" started up hoping to make millions. When the tech bubble burst thousand of these companies went under and thousands of IT specialists were thrown out of work depressing salaries.
6. DVDs were very popular in the late 1990s and early 2000s. The huge demand for them increased profits and induced resources to flow into the moviemaking industry. This raised salaries for actors, editors, directors, writers, and practically anyone connected with the industry. We even increased exports to the rest of the world, except France. The French feel that their movie industry is having difficulty competing, but see American movie imports as an attack on French culture. They have decided to restrict foreign movie imports to protect their culture.

7. Huge profits were being made in banking and finance in the 1990s and 2000s and a large amount of resources flowed into those areas.

We have a general equilibrium for all industries if $\pi/y = 0$ in all sectors of the economy. In that case no owner of capital has an incentive to move her resources from her current investment to another sector in the economy. The concept of an equilibrium is not important from the standpoint that it ever actually exists in the real world. The importance of the concept is that if we notice resources flowing from one sector to another, the model of competition tells us why; there are unusual profits being made in one sector but not in another and this causes resources to move from a sector where profits are negative, e.g., DVDs, to one earning economic profits, e.g., banking.

9.4 Economic Profit
What do we mean by profit, or economic profit, to be more precise? What sense does the theory make if profit is zero in equilibrium? Who would invest if profits were zero? The answer is that we are talking about economic profits and economic profits take into account all opportunity costs not just the usual accounting cost. Recall that the opportunity cost of something is the value of the next best foregone alternative. So $C(y)$ discussed above takes into account the full opportunity costs including the owner's own salary, for example.

Consider the following example. A person can work as a lawyer and earn $200,000 or can quit the law firm and run her own business as the CEO of a pet store. Suppose her pet store company can earn revenue of $R = 2.3m$ with operating costs of $2.2m$. Her accounting profit is

$$\pi_A = 2.3m - 2.2m = 100,000.$$  

However, the economic profit is negative. Why? Because in order to operate her own firm she will have to quit the law firm and give up $200k. So the $200k is her opportunity cost of running her own firm as CEO. Thus, the economic profit is

$$\pi = \pi_A - 200k = -100k.$$  

In all of our analysis, $\pi$ refers to economic profit so we are taking the owner's salary, or opportunity cost, and own investment into account. So in equilibrium, $\pi/y = 0$. Therefore, if there is an opportunity cost for the owner of the firm, the accounting profit must equal the opportunity cost in equilibrium. From the last example, if we are in equilibrium, $\pi/y = 0$. But this means that $\pi_A - 200k = 0$, or $\pi_A = 200k$ if we are in equilibrium. This is a general proposition. In equilibrium, accounting profit is equal to opportunity cost so economic profit is zero.

In the above example, since the economic profit is higher in law than in pet stores, we should notice people moving from pet stores into the legal sector of the economy. Remember the general rule: resources will flow toward above normal economic profits and away from sectors with below normal economic profits.

Another way to think about economic profit is that the owner of the firm has made an investment in capital and time and she would like to make the best investment possible. If economic profits are zero, the investor is earning a normal return on her investment. If economic profit is positive, she is earning an above average rate of return on her investment and she might
consider increasing her investment. Finally, if she is earning negative economic profits, she is earning a return that is below average and she will have to think about moving her investment elsewhere if the situation persists.

9.5 Industry Adjustment

In a long run industry equilibrium, four things must be true: \( p = \text{LRMC} \) (To maximize long run profit), \( p = \text{LRAC} \) (So we are in equilibrium in the long run), \( p = \text{SRMC} \) (So we are maximizing short run profits), and \( p = \text{SRAC} \) (So profit in the short run is zero). All four of these statements are true at point A in the diagram below.

![Industry Adjustment Diagram]

The real value of the theory of competition is that it helps us understand how real markets function. It makes predictions about how markets will adjust to significant changes in the economy. Industry analysts at brokerage firms, for example, use the model of competition to make forecasts and to provide information to their clients. Economists working for the government use the same reasoning to inform Congress and the President about the effect of various policies on the economy. For example, in 1997 many Asian economies "melted down" and collapsed after years of high growth. Analysts in the US used our model of competition to figure out how the "Asian flu" would affect American companies and the American economy.

To learn how to use the model, consider the following example. Suppose the industry starts out in a long run equilibrium at point A and suppose there is an increase in market demand. **Incumbent firms** (Firms already in the industry.) will notice two things: 1. inventories will fall, 2. price will rise. They will respond to the higher price by maximizing profit. In doing so firms will choose a new output level where the new price is equal to MC, \( p^{**} = \text{MC} \) at point B depicted below. This will lead to a higher output level for the firm. Since all firms in the industry have an incentive to do this, the quantity supplied to the market will increase as we move from A to B in the market diagram as well. Second, notice that at point B the individual firm is earning an economic profit at the margin since \( P^{**} > \text{SRAC} \) at \( y^{**} \) (distance B-C).

Since economic profits are being made in the short run we should notice two things happen as we shift our focus from the short run to the long run: 1. incumbent firms may try to get larger, 2. entry into the industry will occur. This requires everyone involved to make a forecast about the price. Basically, the issue is: do you think price will remain high permanently, or at least
long enough to make an extra investment pay off, or not. A conservative, risk averse person might not invest more and simply keep the investment they already have. Someone who is less risk averse, may very well want to invest more. If people believe the increased price is going to last awhile, they will invest more in this sector of the economy.

There are several scenarios that could play out as the industry adjusts to this demand "shock." First, incumbents increase their capital investment and entry occurs. The incumbent firm's short run cost structure will shift to the right under CRS and market supply will shift out so the industry will adjust to point E. Price is once again at p* but the incumbent firm is producing more. If any new firms enter and use the same technology and experience the same costs they will also be at a point like A or E in the long run.

Another possible scenario is that incumbents are cautious and do not invest more. In that case, they will simply move from A to B in the short run and then in the long run move back to A. So the cautious incumbent firm will increase its output and earn an economic profit in the short run. However, as new firms enter the industry and drive the price down, the cautious incumbent firm will eventually have to cut its output back as the price falls. If any new firms enter and use the same technology and experience the same costs, they will also be at a point like A or E in the long run, depending on how large they are. There are many examples of this sort of cautious behavior on the part of incumbent firms. Examples include Sears, JC Penny, GM, Xerox, and IBM. Successful incumbent firms seem to become very cautious over time and many have difficulty adjusting to changes in the marketplace.

A third possibility is that **new firms** enter with lower long run cost structures because they are organized differently, they have a more efficient technology, or they use non-unionized labor, which keeps their labor cost low. In that case, the only way an incumbent can survive price
competition is to get costs down. Many times we observe older corporations have great difficulty innovating. For example, Sears has had great difficulty competing against the upstart Wal-Mart, although Sears seemed to be making a turnaround in 2004-05. One strategy is that they are improving the quality of their merchandise by stocking name brands like Land's End and Levi's. And sometimes a price war breaks out under competitive pressures where \( p < p^* \) as the firms in the industry try to survive competition. A firm that cannot cover its average cost of production will not survive.

Occasionally, a well-known firm that has been around for a long time doesn't survive new competition, e.g., Eastern Airlines, Montgomery Wards, Jones and Laughlin Steel, and Korvette's. Even some long term "blue chip" companies have gotten into trouble like GM and Citi. In fact, GM and Citi have both been taken out of the Dow Jones Industrial average and replaced by Cisco and Travellers, and GM was forced to declare bankruptcy. Both GM and Citi required a bailout during the Great Recession. This was a stunning development and one that has far reaching implications.

9.6 The Shutdown Decision
What happens if the industry is initially in equilibrium and the price falls? Firms will still choose their output to maximize profit. However, now the economic profit the firm earns will be negative and the firm will face "the shutdown" decision; should it continue to produce even though it is losing money, or should it shut down temporarily and try to reorganize itself to get its costs down? This is where the distinction between short run and long run becomes important. In the short run, the firm may shut down temporarily. If its difficulties persist, then it will face a bankruptcy decision in the long run.

First, consider the short run shutdown decision. Suppose the price in the marketplace falls to \( p^{**} \) depicted below. The firm still wants to maximize what profit it can. To do so it applies the same rule as before, choose \( y^{**} \) where \( p^{**} = SRMC \). This occurs at point B below. Thus, the firm should reduce its output. (How does it do this? Remember, in the short run its capital is fixed. However, labor is variable. So the firm will lay off some of its workers.) The next thing to check is whether the firm is earning a normal rate of return. Compare \( p^{**} \) with \( SRAC \) at point B. From the diagram, \( p^{**} < SRAC \) so the firm is earning negative economic profits. If \( \pi_A = \) firm's accounting profit and \( OC = \) owner's opportunity costs, then the economic profit is the accounting profit minus the opportunity costs, \( \pi = \pi_A - OC \). Therefore, if we know \( \pi < 0 \), it follows that the accounting profit is less than the owner's opportunity cost, i.e., \( \pi_A < OC \), at least in the short run. The owner of the firm might begin to wonder if he or she wouldn't be better off going out of business and undertaking his or her next best opportunity.

This is where the shutdown decision becomes important. The owner has the following choice:
1. produce \( y^{**} > 0 \) and incur variable costs as well as the fixed cost; or
2. set \( y = 0 \), shutdown temporarily for a short while and incur only the fixed cost.

If she produces \( y^{**} \), her economic profit will be negative to be sure because she is not covering her average cost and she will be losing money in the short run relative to her own opportunity costs. However, she might lose less money by shutting down her company for awhile. To see what she should do, we check her profit in both cases, compare them, and choose the action that leads to the higher profit.

Recall, the profit from producing in the short run is, \( \pi = py - VC - FC \), where \( py = \) revenue (price multiplied by quantity) \( VC = \) variable cost (mostly labor costs for most firms) and
FC = fixed cost (mostly fixed capital costs, property taxes, and loan repayments). If she produces \( y^* \) in the diagram below, then under #1 above,

1. \( \text{"profit from producing"} = (p^* y^* - VC - FC) \),

and if she shuts down as under #2 above, then

2. \( \text{"profit from shutting down"} = (0 - 0 - FC) = -FC. \)

If she shuts down she doesn't produce anything and has nothing to sell. So her "revenue" would be zero when she shuts down. Her variable is also zero, \( VC = 0 \), when she shuts down since she lays off her entire work force when she shuts down. However, she still must pay her fixed costs FC in the short run even if she shuts down.

What should she do? Her decision rule is that she should shut down temporarily if

\[
(0 - 0 - FC) > (p^* y^* - VC - FC).
\]

Rearrange and cancel common terms to get the following,

If \( VC > p^* y^* \), then shutdown.

Another way of stating this rule is to divide both sides by \( y^* \) to get \( VC/y^* > p^* \). But \( VC/y^* = AVC \) so we can restate the rule by saying

If \( AVC > p^* \ at \ y^*, \ then shutdown. \)

On the other hand, she should continue to produce if profit under #1 above is greater than profit under #2,

\[
(p^* y^* - VC - FC) \geq (0 - 0 - FC).
\]

Rearranging and canceling common terms,

\[
p^* y^* \geq VC, \quad p^* \geq \frac{VC}{y^*} = AVC.
\]

If this last statement is true, she should continue to produce.

The general decision rule becomes:

- If \( p^* \geq SRAVC \), then continue to produce \( (y^* > 0) \).
- If \( p^* < SRAVC \), then shut down temporarily.

So if price is greater than or equal to average variable cost continue to produce in the short run. If price is less than average variable cost, shut down temporarily and hope your price increases or you can find some way to lower your cost. Of course, the firm cannot afford to continue producing if \( p^* < AC \) for long since its economic profit from producing is negative.

If the firm has shut down temporarily because \( p^* < AVC \), then it will go out of business permanently in the long run if its price does not increase or it cannot somehow reduce its costs.
A firm can declare bankruptcy in court and seek legal protection from its creditors, i.e., the people who loaned the firm money. If the court decides the firm is viable, it will allow it some debt relief so it can get back on its feet and start producing again. However, many times the court decides the firm cannot survive. In that case, the remaining assets of the firm are liquidated and the firm is dissolved. Thousands of firms go out of business every year. Many firms will shut down and try to reorganize their operations in order to stay in business.

Example: Suppose \( p^* = 10, AC = 12, AVC = 7, \) and \( AFC = 5. \) If the firm produces, the economic profit, \( p^* - AVC - AFC, \) is \( 10 - 7 - 5 = -2. \) If the firm shuts down, the profit is \( p^* - AFC = 0 - 0 - 5 = -5. \) Given this data it is better to produce even though the company is losing money in the short run. If instead, \( p = 10, AC = 15, AVC = 12, \) and \( AFC = 3, \) then profit when the firm produces is \( 10 - 12 - 3 = -5 \) while profit if the firm shuts down is \( 0 - 0 - 3 = -3. \) It is now better to shut down for a while.

Application: One of the most famous examples of a large firm shutting down for a while is Braniff Airlines. After deregulation began in the late 1970s, Braniff started losing money. Its difficulties multiplied during the recession of 1982 when the demand for air travel fell off. The management at Braniff decided to shut down for a while, get some concessions from their labor unions, cut some of their other costs, and then try to start up again. Unfortunately, it wasn't enough; they were losing too much money and they eventually went out of business.

Application: As another example close to home, the dental office right next to the head of the Chipman trail by the Quality Inn was a steak place in the late 1980s and had to shut down for a while because it was losing money. After reorganizing, the owner reopened as a restaurant specializing in tantalizing fish cuisine, e.g., delectable poached salmon, trout in a lemon butter sauce. Unfortunately, the demand for such food on the Palouse is limited and the owner was forced to go out of business. A new owner opened an Italian restaurant but also could not make a go of it and eventually went out of business. A dentist finally bought the building and converted it into a dental office. This is the only example I am aware of where there is a dentist office instead of a restaurant so close to a motel ready to meet the needs of the guests at a moment's notice.

Note the difference: the "shutdown" decision is temporary; you can start your business again if price goes up or you can reorganize production and get your cost down. The "going-out-of-business" decision is a long run decision and is permanent.
Therefore, we have a **simple rule** for the short run profit maximizing behavior of the firm: When \( p \geq SRAVC \) choose output where \( p = SRMC \) and when \( P < SRAVC \), set output \( y = 0 \) and shut down. This gives us the firm's **short run supply curve**, it is the emphasized area in the diagram. This "supply curve" tells us immediately the amount of output the firm is willing to sell given the price, which is exactly what a supply curve is supposed to tell us.

**Application:** US Airways filed for chapter 11 bankruptcy protection (8/11/02). It cited financial problems prior to 9/11 and the slowdown in demand for air travel after 9/11. It also cited high labor costs (highest in the industry) and high costs for leasing its fleet. However, they will continue flying while they reorganize so their price must be sufficient to cover their AVC.

To get the **short run industry supply** we **sum horizontally** across the diagrams just as we did to get the market demand curve. In the left two diagrams the short run supply curve for firms #1 and #2 are depicted. Pick a price and figure out how much each firm will supply at the price and then add to get the market supply. This gives us one point, A, on the market short run supply curve, SRS. Continue doing this: pick a price, figure out how much each firm will supply at that price, and add up across all firms to get the short run market supply curve or the "**short run industry supply curve**."

A change in the economic environment, which causes the firms in the industry to adjust, will cause an adjustment in the industry supply curve. As new firms enter or old firms exit the industry, for example, the entire industry supply curve will shift out or back depending on which adjustment is occurring. Note that small, unobservable differences across firms will always exist so their own cost structures will differ slightly. That is why the short run supply curves of the two firms depicted in the last diagram differ slightly.

### 9.7 Industry Equilibrium: Constant Costs Case

Assume the industry is small relative to the entire economy. A change in demand for the industry's output will require firms in the industry to adjust their workforce and eventually their capital investment. Assuming the industry is small relative to the economy is tantamount to assuming that the industry has no impact on other markets especially input markets, i.e., the labor or capital market. When the industry hires more workers, for example, it does not cause the wage to increase in the **constant cost case**: **cost per unit (wage rate) is constant** and unaffected by the industry in this case.

In the diagram we have depicted a long run equilibrium for a benchmark case. There are constant returns to scale for the representative firm in the long run and the industry is a constant cost industry so the long run industry supply curve, LRS, is perfectly horizontal. The industry is in equilibrium so price is equal to SRMC, SRAC, LRMC, and LRAC.
9.7 Response to a Tax: Who bears the burden of a sales tax?

Recall from before that when we analyzed the incidence or burden of a tax on a market transaction, both sides generally bore part of the burden of the tax if the supply and demand curves have their usual slope. Special cases were considered where one side of the market or the other bore the entire incidence of the tax, however. Now we wish to go into more detail about exactly who will bear the incidence of the tax when profit maximizing firms must adjust to the tax. In a sense we are going behind the supply curve to find out how the individual firm will respond to the tax. This is one of the most important cases we can study since taxes appear to be ubiquitous; almost all firms in almost all countries must pay taxes of one sort or another. Indeed, a large number of people earn a good living figuring out how the economy will respond to a new tax policy.

Suppose we impose a tax on consumers of a certain commodity. Demand will shift down vertically by the amount of the tax. We then want to know how the industry will respond in the short run and in the long run. The starting point is A in both diagrams below. The tax causes the demand curve to shift down to D' in the diagram on the left. This gives us two prices as in our earlier analysis in Chapter 3. In the short run, the price the consumer pays increases to \( p_c \) and the price the firm gets to keep falls to \( p_f \). The difference between the two prices is the tax. Quantity falls from \( Q^* \) to \( Q^{**} \). How does the firm adjust? The price it gets to keep has fallen from \( p^* \) to \( p_f \). It wants to maximize profit. So it will lower its output to \( y^{**} \) in the short run to the point where \( p_f = SRMC \). Notice that it is losing money at \( p_f \) and \( y^{**} \) because \( p_f < SRAC \). Not all firms are identical. Technologies, the way the firms are organized, labor contracts, and so on may differ slightly across firms. So some firms may shutdown at the low price of \( p_f \). Some firms will...
still produce, however, and such a firm will move down its SRMC curve from A to B and this causes the industry to adjust moving down the short run industry supply curve, SRS, from A to B.

It would appear that **both firms and consumers share in the short run burden** of the tax. This was the extent of our analysis earlier in the course. However, notice that $p_f < AC$ so firms in this industry are losing money in the short run, i.e., they are earning below normal rates of return on their capital investment. This cannot be an equilibrium for such a firm. Since $\pi < 0$, some firms will exit the industry and some of the remaining firms will reduce their operations somewhat by shutting down some of their factories. This will cause their short run cost structure to shift to the left as they get smaller. As firms cut back, the SRS curve will shift back as depicted below. If unit costs, e.g., wage, are constant, and constant returns to scale prevails, then $p^*$ must be the new long run price once again. The SRS curve will shift back so that it intersects the after-tax demand curve at the initial price of $p^*$, point C in the diagram below. The representative firm will produce somewhere like $y^+$ where $p^* = SRMC = SRAC$, after the short run curves have shifted to the left, and the total output of the industry will be $Q^+$. However, the price the consumer pays must include the tax. So the consumer price rises to the new long run level $p_{LR}$. This means that the consumer will bear the full amount of the tax in the long run once the industry has adjusted to the tax! This happens because of constant costs and constant returns. Of course, as the industry adjusts, firms that drop out of the industry will also bear part of the burden as well.

To summarize, both firms and consumers will bear some of the burden of the tax in the short run. As the industry adjusts, some firms will drop out and the owners of such a firm will bear some of the burden since they are losing their business. Finally, in the long run after the adjustment has been completed, only consumers will bear the burden of the tax.

What is the intuition behind this result? Firms have to earn a normal rate of return or else they will exit the industry. This is true regardless of the taxes imposed on the private sector. If the industry is small relative to the rest of the economy, it will not affect the labor market or the capital market and so its unit costs like the wage rate or the interest rate will be fixed. In the short run, some firms will bear part of the burden of the tax, as will the consumers. Certainly firms that go out of business in the adjustment process are bearing part of the burden of the tax. However, once the industry has settled down again, the firms that survive the process have to earn a normal rate of return or else the entire industry will collapse and the good will not be produced. In a sense, the price on the long run industry supply curve, LRS, is a measure of the opportunity cost of the firm. If the firm can earn this price, it will stay in the industry. If price is higher, there are economic profits being made and resources will move into the industry. If price
is lower, as in the case of a tax imposed on the commodity, then some firms will exit the industry. Enough firms will leave so the remaining firms will earn a normal rate of return once again. This is why consumers will bear the full burden in the long run, namely, because the LRS curve is perfectly elastic.

Application: In 1990 the federal government imposed the now infamous luxury goods tax as part of the budget deal between President Bush and the Congress. This is where Bush broke his famous pledge not to raise taxes. Essentially, the tax was imposed on luxury goods like yachts, furs, expensive jewelry and sports cars. The government estimated the tax would raise a large amount of revenue, approximately $2b in the first year. However, the tax only raised about $200m and the yacht industry almost collapsed because no one wanted to buy a yacht. This caused an increase in unemployment as shipyards shut down. The tax was rescinded in 1993 after President Clinton took office.

9.8 Examples of Competition
Pizza Wars. During the 1980s the volume of pizza sold in the United States doubled. Price increased as a result and this attracted entry into the industry. There was tremendous competition for business. This entry led to a price war and some high cost producers dropped out of the market. By 1990, the market had settled down to what appeared to be an equilibrium. The following are the market shares in 1990: Pizza Hut 18.9%, Domino's Pizza 13.7%, and Little Caesar's 7.9%. The rest of the market is carved up amongst small, local, or regional producers. In the 1990s there have been several new entrants into the national market, Papa John's ("Better ingredients, better pizza.") and Papa Murphy's. The latter firm is especially notable for introducing "take and bake" pizza. (This reminds me of Cosmo Kramer's idea on "Seinfeld" to have people come to a sit-down restaurant and bake their own pizza.)

Cliff's Notes. In the early 1960s Cliff Hillegass got the idea of hiring English professors to write plot summaries for the classics, e.g., Moby Dick. He literally started his company in his basement. He would hire a professor and pay a fixed fee for writing a summary of, say, Hamlet. He then prints and photocopies the "Notes" and sells them to college bookstores and chain retailers like Waldenbooks and Barnes and Noble's. In 1990, his revenue was $10.9m and his production cost was $9m so his accounting profit was close to $2m. (The real question is: Has Cliff read any of the classics or just "Cliff's Notes?" Come to think of it, they're not really Cliff's own notes, but someone else's since apparently Cliff missed class that day.) Cliff eventually sold his company to a book publisher for an undisclosed amount. Clearly, Cliff was earning an economic profit. This has led to entry into the industry and competition. Monarch has started selling its version mostly on the East Coast. Second, some recent Harvard students got together and started marketing their own notes on some of the classics labeled "Sparknotes." Barnes and Noble started selling them in 2003. It will be interesting to see if this causes problems for Cliff's Notes.

Ballpoint pens. The Reynolds International Pen Co. started producing ballpoint pens in 1945. Their average cost of production was about $0.80 and the price they charged was $19.98. The ball pen was very popular because the only alternative, aside from pencils, was the fountain pen that had to be filled from a bottle. The fountain pen tended to leak and would occasionally blot up on the paper making a mess of your writing. By late 1945 there were several competitors selling ballpoint pens, e.g., Eversharp and Schaeffer, and a price war broke out. The price fell to $9.98 in 1946 with an AC = $0.30. In 1947 over one hundred firms were producing ball pens. By 1948 a price war had reduced the price to P = $0.39 and AC = $0.10. By 1990, BIC was the largest pen producer in the world. It charges a price close to its AC so the economic profit is virtually zero.
9.9 **Application: The automobile industry.**

In 1970 the United States was the world leader in automobile production. US consumers did buy imports, however, and Volkswagen exported the most cars to the US. The VW "bug" was particularly popular in the 1960s. In 1964 Chevrolet began selling the Corvair, a small compact car designed to compete with the VW "bug." The Corvair was not particularly well designed and was involved in a large number of fatal accidents. This led Ralph Nader to start a consumer watchdog group and to lobby the Congress to improve automobile safety. He wrote a famous book called, "Unsafe at any Speed," about the Corvair and its design problems. Eventually, Chevrolet stopped making the Corvair. It was replaced by other compact cars like the Vega.

In the mid 1960s Toyota, and Datsun, among others, began selling small cars in the US. Later, Honda would take a motorcycle engine, build a small car around it, call it the Civic, and start selling it in the US. The small car market got a big boost from OPEC in the 1970s. Because of tension in the Middle East, OPEC raised the price of oil fourfold in late 1973. At the time the MC per barrel of light Saudi crude was about 50¢ and the price per barrel was about $1.50. They raised the price per barrel to over $7 by mid 1974. This caused the recession of 1974 - 75 and increased the demand for fuel-efficient cars. OPEC raised the price of oil dramatically once again in 1979. However, war broke out between Iraq and Iran in 1980 and both countries started flooding the world market with oil in order to finance their war effort. The price dropped in 1986.

Consider the following diagram depicting the auto market circa 1975. Japanese car companies are more efficient at producing cars and so the SRS curve is lower at each quantity in Japan than for the US. In the middle diagram we have depicted GM's cost structure. A study in 1983 revealed that it took Toyota about 20 hours to build a car, whereas the average US car company took about 25-27 hours. This indicates the Japanese were more efficient. Before trade takes place the price of a car in Japan is lower than in the US. This reflects the higher productivity in Japan. If we allow trade to open up between Japan and the US, Toyota will ship cars to the US, since the price is higher there. The effective supply of cars for sale in Japan will shift back, while the effective supply of cars for sale in the US will shift out. Price will rise in Japan and fall in the US. What happens to GM? There is some indication that GM was only breaking even in the early 1980s and so we can model that as being at point A. When the price falls, a profit maximizer will move down the MC curve to point B. This is the best that can be done. But even so, GM is losing money, i.e., earning a negative economic profit. That is why the US car companies wanted to restrict Japanese imports in the 1980s and eventually why the Reagan Administration imposed the VER's, as we know from earlier in the course. Restricting imports would raise the price in the US by limiting supply.
Several studies in the early 1980s revealed that the difference in productivity was not due to capital investment. This means that GM could invest more and not necessarily become more efficient and thus lower its cost. The studies indicated several other reasons for the relative Japanese efficiency. They were:

1. Japanese car companies pay their workers end of the year bonuses that are tied to productivity. US workers do not generally receive pay tied to their productivity. Thus, Japanese workers have more of an incentive to work harder than American autoworkers do. This is a potential solution to the so-called "principal-agent" problem.

2. In Japan many of the cars and trucks are the same size, i.e., they have the same size chassis, for example. As another example, the doors might be of the same size for a large number of models. This makes it very easy for Toyota to change a production run from one type of car to another. In the US many of the cars and trucks are different sizes. This can make it more costly to produce a run of cars and then switch over to another type of vehicle.

3. Suppliers in Japan are organized in Keiretsu or interlocking companies that make some decisions as a group. One company is at the head and acts as leader. For example, Toyota is at the head of one of the largest and most powerful Keiretsu. The Keiretsu will include a car company, for example, a bank, a tire manufacturer, a number of smaller parts suppliers, and so on. Being a member of a particular group and maintaining the quality of your product becomes a measure of tremendous pride. Special arrangements can be worked out and profits are shared between members of the group. This can lower costs by reducing tension between suppliers and purchasers in the group.

4. The traditional method of producing, especially in heavy manufacturing, is to try to maintain an even production flow. Unfortunately, not all units of the good can be sold right away and an inventory has to be maintained. Maintaining an inventory can be very expensive. Instead, the Japanese use what is known as "just-in-time" inventory. If a producer is going to produce something at 9am Monday morning, the producer wants to take shipment of the parts needed just before production takes place. The parts supplier has to produce the parts on Friday and ship them to the producer "just in time" for production to take place on Monday morning. Imagine a chain of production where A supplies B and B supplies C. C wants to produce on Wednesday and must receive parts Tuesday, for example. This means that B must produce on Monday afternoon and want to receive parts from A on Monday morning. Firm A produces its output on Friday and ships it to firm B Monday morning. B can produce its output Monday afternoon and then ship to C so that C can produce on time Tuesday. No inventory is required. (So "just-in-time" inventory really means not having an inventory.)

However, workers have to become very efficient at setting up their machinery. Firm B might have a production run of one good one day and another type of good the next day. Workers at B have to become very efficient at readjusting their machinery to produce different parts. Japanese car workers can set up a new production run in 30 minutes moving heavy dyes and stamping machinery very quickly. In the US the same operation might take 4-6 hours. The trade off is between the costs of setting up the machinery versus the costs of an inventory.

US companies have responded by designing more cars and trucks to be of the same size and trying to create "just-in-time" inventory type relationships between its parts suppliers. Indeed, the new Saturn facility for GM can produce a car in about 21 hours so they were close to Toyota's level of efficiency in the early 1990s. However, one downside of "just-in-time" inventory occurs when a strike happens at a parts supplier. GM, for example, has had to close its own assembly plants several times throughout the 1990s and early 2000s because it could not get parts on time and had no inventory to fall back on. Also, companies in Tokyo are finding that when everyone tries to use "just-in-time" inventories the streets and highways become so
congested that deliveries are many times late. This can hold up production and is an added cost of the "Japanese style" of production.

9.10 "Constant costs" versus "constant returns to scale."

One item that tends to be confusing is the distinction between the constant cost case when an industry responds to a change in demand, for example, and constant returns to scale. "Constant returns to scale" refers to the effect of a change in all inputs on output for a single firm. If the technology used by the firm to produce its output exhibits constant returns to scale (CRS), then an equiproportionate increase in all inputs causes output to increase by the same proportion. For example, a doubling of all inputs, say, when the company builds and equips a second factory and hires a work force to operate the new plant, will lead to a doubling of output. "Constant costs" refers to the way the entire industry interacts with its input markets, e.g., the labor market. When the industry adjusts in the constant cost case, the change in its demand for inputs has no effect on the input markets. So, for example, when an industry expands by increasing its output, its demand for labor increases. However, in the constant cost case, this increase in demand for labor has no effect on the labor market and hence no effect on the wage rate because the industry is too small to affect the US labor market by itself.

When "costs are increasing," an expansion of the industry, say because demand for the industry's product has increased, causes an increase in demand for labor that raises the wage per worker, and the increase in the wage rate per worker causes the individual firm's cost structure to shift upward. Hence the term "increasing cost." The same is true for other inputs if the industry is large enough. So an expansion of the desktop computer industry in the 1980s led to an increase in the demand for computer programmers and engineers in the 1980s and this caused their salaries to increase. The increase in the average salary in turn caused an increase in the individual firm's cost structure. On the other hand, the cost structure will shift down if the industry contracts, say, because demand for its product has fallen. Why? Suppose demand for the industry's output falls. Firms cut back and lay off workers. This decrease in demand for labor lowers the wage per worker and this in turn lowers the cost structure of the firm in the "increasing cost" case. So in the "increasing cost" case, there is a positive correlation between unit input cost, like the wage, and industry output, i.e., corr(Q, w) > 0, where Q = industry output and w = wage. It follows from this that the long run supply curve of the industry is upward sloping in the "increasing cost case."

To see how this works, consider the case where CRS prevails for the individual firm so that LRAC = LRMC and the industry, e.g., the PC industry, is large relative to the labor market so "costs are increasing." Point A below represents the initial equilibrium because \( P_1 = SRMC = SRAC = LRAC = LRMC \). This is our starting point. An increase in demand for output causes firms to increase their production in the short run as they move up their SRMC curve from A to B. For the industry this leads to a move up the industry's SRS curve from A to B. Economic profits are being made at point B since \( P_2 > SRAC \). As firms adjust so as to capture more profit in the short run, incumbent firms start building more factories and hiring more workers and new firms enter the industry. This increase in demand for labor, and possibly other inputs, is large enough to cause the wage to rise. The increase in the wage rate and other input prices leads to an increase in the firm's cost structure to LRMC', LRAC', SRMC', and SRAC'. When the industry finally settles down again and all adjustments are complete, the final resting point or equilibrium point will be like point C where \( P_3 = SRAC' = SRMC' = LRAC' = LRMC' \). As new capital flows into the industry, the short run industry supply curve shifts out to SRS'. However, in the increasing cost case, the shift in the SRS is not as large as in the constant cost case because
"costs are increasing." Connecting points A and C we obtain the LRS curve of the industry in the diagram on the left.

What will happen if demand for the industry's output falls? Firms will cut back and lay off workers. This reduces the demand for labor and puts downward pressure on the wage rate. As the wage falls, the individual firm's cost structure shifts down. Surviving firms will set price equal to \( \text{LRMC}' = \text{LRAC}' = \text{SRMC}' = \text{SRAC}' < \text{LRMC} = \text{LRAC} = \text{SRMC} = \text{SRAC} \) since costs have shifted down. (The double prime cost curves are not depicted for simplicity.)

In the "decreasing costs" case, an increase in industry output, which raises the demand for inputs, lowers unit costs like the wage. Since this case seems somewhat unlikely we won't study it further.

### 9.11 Application: EPA Regulations

In the late 1960s significant evidence began to mount that industrial waste was becoming a serious problem worldwide. For example, in the 1940s and 1950s Japan dumped a broad variety of chemicals into lakes and streams and a variety of birth defects could be traced to ingesting fish contaminated with mercury, in particular. Poignant photographs including one of a woman bathing her deformed and mentally retarded daughter shocked the world. Similar problems were discovered in the US and Europe, e.g. lead based paint, acid rain, leaded gasoline, and various industrial pollutants including heavy metals.

The Environmental Protection Agency (EPA) was set up in 1970 under the auspices of the Environmental Protection Act during the Nixon Administration to write and enforce rules and regulations governing the emission of effluents into the air and water. These regulations can be very costly for business to comply with. Indeed, an absolute standard was set without reference to the benefits and costs of protecting the environment. Protecting the environment was deemed so important that the costs could be ignored. Yet, the costs can be substantial and must be paid by someone. This raises the issue of who bears the burden of protecting the environment.

Consider imposing additional regulations on an industry. For example, waste water has to be treated before it can be dumped into a river, or smoke stack emissions have to be sent into a "scrubber" which filters the air before it leaves the smokestack. This raises the cost structure of the firm. Most likely it will shift up and to the left. In the long run firms will move from point A to point B. As firms in the industry contract, the SRS curve shifts back. The end result is a new equilibrium position at point B in both diagrams. Some firms that cannot adapt will exit the industry. Ultimately, this type of regulation will raise the final selling price of the good.
Who bears the burden of the regulations? Firms that incur greater costs will experience lower profitability. Some firms will exit the industry altogether. Workers will be laid off as firms contract. And finally, consumers will pay higher prices in the market place. All three will bear some of the burden of the regulations.

What happens if most firms in the economy incur these additional costs? Most prices will increase and this will put upward pressure on the inflation rate. Indeed, some cite this as a source of the low growth problem that started in the early 1970s. If a lot of firms have to comply with new regulations and everyone is laying workers off, higher unemployment and lower productivity is an unintended consequence. So the high inflation, low productivity, and high unemployment we experienced in the 1970s may be in part a consequence of the greater regulation of the economy during that decade.

Since then, many firms have innovated in order to get their costs down and have begun using "clean" technologies that are more fuel-efficient and less polluting. However, many problems still remain; the global warming problem due to burning fossil fuels, the acid rain problem, and toxic waste dumping in the oceans, still need to be addressed. Dealing with these issues does not come free of charge. Just because a regulation is not a tax does not mean that there isn't a cost associated with it. Indeed, the higher prices we pay for all goods is the general "cost" of a cleaner environment.

**Application:** The EPA issued regulations on fuel efficiency in an effort to reduce air pollution from automobiles. Each car company had to meet a certain standard for miles per gallon averaged across their entire fleet. Large cars are below the standard while smaller, more fuel efficient cars are above the standard. The more small cars a company produces, the better the average gas mileage of its entire fleet. Interestingly enough, SUV's are classified as trucks and, therefore, do not have to meet the same stringent fuel efficiency requirements as cars even though they probably cause more air pollution!

**Application:** Many poor countries like Indonesia, Thailand, and especially India and China, are in the process of industrializing. The pollution levels in some of these countries have increased dramatically in the 1990s. Is a "clean" environment a normal good?

### 9.12 Sports Markets

The sports industry is booming worldwide. There is greater interest now than ever before in sports activities like soccer, basketball, tennis, baseball, American style football, hockey, golf, and competition in international sporting events like the Olympics. Sports activities appear to be a normal good. As income increases, demand increases. In fact, the income elasticity might even

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1 The following details come from *Sports Economics* by Rod Fort.
be greater than one. In many countries demand for sports activities is increasing faster than income.

Sports are big business as a result of the strong increase in demand over the years. A league may control most of the important aspects of a sport. For example, the owner of a franchise cannot simply move his team to another city to take advantage of a better situation. This is very similar to other franchise operations. The owner of a Burger King, or a McDonald’s, or a Wendy’s, or an Ace Hardware, cannot relocate their operation to get a better location. The Oakland Raiders football team created quite a stir when they wanted to relocate to southern California, a more lucrative television market. The courts got involved and Al Davis, the managing partner, was allowed to move the team in 1982. It won its third Super Bowl in LA, but did not do well after that. Eventually, Davis moved the team back to Oakland in 1995.

Sometimes a franchise is allowed to move to improve competition in the league. For example, the Utah Jazz did not start out in Utah but New Orleans. The LA Lakers started out in Minnesota, a place where there really are a large number of lakes, unlike southern California. And the Minnesota Twins started out as the Washington Senators, who were one of the founding members of the American League in 1901. The owner of the Senators was allowed to move his team to Minnesota in 1961 and Washington DC was granted a new franchise that was very creatively called the "Senators." They were so bad, however, that eventually they were moved to Texas and became the Rangers in 1972. Since 2005 the team in DC is called the Nationals, or "Nats" for short, having been the Montreal Expos originally. Initially, they performed as dismally as they did when they were the Expos, but not as dismally as Congress until 2012 when they went to the playoffs.

Ticket sales will be higher for a team that is winning. This is also similar to any other commodity. A good, well-made and designed product will also command high demand. For example, a Toyota Rav 4 will command a better price and have greater demand than say a similar GM product since it is perceived as having better quality. Similarly, the Yankees will command a premium over other less successful teams.

Teams can charge a price of admission in a manner that is similar to a movie theater owner. They can price discriminate by charging seniors or children a lower price than adults. They can't charge too high an admission price, however, since there are other alternatives to sports activities like going to movies, concerts, the opera, the zoo, or just staying home and watching television. And like a theater they can charge high prices for concessions.

On the other hand, there are characteristics of sports markets that are very unusual. For example, a player can be traded from one team to another team. Can you imagine GM trading a design engineer to Ford Motor Co. for a purchasing manager and a supervisor to be named later? Trading labor across firms is very unusual. In addition, many athletes sign contracts that contain bonuses for performance like merit pay. This is unusual, but not unheard of in some industries, e.g., finance.

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2 There are exceptions. Disney started revamping the character of its most famous cartoon personality, Mickey Mouse, in 2009. The company designed a video game called "Epic Mickey" to showcase the new Mickey, a more impish version of the old Mickey. The game included old and abandoned characters including one rabbit named "Oswald," who was a prototype of Mickey designed in 1927. Copyright problems with Universal Studios at the time caused them to drop Oswald and this led to the development of Mickey. Now Disney wants to resurrect Oswald for the game. So they literally traded their rights to Al Michaels, the sportscaster, through their affiliate ESPN, to NBC Universal for the rights to Oswald in a straight up deal.
Another unusual feature of many sports markets is the importance of television and the revenue it can generate for a team. Obviously, there are some markets that are more lucrative than others. New York, LA, and Chicago are the top three television markets for sports in the US, and Kansas City, Cleveland, and Minnesota are near the bottom.

One strong argument for the success of a sport is that if all the teams appear to be competitive, then the sport will thrive. Fans are more likely to support their team if they are competitive but may not if the team is not competitive. If the same one or two teams dominate every year, fans may lose interest. So maintaining competition among teams in a league, sometimes called parity, is an important goal for a league to pursue. Some argue that the government should also pursue parity in other industries. This is one justification for using anti-trust laws to ensure competition.

We can combine the ideas of television and parity to argue that some mechanism may be required to ensure fairness and maintain interest in a sport. It is more likely that a team will dominate if it is in a lucrative television market since it will be able to buy better players and coaches. So some form of revenue sharing arrangement is often allowed to create parity within a league.

This can raise issues involving anti-trust. Typically, one company is not forced to share its revenue with another. American Airlines is not forced to share its cash flow with United, for example. Parity is not a goal that is pursued by the Justice Department in autos, movies, steel, dishwasher soap, electronics, watches, laundry detergent, and most other goods, unless it is clear that one firm is becoming dominant in an industry, e.g., Microsoft, Google, Apple. Sports markets are unique in this regard. Indeed, a sports league attempts to rig the market to create competitiveness with revenue sharing arrangements, player trading, and so on. In fact, in many countries sports are exempt from anti-trust laws.

There are significant monopoly elements, however, in sports markets. A local team will have a strong, loyal fan base. It can, within limits, exploit that base as any monopolist would charging high ticket prices (whatever fans are willing to put up with) and high prices for concessions. A fan is literally a captive audience at a ballpark watching their favorite team, much like a movie goer watching a movie in a theater. In some sports teams will sign players when they are very young to exclusive contracts for a number of years. In a very real sense, once the contract is signed, the team becomes a monopsonist, the only buyer of the player's services. American baseball is a case in point. Prior to free agency, players signed exclusive contracts with a team. The team brought the player along through its "farm" system, AA ball, AAA ball, and eventually if the player was good enough, up to "the show," the major league. In exchange for all this training, the team had exclusive rights to the player's services. It had the right to trade the player even without the player's consent. In the 1970s several players challenged this and eventually the courts ruled in the players' favor creating the free agency system we have now.

Another aspect of sports markets is that the teams have to play somewhere. Stadia can be very expensive and naturally teams don't want to pay for them. Instead, a team may hold a city hostage using a threat strategy to get the city to provide a new stadium. Many times this will work, e.g., Seattle Mariners. Sometimes it doesn't. The city of Baltimore did not meet the demands of the Colts so the owners moved the team to Indianapolis. Imagine what would happen if Walmart, one of the largest employers in the country, tried the same strategy. That sounds fanciful but it has worked for some large manufacturers. When GM announced it would create a new division in the 1990s called Saturn, it took bids from a large number of cities and states all wanting GM to locate the plant in their city or state. GM eventually chose Tennessee. It's the same with a sports franchise. Studies indicate that the economic benefits of a stadium are very
limited, however. One study concluded that a good sized upscale shopping mall will generate more revenue and more jobs over the entire year than a stadium.

A league can limit competition by limiting new entry into the league. This has the effect of keeping ticket prices high and creating economic profits. Sometimes expansion is allowed. Major League Baseball has expanded several times in its history, notably in 1969, when it added the Montreal Expos, the Seattle Pilots, the San Diego Padres, and the Kansas City Royals. Limiting entry into the league is very similar to the AMA using medical school enrollments to control the flow of doctors into the medical profession. The goal is to keep prices high and create economic profits.

Occasionally, another league is started and can compete with the established league. Economic profits earned in the established league will generate entry just like in other industries. The AFL, for example, was created in 1960 to compete with the NFL. Interest in football was so great that the new league was able to compete and eventually was merged with the older league. Of course, when a new league competes with the established league, profits of the old league will fall. Merging the leagues will reduce competition and create economic profits once again. Once the leagues merge, there is less competition in price and profits build up again. Of course, new leagues don't always compete effectively. The World Football League couldn't compete with the NFL. (Although, it may have changed the course of several teams. The Miami Dolphins won back to back Super Bowls in '72 and '73, completing a perfect season winning all its games in '72. Three of its best players, Larry Csonka, Jim Kiick, and Paul Warfield, jumped leagues to the WFL. The Dolphins struggled for a number of years after that allowing the Pittsburgh Steelers and the Oakland Raiders to dominate for the rest of the 1970s. Eventually, the WFL collapsed.)

For a specific team we can ask: what are the variable inputs and what are the fixed inputs in the short run? Surprisingly, most of the inputs are fixed in the short run of a single season. These include the roster of players and coaches under contract, payments on the stadium, loans, insurance, and any other front office people under contract. The variable inputs are scouting, player development, and the so-called stadium experience, which may include fireworks displays, huge video monitors, fancy scoreboards, live music, and mascots. Firm data is usually kept secret. However, one recent estimate for the Mariners was that 76% of its costs were fixed costs. This is because over 50% of its costs were player salaries.

What do leagues do? The league provides organization and general rules that have to be followed in order to be a member of the league. In a sense, the league provides a standard under which the output of the league is produced. A standard is a basic organizing principle. Examples include the special QWERTY keyboard on a typewriter and now a computer keyboard, driving on the right hand side of the road as in the US, or the left side as in the UK, a common language used in a country, a common currency, and a computer operating system like Unix. If everyone adheres to the standard, there is greater efficiency in the system. Imagine what would happen if there wasn't a standard for driving your car.

More specifically, there are several important things a league does. Remember, the team owners run the league. So it is not surprising the league will take actions that are in the interest of the owners. First, a league will set the schedule of when teams play, which team plays against which other team, how many times they play, the length of the season, the structure of playoffs, imposes the rules to be followed in a game, and sets the structure of the team organization. Each team wants to draw the most fans but they also want to minimize travel costs. For example, setting up regional divisions may achieve both goals. It may also create rivalries that are popular among fans. The Bears and Packers, and the Red Sox and Yankees, are examples. The league chooses the rules of play and this can evolve over time. For example, in the 1880s it took 8 balls to walk a hitter in baseball and five strikes to strike him out. The mound was moved back to 60.5
feet from home plate in the 1890s. The lively ball was introduced in 1920 and made Babe Ruth a home run star with the Yankees, much to the chagrin of the Red Sox who sold his contract to the Yankees earlier. The strike zone was reduced in size in the 1950s, increased in the early 1960s, and reduced again in 1969. The mound was also lowered in 1969 to give hitters an advantage, score more runs, and make the game more exciting. And the designated hitter was added in the American League in the early 1970s.

The league must also decide where the teams will be located and the parity of competition. There are a variety of dimensions to the location choice. Teams need to be spread out so as not to saturate a particular local market. However, they need to cover enough cities to guard against a new league forming. Major League Baseball was slow to move west of the Mississippi in the late 1940s and early 1950s. The Pacific Coast League was very successful at the time and had teams in San Francisco, LA, San Diego, Hollywood, Sacramento, Portland, Seattle, and Vancouver, BC. They were so popular they even considered becoming a third major league. The Celler Commission, looking into Major League Baseball's (MLB) exemption from anti-trust laws, forced MLB to come up with an expansion plan. MLB put forth a plan involving a minimum attendance level, but none of the Pac Coast teams could meet it. Then in 1957 the Giants and Dodgers moved to California and many of the fans deserted the Pac Coast league and the league basically collapsed. Some of the teams shifted cities and eventually became farm teams for MLB in Phoenix, Salt Lake City, and Spokane. MLB and the NFL have each faced seven new leagues over the course of their history and survived through partial mergers or a collapse of the rival league.

9.13 Conclusion
A competitive market is one in which none of the market participants have any market power. The good produced is homogeneous, information flows quickly through the market, and there is a large number of participants. Such a model characterizes a broad variety of real markets. In addition, the model of a competitive market also serves as a useful benchmark when studying other cases. We studied how such a market adjusted to an increase or decrease in demand. A key distinction is between the short run, where some decisions are fixed and where the firm may decide to shut down temporarily, and the long run, where the firm can decide to go out of business. Resources always flow toward sectors of the economy experiencing positive economic profits and away from sectors earning negative economic profits. A number of applications were studied including tax incidence, environmental regulations, and international competition. We also looked at sports markets in detail. Such markets have things in common with other markets, e.g., pricing, but also have other things that differ dramatically from other markets, e.g., trading players, sharing revenue, limited entry controlled by the league.

**Important Concepts**
- Profit Maximization
  - Maximizing rule: choose output where \( p = MC \).
- Economic profit
- Opportunity cost
- Industry equilibrium
- Short run shutdown decision
- Short run industry supply curve
- Constant costs case
- Increasing costs case
Economies of scale
Examples: EPA regulations, grocery stores, Asian crisis.

**Review Questions**
1. What are the key assumptions of a "competitive" market?
2. How does the firm go about choosing its output level? What output level maximizes profit?
3. What is meant by profit? What is an opportunity cost?
4. When is an industry in economic equilibrium? What must be true about the representative firm in the industry if it is in equilibrium with the other firms?
5. What is the short run shutdown decision?
6. Describe the "constant costs" case.
7. Describe the "increasing costs" case.

**Practice Questions**
1. Suppose the following data is true for firm X who faces a U-shaped cost structure and maximizes profit: \( P = $11.95, \text{AVC} = $7.95, \text{AFC} = $4 \). What would happen in the short run if a new firm entered the market and began charging \( P = $10.95 \)?
   a. Firm X will go bankrupt.
   b. Firm X should shut down.
   c. Firm X should continue to produce the same output level as before.
   d. Firm X should continue to produce but should cut its output.

2. Given the information of the last question, suppose new firms continue to enter so the new price of \( P = $6 \) is established in the short run. What should firm X do?
   a. Firm X will go bankrupt.
   b. Firm X should shut down.
   c. Firm X should continue to produce the same output level as before.
   d. Firm X should continue to produce but should cut its output.

3. Suppose \( P = $6 \) is the new long run price. What should firm X do?
   a. Firm X will go bankrupt.
   b. Firm X should shut down.
   c. Firm X should continue to produce the same output level as before.
   d. Firm X should continue to produce but should cut its output.

4. Why do firms under perfect competition take price as given?
   a. They don't; they can choose price to maximize profit.
   b. Their product is differentiated.
   c. They are the only producers of their product.
   d. Their product is not differentiated.

5. How many firms does it take to make an industry competitive?
   b. More than 10.
   c. More than 100.
   d. Hard to say.
Answers
1. d, (Recall, its cost curves are U-shaped and it maximizes profit.)
2. b.
3. a.
4. d.
5. d.