PRINCIPLES OF MICROECONOMICS

A. Competition

The basic motivation to produce in a market economy is the expectation of income, which will generate profits.

- The returns to the efforts of a business - the difference between its total revenues and its total costs - are profits. Thus, questions of revenues and costs are key in an analysis of the profit motive.
- Other motivations include nonprofit incentives such as social status, the need to feel important, the desire for recognition, and the retaining of one's job.

Economists' calculations of profits are different from those used by businesses in their accounting systems.

Economic profit = total revenue - total economic cost
- Total economic cost includes the value of all inputs used in production.
- Normal profit is an economic cost since it occurs when economic profit is zero. It represents the opportunity cost of labor and capital contributed to the production process by the producer.
- Accounting profits are computed only on the basis of explicit costs, including labor and capital. Since they do not take "normal profits" into consideration, they overstate true profits.

Economic profits reward entrepreneurship. They are a payment to discovering new and better methods of production, taking above-average risks, and producing something that society desires. The ability of each firm to generate profits is limited by the structure of the industry in which the firm is engaged.

The firms in a competitive market are **price takers**.
- None has any **market power** - the ability to control the market price of the product it sells.
- A firm's individual supply curve is a very small - and inconsequential - part of market supply.

Market Demand Curves vs. Firm Demand Curves
- By the law of demand, the market demand curve is always downward-sloping.
- The demand curve confronting a perfectly competitive firm is horizontal.

<u>Production Decision of a Competitive Firm</u>

A competitive firm has only one decision - how much to produce.
- Maximizing output is not a guarantee of maximizing profits.
- More output means greater total revenue, but revenue maximization is not profit maximization.
- To maximize profit, a firm must consider economic cost, as well as revenue.

Output and Costs
- **Fixed costs** are costs of production that do not change when the rate of output is altered. Fixed costs exist only in the **short run**.
- **Variable costs** are costs of production that change when the rate of output is altered.
- **Marginal costs** (MC) are the increase in total costs associated with a one-unit increase in production.

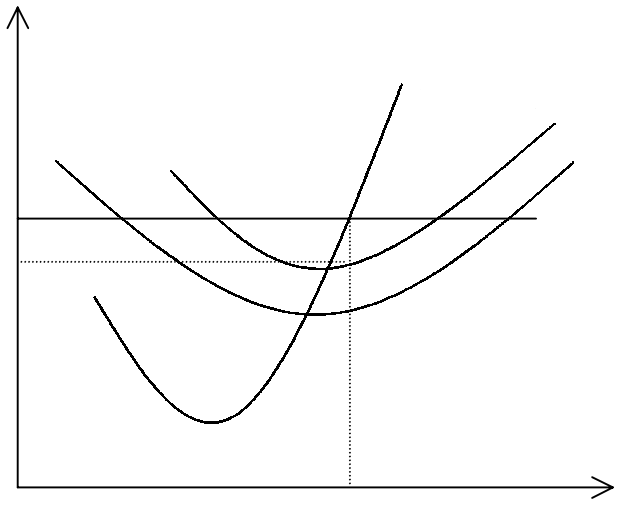
Firms can maximize profit by following a simple guideline: Never produce anything that costs more than it brings in. In economics, this **profit-maximization rule** is achieved at the output at which

Marginal revenue (MR) = marginal cost (MC)

Marginal revenue is the change in total revenue that occurs when the rate of output is increased by one unit:

- When the firm's demand curve is flat, as in a competitive market, marginal revenue remains constant and equal to the demand curve (horizontal demand curve). Profit maximization occurs where price = MC (see Figure 4)
- With market power and a downward-sloping demand curve, the marginal revenue falls below the demand curve.

Figure 4 Competitive Firm



Shutdown Decision

The rule for short-run profit maximization speaks only of marginal costs and revenues. While a firm can do nothing about its fixed costs in short-run decisions (by definition), it stops production if its revenues do not cover the costs that it can control (variable costs).

So long as price is greater than average variable costs (AVC), yet less than average total costs (ATC), the firm will minimize losses by continuing to operate rather than shutting down. When price falls below average variable costs (AVC) at any rate of output, production should cease. A lower price will result in losses that are larger than fixed costs. In Figure 4, the intersection of MC and AVC represents the shutdown point.

While shutdown decisions are basically short-run responses, decisions to invest in additional capacity are long-run decisions. In the long run, all costs are variable and a firm exits if it does not cover all these costs.

Short-Run Supply Curve

- The short-run supply curve for the competitive firm is its marginal cost curve.
- The law of supply is consistent with the upward-sloping marginal cost curve.

- A change in price causes a movement along a supply curve.

All factors that affect costs are determinants of supply:
- The price of factor inputs.
- Technology.
- Expectations (of sellers).
- Taxes.

Effects of Taxes

Local government **property taxes** are a fixed cost for a firm. They shift the ATC upward, which affects investment decisions, but they do not affect the production decision in the short run. They do, however, reduce profits and bring the firm closer to the shutdown point.

Payroll taxes increase marginal costs, which changes both the production and investment decisions. A firm responds by reducing both output and employment.

Profit taxes are neither a fixed nor a variable cost, but are computed after the profit-maximizing choice has been made. The profit-maximizing choice will be the same with or without the profit tax and therefore leave output and price unchanged. Profit taxes reduce the rewards of running a business and as such may alter investment decisions.

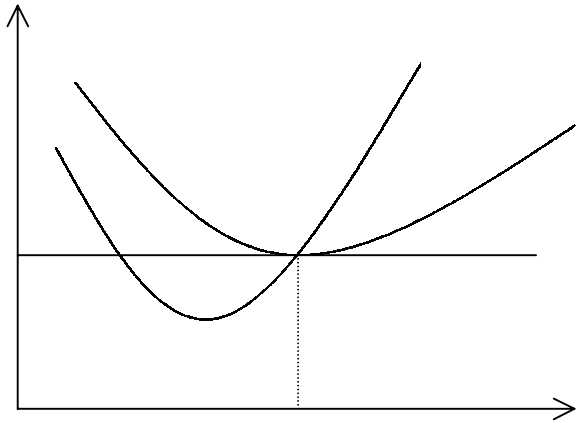
Market Supply

Market supply and market demand interact to determine the equilibrium price. The **market supply curve** is the sum of marginal cost curves (above minimum AVC) of all the firms. The market supply of a competitive industry is determined by the number of firms in the industry in addition to all the factors that determine the individual firm's supply. If the number of firms in an industry increases (**free entry**), the market supply curve will shift to the right and drive down prices, *ceteris paribus*. An increase in the number of firms results from investment decisions. If prices fall too far, entry will cease and some firms will leave (exit) the industry. This causes the market supply curve to shift to the left.

In the competitive market, entry of more and more firms into the market will push prices down until economic profits disappear. *The long-run tendency in any competitive market will be for profits to tend to zero* (see Figure 5). New producers will be able to enter a profitable industry and help drive down prices and profits as long as they do not encounter significant barriers. **Barriers to entry** may include the following:
- Long-established consumer acceptance.
- Patents.
- Control of essential factors of production.
- Various forms of price control.

Such barriers make it expensive, risky, or impossible for new firms to enter into an industry. Firms already entrenched in a profitable industry do their best to keep newcomers out by erecting barriers to entry. In a competitive market, these barriers are low.

Figure 5 Long-run Equilibrium in A Competitive Market



Reflections on the Competitive Process

The relentless profit squeeze. The most distinctive thing about competitive markets is the persistent pressure they exert on prices and profits.

The social value of losses. Economic losses are a signal to producers that they are not using society's scarce resources in the best way.

Competitive efficiency. Competitive firms seek to keep ahead of the game by producing a mix of output consumers desire with the most efficient combination of resources. The market composed of a very large number of these firms will maximize consumer welfare. There are two specific dimensions of competitive efficiency.

1. Minimum Average Cost of Production

Competitive pressures squeeze profit margins, and prices are driven down to the minimum average cost of production. This means that society is devoting only the minimum amount of resources necessary to produce products.

2. Marginal Cost Pricing

In competitive markets at the equilibrium level of output, market price equals marginal cost as well as minimum average total cost. The amount consumers are willing to pay for a good (its price) equals its opportunity cost (marginal cost).

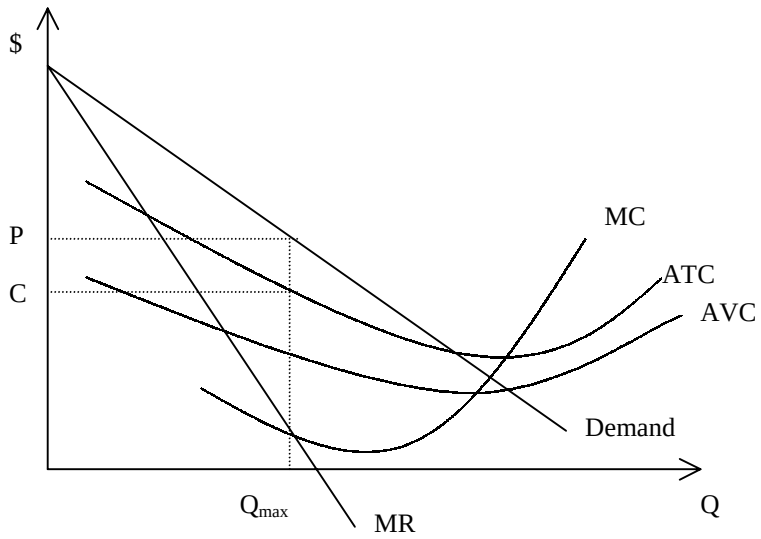
B. Monopoly

Market power is the ability to alter the price of a product. *Firms with market power face a downward-sloping demand curve*. The price elasticity of demand is not infinite, as it would be in competition. For a **monopoly**, the demand curve for the firm and for the market are identical. The monopoly firm possesses complete market power. As the only firm producing the entire supply of a product, it controls the entire supply and, therefore, the market price of the product.

A monopolist, like all other firms, seeks to maximize profits. For the competitive firm, this is possible by producing at the point where marginal cost equals price. Price is equal to marginal revenue. Since the monopolist faces a downward-sloping demand curve, *the profit-maximizing rate of output is that where marginal cost equals marginal revenue. And for a monopolist, marginal revenue is always less than price because of the downward-sloping demand curve*. The extra curve - the marginal revenue curve - is

the most obvious and immediate consequence of market power (see Figure 6).

Figure 6 Profit Maximization under Monopoly



There is only one price which is compatible with profit maximization - the price on the demand curve directly above the point of intersection of MC and MR. The monopoly will not use marginal cost pricing.

Because marginal revenue is always less than price for a noncompetitive firm, *the monopolist will produce less output than a competitive industry* confronting the same market demand and cost structure. A monopolist gains larger profits than are generated in a competitive market by reducing quantity supplied and pushing prices up.

Higher profits attained by a monopolist will attract envious entrepreneurs to the market. Market power and its related profits can be maintained only if barriers to entry prevent other firms from entering and expanding market supply. Patents are one form of barrier to entry that protect the monopolist's position. Barriers to entry prevent firms from making the investment decision to enter.

There are some limits to the market power monopolists hold. They must live with a market demand curve. They have no control over demand for their product, only supply. To the extent a monopolist can separate the market for its product into different segments and charge different prices in different segments - **price discrimination** - the monopolist can increase total profits.

Pros and Cons of Market Power

Despite the strong case that can be made against market power, it is possible that it can also yield some benefits to society. There are four areas in which market power might be tolerated by society.

- *Research and Development.* The argument is that monopolies are sheltered from the constant pressure of competition and so can spend some of their profits on expensive research and development to protect themselves from potential competition.

- *Entrepreneurial Incentives.* The argument is that the prospect of monopoly profits acts as a tremendous incentive for entrepreneurial activity.

- *Economies of Scale.* The argument is that the large firm can produce goods at a lower *average total cost (ATC)* than the small firm. Large firms expand society's production possibilities. These occur in industries where one large firm can produce the entire market's output more efficiently than any number of smaller firms combined. Local telephone and utility services are classic examples of this type of **natural monopoly**.

- *Contestable Markets.* The argument is that potential competitors look carefully at the monopolist's profits and if they are sufficiently large, the competitors will enter the market to get their share. This potential competition restrains monopoly profits and conditions the monopolist to act more like a competitive firm. From this point of view, ***market structure*** *is not the problem with monopolies. It is* ***market behavior***. If potential competitors force a monopolist to behave like a competitive firm, then monopoly imposes no cost on consumers or society.

A Comparative Perspective on Market Power

Competitive Industry	Monopoly
• High prices and profits signal demand for more output.	• High prices and profits signal demand for more output.
• High profits attract new suppliers.	• Barriers to entry prevent entry.
• Production and supplies expand.	• Production and supplies are constrained.
• Prices slide down the market demand curve.	• Prices don't move down the market demand curve.
• New equilibrium and economic profits approach zero.	• No new equilibrium is set and profits are maximized.
• Price equals marginal cost throughout the process.	• Price is always greater than marginal cost.
• There is continuous pressure to keep ahead of the profit squeeze by reducing costs and raising quality.	• There is no squeeze on profits and thus no pressure to reduce costs or raise quality.

Regulating Monopolies

Since monopolies may have adverse effects on prices, output, technological advance, and the distribution of income, governments have been empowered to prevent or regulate concentrations of market power. A number of significant pieces of legislation have been enacted to facilitate such regulation.

- The Sherman Act (1890) prohibits "conspiracies in restraint of trade."
- The Clayton Act (1914) prohibits price discrimination, exclusive dealing agreements, certain types of mergers, and interlocking boards of directors.
- The Federal Trade Commission Act (1914) provides for the agency which studies industry structure and behavior in order to be able to identify anticompetitive practices.

C. Imperfect Competition

There is a continuum from perfect competition, through **monopolistic competition**, **oligopoly**, and monopoly.

- Perfect competition means no buyer or seller of a particular product has any direct influence on the market price of a good.
- In monopolistic competition there are many firms supplying the market, but customer loyalty gives them some flexibility in raising prices without losing all their buyers.

- Oligopoly consists of only a few firms which have interdependent behavior and substantial market power.
- Monopoly indicates that one firm controls the market.

Market power is derived from certain characteristics of market structure.
- The number of producers in the market: the smaller the number of firms, the greater the market power.
- Their relative size, as distinct from absolute size: bigness is not sufficient to give a firm market power. Big corporations do not necessarily have market power.
- The extent of barriers to entry: a contestable market is not possible when barriers to entry exclude potential competitors.
- The availability of substitute products: the more substitutes available, the less market power a firm will have.

Most observers use just one yardstick to measure the extent of power in an industry.
- **Market share** measures the proportion of a market which is contributed by a single firm. A firm with very large market share has market power, but we need to focus on more than just one firm.
- The **concentration ratio** is a measure of relative size: the proportion of total industry output produced by the largest firms. It is the sum of the market shares of the top (usually four) firms.
- The **Herfindahl-Hirshman Index** (HHI) is the sum of the squared market shares of the firms.
- **Firm size**: even if a firm is very large, it may have only a small part of the market or there may be many potential entrants. Market power is not necessarily associated with firm size.

<u>Oligopoly Behavior</u>

Oligopolists seek to exercise their power for the primary purpose of attaining greater market share and ultimately for increasing profits. Barriers to entry determine the oligopolists' ability to maintain above-normal profits over the long run. Each oligopolist can increase sales through reduced prices or through **nonprice competition**.
- Increased Sales through reduced prices. If there were no difference, either perceived or real, in the product of all firms in the market, a pure oligopoly would exist and the firm which lowered its price, *ceteris paribus,* would capture the entire market.
- Increased Sales through nonprice competition (while holding prices constant). Greater advertising helps to achieve greater **product differentiation** and sales.

As a firm succeeds in gaining market share through price reductions or nonprice competition, the other oligopolists retaliate to avoid loss of market shares.
- An attempt by one oligopolist to increase its market share by cutting prices will lead to a general reduction in the market price. It will become less profitable for all as prices slide down the market demand curve.
- The success of nonprice competition by one firm will force all the other firms to make the necessary outlays to embark on nonprice competition of their own - again reducing profit for the oligopoly as a whole.

The degree to which sales increase when the price is reduced depends on the response of rival oligopolists. We expect rival oligopolists to match any price reductions. Rival oligopolists may not match price increases. *The demand curve will be kinked if rival oligopolists match price reductions but not price increases.*

Oligopoly vs. Competition

Oligopolists in a market are interdependent. Their degree of cooperation determines industry profitability. However, coordination is difficult because each oligopolist finds an inherent conflict between joint goals (maximizing industry profit) and individual goals (maximizing the firm's share of industry profit). An oligopoly can be a shared monopoly if firms cooperate to maximize total industry profit; however:

- It is difficult to find a way to distribute the profits among the oligopolists.
- Firms may not be able to coordinate legally to maintain the price and output to achieve the monopoly profit.

Oligopolies create the potential for gamesmanship. The potential cost of experimentation is high and the rewards they receive for coexistence are the oligopoly profits that they continue to share. Higher than normal profits and the threat of mutual destruction, leads oligopolists to limit their price rivalry.

The kinked oligopoly demand curve consists of two demand curves - each with its own marginal revenue curve.

- At the point where the two demand curves intersect, there is a gap in the oligopolist's marginal revenue curve (see Figure 7).
- Firms in the kinked-demand-curve oligopoly maximize profit as all firms do, with the *profit-maximization rule*: MC = MR.
- If the marginal cost curve shifts in the gap between the two marginal revenue curves of the oligopolistic firm, the oligopolist will not change output.

To achieve monopoly-level profits by restricting industry output requires mutual agreement and coordination among the oligopolists. The most explicit form of coordination is called **price fixing**. **Price leadership** results when all the firms in a market follow the price changes of a single firm. It allows firms to coordinate their pricing decisions. The oligopolists may also engage in an explicit agreement on dividing up the market. When firms are totally incapable of coordinating with each other, their unwillingness to coordinate may result in a war of price reductions. Such a war drives out competitors, prevents new competition from entering the market, and reestablishes market shares.

High profits will attract the envy of would-be entrants. Barriers to entry must be erected to keep out rivals and maintain above-normal profits.

- *Patents* endow the holder with exclusive use of specific technology for 17 years.
- *Control of distribution outlets* is also used. Nearly all new cars in the U.S. are sold through dealerships franchised by car manufacturers.
- *Mergers and acquisitions.* Large and powerful firms can also limit competition by outright acquisition.
- *Government Regulation.* Patents are issued and enforced by the federal government. Barriers to international trade are another type of government-imposed barrier to entry.
- Producers who have control over market supply can also enhance their power and income further by influencing market demand through *advertising*.
- To switch to a new product may entail significant cost, including the *retraining* of user staff. Would-be competitors will find it difficult to sell their products even if they offer better quality and lower prices.

Antitrust Guidelines

Market power contribute to market failure when it leads to resource misallocations (restricted output) or greater inequity (monopoly profits, higher prices). The existing antitrust laws explicitly forbid most anticompetitive practices. However:

- "Trust-busters" have difficulty catching colluding executives in the act.
- The charge of explicit collusion is hard to prove.
- The U.S. Supreme Court recognized that consumers may suffer from tacit collusion even where no explicit collusion is proved or occurs.

There is considerable objection to antitrust laws. Some see them as punishment of successful firms. They claim that noncompetitive behavior rather than industry structure should be the focus of antitrust.

In 1982, the Antitrust Division of USDOJ adopted specific guidelines for intervention based on industry structure alone by relying on the HHI:

- Any merger that creates an HHI value over 1,800 will be challenged by the Justice Department.
- For an HHI value between 1,000 and 1,800, DOJ will challenge any merger that increases the HHI by 100 points or more.
- Mergers and acquisitions in industries with an HHI value of less than 1,000 will not be challenged.

Monopolistic Competition

Examples of monopolistic competition include gasoline stations, banks, law firms, dentists, retail stores, and many of the firms one would see in a mall. *There are many firms in a monopolistic market*. Low concentration ratios are common. The relative independence of monopolistic competitors means that they don't have to worry about retaliatory responses to every price or output change. Modest changes in the output or price of any single firm will have no perceptible influence on the sales of any other firm.

In monopolistic competition, there are low barriers to entry*;* it is relatively easy to get in and out of the industry. *In monopolistic competition, there is product differentiation*. In other words, output is perceived by consumers as being somewhat different from the output of all other firms in the market.

In monopolistic competition, each firm has some *market power* as a result of the product differentiation of its product. Each firm has a distinct identity - a "brand image." Each monopolistically competitive firm will establish some consumer loyalty. Brand loyalty makes the demand curve facing the firm less price-elastic.

- Brand loyalty can exist even when products are virtually identical.
- Packaging, advertising, service, and other forms of nonprice competition have been used frequently to differentiate goods and services.
- A monopolistically competitive firm competes with other firms offering close substitutes.

The monopolistically competitive firm makes the same production decision as firms in other market structures.

- The demand curve facing a monopolistically competitive firm looks like the demand curve confronting a monopolist, but in this case each firm has a monopoly only on its brand image.
- The monopolistically competitive firm equates MR and MC to determine the profit - maximizing output and uses the demand curve to determine the price at which it can be sold.

If firms in monopolistic competition are earning an economic profit, other firms will flock to the industry. As new firms enter the market, supply of close substitutes increases. More close substitutes shift the

individual firm's demand curve leftward. As the demand curve it faces shifts leftward, the monopolistically competitive firm will have to make a new production decision. Continued leftward shifts of its demand curve will ultimately eliminate economic profits.

- The profit-maximizing equilibrium occurs where the demand curve is tangent to the long-run ATC curve.
- If the demand curve shifted any farther, price would fall below the ATC for any given output level, and the firm would incur losses.
- If the demand curve were positioned farther to the right, price would exceed long-run ATC at some rates of output.
- Once entry and exit cease, the long-run equilibrium has been established and there are no economic profits.

The demand curve of a monopolistically competitive firm must touch the long-run ATC curve to the left of the minimum ATC.

- The long-run equilibrium output is less than the minimum-cost rate of production. Monopolistic competition tends to be less efficient in the long run than a perfectly competitive market.
- Flawed Price Signals. Because the demand curve facing a firm in monopolistic competition slopes downward, such a firm will violate the principle of marginal cost pricing. Price will exceed marginal costs.
- Consumers respond to these flawed signals by demanding fewer goods from a monopolistically competitive market than they would in a competitive market. A suboptimal mix of output and misallocated resources are the result.

Thus monopolistic competition results in both production inefficiency (above-minimum long-run average cost) and allocative inefficiency (wrong mix of output).

D. Government Intervention

Market failure refers to situations where the market generates less than perfect (suboptimal) outcomes from the point of view of society. It implies that the forces of supply and demand do not lead to the best point on the production-possibilities curve. Market failure establishes a basis for government intervention.

There are four specific sources of market failure:

- Public goods.
- Externalities.
- Market power.
- Equity.

To begin with, we must distinguish the characteristics of **private goods** from those of **public goods**. A private good can be consumed by the individual buyer to the exclusion of anyone else. However, c*onsumption of a public good (e.g., national defense) by one person does not preclude consumption of the same good by another person. The difference between public goods and private goods is determined by the technical capability to exclude nonpayers.*

The "communal" nature of public goods leads to a real dilemma: if you and I will both benefit from national defense, which one of us should pay for it? A public good allows people to become **free riders** at someone else's expense. The familiar link between paying and consuming is broken. The free riders have an incentive to conceal their desire for a public good to avoid paying for it. Economists use "public good" to refer only to those goods and services that are consumed jointly, both by those who pay for them and by those who don't.

Both public goods and private goods can be produced by either the government or the private sector. *The market tends to underproduce public goods and overproduce private goods.* If we want more public goods, we need a nonmarket force - government intervention - to get them.

The term "**externalities**" refers to all costs or benefits of a market activity borne by a third party (someone other than the immediate producer or consumer). *Whenever external benefits are present, the market will underproduce goods. Whenever external costs are present, the market will overproduce goods.*

Market power is often the cause of a flawed response to price signals. As in the monopoly, oligopoly, and monopolistically competitive models, supply may be restricted from the optimal mix of output. The most obvious course for government intervention in this case is to prevent or dismantle concentrations of market power by using antitrust policy. In **natural monopoly**, where a single firm can achieve economies of scale over the entire range of market output, we may wish to regulate behavior. In these cases, a monopoly structure may be economically desirable.

If the market fails to reflect society's desire for **equity**, government intervention may be needed to redistribute income. The market mechanism tends to answer the basic question of *for whom to produce* by distributing a larger share of total output to those with most income. *This result may be efficient, but not necessarily equitable.* Transfer payments are income payments for which no goods or services are exchanged. They can be used to address inequities from market outcomes.

The micro failures of the marketplace imply that we are at the wrong point on the production-possibilities curve or inequitably distributing the output produced. The goals of **macro intervention** are:

- Economic growth.
- Price stability.
- Full employment.

Government failure means that government intervention fails to move us closer to our economic goals. Government waste is a government failure. The issue of government waste encompasses two distinct issues:

- **Efficiency**. Government waste implies that the public sector is not producing as many services as it could with the resources at its disposal, forcing us somewhere inside our production-possibilities curve.
- **Opportunity Cost**. Everything the government does entails an opportunity cost. Government waste can be measured in terms of what society gives up when the government wastes resources that might have been used better elsewhere.

Additional public-sector activity is desirable only if the benefits from that activity exceed its opportunity costs.

1. Choices Between Public- and Private-Sector Activity

Benefits of a public project must be compared with the value of the private goods given up to produce it. Theoretically, by performing this calculation repeatedly along the perimeter of the production-possibilities curve, one can find the optimal mix between private and public goods.

2. Choices Among Different Public Goods.

The same principle can be used to decide which goods to produce within the public sector. The benefits of production can be gauged by the amount of money consumers are willing to pay for private goods and

services. In the case of public goods, however, we must take crude and highly subjective estimates of the benefits yielded by a particular output. Accordingly, **cost-benefit analyses** are valuable only to the extent that they are based on broadly accepted perceptions of benefits (or costs).

In practice, we rely on **political mechanisms**, not cost-benefit calculations, to decide what to produce in the public sector and how to redistribute incomes. Voting mechanisms sometimes substitute for the market mechanism in allocating resources to the public sector. Bond referendums are direct requests by a government unit for the authority and purchasing power to expand the production of particular public goods. However, the real demand for public goods is not known and votes alone do not reflect the intensity of individual demands.

The theory of **public choice** emphasizes the role of self-interest in public decision making. Public officials are assumed to have specific personal goals (e.g., power, recognition, wealth) that they will pursue in office. Although self-interest cannot provide a complete explanation of public decision making, it adds important perspectives on the policy process.

E. Deregulation

In a perfectly competitive market, laissez faire provides economic efficiency and optimal output combination. But, few markets are perfectly competitive. Many markets are characterized by market failure. *The government has two options for intervention: changing structure or changing behavior*. Antitrust laws cover both options. Government regulation takes industry structure as a given.

Social regulation is concerned with such issues as workplace safety, health, environmental protection, and so on. **Economic regulation** is more directly focused on prices, production, and the conditions for industry entry or exit, i.e., on business behavior.

While government may intervene to improve market outcomes, such intervention may not be successful. The choice is between imperfect markets and imperfect intervention.

*Market failure originating in **natural monopoly** provides the most convincing case for economic regulation.* Natural monopoly is characterized by **economies of scale**.

- The long-run average cost curve is downward-sloping.
- The economies of scale imply that no other market structure can supply the good as cheaply.
- One firm will dominate the market because it can undercut any new firm that would enter.
- However, the natural monopoly will maximize profit, resulting in higher prices and less output than would be justified by costs. Point A represents the profit-maximization rule.
- Production efficiency occurs at the lowest possible ATC. Since ATC declines continuously, it is always possible to increase output and reduce costs. No regulated price can induce a monopolist to achieve minimum cost.

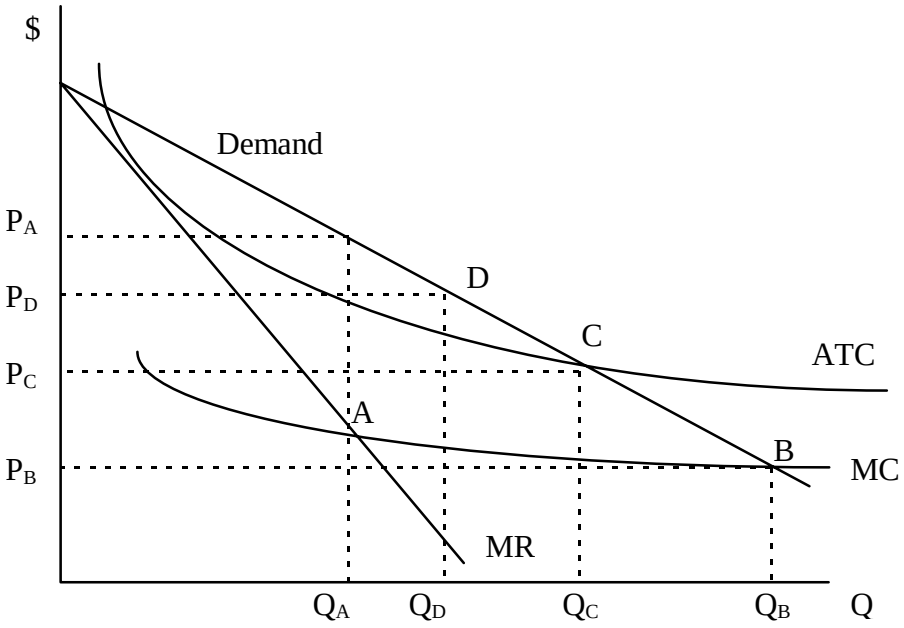
Regulation can take four general forms:

1. **Price Regulation**. Government sets price at a desired level. Pricing at marginal cost means the natural monopoly is sent to bankruptcy (MC is below AC when AC is falling). A subsidy may be needed if price is set at MC. Point B in Figure 9 represents this option.

2. **Profit Regulation**. Price can be set just high enough to equal average total cost to eliminate any economic profit (allow only a normal profit or "rate of return") - see point C in Figure 9. In this case, the

firm has no incentive to limit costs. Profit regulation can also motivate a firm to inflate its costs.

Figure 9 Natural Monopoly



3. **Output Regulation**. The natural monopoly can be instructed to make a certain output available (for example, Q_D). But, in this case, the firm has an incentive to lower quality to lower cost. Also output regulation does not achieve efficiency (marginal cost pricing or minimum average total cost).

4 **Second Best Solutions**. Regulators will have to choose a strategy that balances competing objectives (e.g., price efficiency, equity) rather than satisfying all objectives. Such a strategy is referred to as a "second-best" strategy.

Each regulatory alternative brings a distinct tradeoff between economic goals.

A **Administrative Costs**. To make sound decisions, regulators must have much information. Such information management requires a substantial administrative apparatus which represents a considerable opportunity cost of regulation.

B. **Compliance Costs**. Regulated industries must expend resources to learn about the regulatory environment in which they operate, to change their behavior, and to file reports with regulators.

C **Efficiency Costs**. If the mix of output required by the regulators is worse than the mix before regulation, then the loss of utility imposes a cost in addition to administrative and compliance costs.

D. **Balancing Benefits and Costs**. Although regulation may improve market outcomes, it carries with it some costs. The task of regulators is to balance the benefits of regulation against its costs.

<u>Deregulation in Practice</u>

During the 1980s deregulation occurred because:
- Regulation resulted in dynamic inefficiency.
- New technologies destroyed the basis for natural monopoly and obviated the need for regulation.

Some of the industries that have been affected by deregulation are as follows:

Railroads. In the nineteenth century, railroads were natural monopolies and were the first broad regulatory target of the federal government. Buses, trucks, subways, airplanes, and pipelines became substitutes, and regulation helped force railroads into bankruptcy. *In 1976, the Railroad Revitalization and Regulatory Reform Act reduced regulation on railroads. The Staggers Rail Act of 1980 further reduced regulation and many kinds of freight were exempt from regulation*. Not all rail rates have fallen. The ICC still sets limits to prevent abuse of monopoly powers. Railroads now have considerable freedom to adapt their prices and services to market demands.

Trucking. *In the 1930s the ICC regulated trucking routes*. Resulting monopoly routes bestowed value to trucking licenses (average prices reaching $500,000). *Regulations were relaxed in 1978, and major reforms were instituted by 1979*. New entrants, most of them small owner-operated firms, put great downward pressure on prices and profits while greatly increasing the quantity and variety of service.

Telephone Service. *AT&T's monopoly of telephone service was ended in 1982*. Long-distance telephone service has been transformed into a competitive industry, although AT&T remains regulated to an extent. *Between 1983 and 1990 long-distance telephone rates fell by over 40 percent*.

Airlines. *In 1938, the Civil Aeronautics Board (CAB) was created to regulate airline routes and fares through profit regulation*. The CAB permitted airlines to charge prices well in excess of average costs on longer, more efficient routes so long as they maintained service on shorter, unprofitable routes by cross-subsidization. The CAB limited entry to maintain the price structure, achieving its goals. Lack of entry kept prices too high. Instead carriers conducted nonprice competition in frequency of service and product differentiation. *In 1978 the Airline Deregulation Act phased out the CAB (by 1984) as a barrier to entry*. New entrants competed fares and profits downward. Increasing concentration has resulted from more efficient practices (e.g., the "hub" system), control over reservation systems, and a limited number of gates at airports. *By 1990 eight carriers accounted for over 90 percent of all scheduled airline traffic*. Some critics feel this has made the industry uncompetitive as well as unregulated. The airline industry has become a contestable market, even if not a perfectly competitive one.

Cable TV. *Up until 1986, city and county governments had the authority to franchise (approve) local cable TV operators and regulate their rates*. By 1984 Congress was convinced that broadcast TV and emerging technologies (such as microwave transmissions and direct satellite broadcasts) offered sufficient competition to ensure consumers fair prices and quality service. *The Cable Communications Policy Act of 1984 deregulated cable TV*. From 1986 to 1992 cable TV was essentially unregulated. Program quality and variety increased tremendously in the unregulated environment. From 1986 to 1991, cable TV rates increased three times faster than inflation. Consumers also complained of poor service. *In 1992, Congress passed the Cable Television Consumer Protection and Competition Act*. That act gave the Federal Communications Commission (FCC) authority to re-regulate cable TV rates. *Potential competitors are scrambling to gain entry to the industry. However, entry is blocked by government regulation at all levels and monopoly practices of established cable operators*.

For examples from the energy industry (especially, natural gas and utility industry), see articles [4] and [5].

F. The Environmental Threat

Pollution impairs health, reduces labor-force activity and output, destroys capital and diverts resources to undesired activities, and reduces our social welfare by denying us access to clean air, water, and beaches.

Air pollutants include carbon monoxide (CO), carbon dioxide (CO_2) which contributes to the greenhouse effect (global warming - see articles [18] and [19]), total suspended particulates (TSP), sulfur dioxide (SO_2) which causes acid rain, volatile organic compounds (VOCs), nitrogen oxides (NO_x) which contribute to smog, chlorofluorocarbons (CFCs) which eliminate atmospheric ozone and lead to ultraviolet poisoning.

The EPA estimates that one-third of U.S. **water** is polluted by violating federal water-quality standards. Organic pollution comes from disposal of organic wastes from toilets, garbage disposals, industrial wastes, organic waste from livestock, and so on. Thermal pollution is an increase in the temperature of waterways. Eutrophication is the discharge of sediments and nutrients into waterways.

Most **solid wastes** originate in agriculture and mining.

Monetary measurement of environmental damage is important in decision making. We won't get clean air unless we spend resources to get it. In some cases, it is fairly easy to put a price on environmental damage, but much of the damage is due to intangibles. The EPA estimates that 95 percent of current air and water pollution could be eliminated by known and available technology.

Market incentives play a major role in pollution behavior. A firm makes a profit-maximizing production decision by producing where MR = MC. A firm makes the efficiency decision by finding the least expensive way to produce any output. If pollution costs are not internalized, the firm does not pay for them and will have no incentive to do so. *Such costs are "external costs."* Those external costs - or **externalities** -are incurred by society at large rather than by the firm. Whenever external costs exist, a private firm will not allocate its resources and operate its plant in such a way as to maximize social welfare. With external costs, the market mechanism will not allocate resources efficiently. Individuals will produce more of a product than is socially desirable because they are not compelled to pay its full cost of production.

External costs = social costs - private costs

Through its inability to recover full social costs as well as private costs, the market fails to maximize social welfare.

When consumers can substitute external (social) costs for private costs, they will. Like producers, they will have an incentive to pollute.

<u>Regulatory Options</u>

The failure of the market to assign environmental costs in private production and consumption decisions is a basis for government intervention. *Two general forms this intervention takes are altering market incentives and bypassing the market*.

In order to alter market incentives, programs compel producers and consumers to internalize all social costs, e.g., they make polluters pay for their pollution.

1. **Emission Charge**. Imposing emission charges raises marginal costs and creates an incentive to install emission controls.
2. **Recycling Materials**. Requiring deposits on recyclable containers raises costs to consumers and encourages the return and recycling of bottles and cans. This lowers the producers recycling costs, encourages recycling, and reduces solid waste.

3. **Higher User Fees**. Higher water fees encourage us to use less water. Higher gasoline taxes encourage us to drive less or to drive more fuel-efficient cars.
4. **Pollution Fines**. Fines and cleanup costs imposed on polluters increase their costs of production or consumption and encourage them not to pollute.
5. **Privatization**. A recent innovation in the fight against environmental pollution, this process gives participants a market-based incentive to prevent pollution and protect their investment.

Alternatively, by requiring specific pollution controls or outright prohibition, regulatory standards bypass market incentives.

Some of the worst evidence of government failures in the area of environmental protection exists in the most regulated economies. Government-directed production is not necessarily cleaner than market-directed production, as was revealed when Eastern Europe was opened up in the 1990s.

Since protecting the environment entails costs as well as benefits, both must be evaluated when considering regulations. *The opportunity costs of pollution control are the most desired goods and services given up when factors of production are used to control pollution. The* ***optimal rate of pollution*** *is achieved when the marginal benefit of pollution abatement is equal to the marginal cost of pollution abatement.* ***This implies that a totally clean environment is not economically desirable.*** The marginal benefit of achieving zero pollution is likely to be infinitely small and to cost very much.

All pollution-control efforts divert resources from market-driven allocations. They change the mix of output. They redistribute income. *Some producers and consumers pay a disproportionate share of the costs of pollution cleanup*. Those who do, seek to postpone or avoid their losses by spreading the costs to others beyond where the pollution occurs. However, there are also those who create new businesses from environmental regulations (see article [17]).

The Clean Air Act was passed in 1970 and amended in 1977. Further amendments in 1990 set ambitious goals for environmental protection in the 1990s. The 1990 Clean Air Act amendments rely heavily on government regulation to clean up the environment. The amendments also created market incentives, in the form of marketable pollution permits. Firms can earn pollution permits by reducing emissions by more than the government requires; they can then sell these permits to other firms which then can exceed government pollution standards. Under the command-and-control strategy, firms had no incentive to reduce pollution below government requirements. For the effects of environmental regulations, Clean Air Act and its amendments in particular, on electric utilities (the single largest polluter) see articles [5], [18] and [19]. Articles [20] and [21] provide some insight to the “hottest” environmental topic du jour, global warming.