Chapter 2-Monopolistic competition and Oligopoly

Syllabus-Monopolistic Competition: Assumptions, Short run and long run price and output determination under Monopolistic competition, economic efficiency and resource allocation; Oligopoly: assumptions, oligopoly models, game Theory, contestable markets, role of government.

In the last chapter, we examined the first type of imperfectly competitive market: monopoly. In this chapter, we will extend what we know about monopoly to consider two other types of imperfectly competitive markets: monopolistic competition and oligopoly.

**Monopolistic competition**

If the different forms of market organization were categorized in such a way that they were arranged on a line, perfect competition and monopoly would occupy the two end points of the line.

They are, in many senses, polar opposites.

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<tr>
<th></th>
<th>Monopoly</th>
<th>Perfect competition</th>
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<tbody>
<tr>
<td>level of competition</td>
<td>zero, only one seller</td>
<td>maximum, many no. of seller</td>
</tr>
<tr>
<td>availability of substitutes</td>
<td>No substitute is available</td>
<td>Perfect substitute</td>
</tr>
<tr>
<td>produce at minimum of AC curve</td>
<td>No</td>
<td>yes</td>
</tr>
<tr>
<td>profit in long run</td>
<td>super normal Profit</td>
<td>only normal profit</td>
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Monopoly has no competition, with only one seller, while perfect competition has many sellers competing. Monopoly goods have, essentially, no substitutes, while competitive goods have many perfect substitutes. Monopolistic markets do not produce goods at minimum costs and can make profits in the long run, while competitive markets produce goods at minimum costs and make no long-run profit.

The one thing that these two markets do have in common is that they are both extreme examples of markets that are rarely seen in real-world business. In reality, most firms that operate in the U.S. have qualities of both of these markets.

The reason that monopoly and perfect competition are studied in such detail is to understand how the unique qualities of each of these types of market organizations come together to determine the behavior of most firms. Two types of market organizations will be studied in this chapter: monopolistic competition and oligopoly.

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Monopolistic Competition

Monopolistic competition is a mixture of monopoly and perfect competition. A monopolistically competitive industry has the following characteristics:

- a large number of firms
- no barriers to entry
- product differentiation

The key to understanding monopolistic competition is the role of the unique product.

Monopolistic competition is very much like perfect competition in the large number of firms and the absence of barriers to entry. But the perfectly competitive firm has a flat demand curve because it produces the same product as other firms; thus, any change in price will cause households to buy from another firm.

The monopolistically competitive firm, on the other hand, produces something that is unique but similar to other firms’ goods, just like a pizza shop produces a unique pizza that is similar to pizzas available elsewhere. The uniqueness of the good means that the demand curve for the monopolistically competitive firm is downward sloping. (Remember that, as there are more substitutes, the demand curve gets flatter (more elastic). The fewer substitutes for the monopolistic competitor’s good, the steeper (less elastic) the demand.)

- Product Differentiation, Advertising, and Social Welfare
- The Case for and Against Product Differentiation and Advertising
- Price and Output Determination in Monopolistic Competition
- Economic Efficiency and Resource Allocation

Product differentiation, advertising and social welfare

How does a firm establish the uniqueness of its product?

1. Create unique product (or product differentiation)- Take, for example, the local pizza shop. Part of the pizza strategy is to create a unique product. Maybe that means using special sauce, the
freshest ingredients, or a wood-fired oven. That is only half the battle to achieve successful product differentiation. The second part is

2. To convince people that the product is unique. The perception of uniqueness is just as important as actually creating a unique product. Take the mineral water industry as an example. The difference between grocery store water and a brand name mineral water is imperceptible. Why do people pay so much for the brand name water? The reason is that they believe that it is unique. They believe the generic spring water is not a close substitute. How do people come to this belief? The answer is advertising.

The goal of advertising is to establish product differentiation and create as inelastic a demand as possible. The intuition is that the more inelastic the demand, the more the firm can profit. For now, though, assume that product differentiation is a profitable strategy and ask if it is also a socially desirable strategy.

When evaluating the social value of advertising, the question posed is, does advertising respond to the desires of a society or does advertising create the desires of a society?

**The Case for Product Differentiation and Advertising**

*Advertising responds to the desires of a society*—Some economists (and most advertising professionals) believe that advertising responds to the desires of a society. For example, if people want to surf the Web faster, then Intel spends time and money to develop a faster processor and launches an advertising campaign to let people know that they have met this need.

*Greater the variety and choice*—People have nearly unlimited desires for new and different goods and services. The greater the variety and choice, the more likely each person can find the goods and services that will maximize his or her own personal utility. If there are many different companies making the same type of good, competition between them will cause each of them to innovate and cut costs, thus creating a better and less expensive product.

*Leads to more informed consumers*—Proponents of advertising also argue that it leads to more informed consumers. The more information consumers have, the more competitive the markets become, and thus, the more markets move towards efficiency. Product differentiation is seen as leading to efficiency as firms compete with the quality of their products.

**The Case against Product Differentiation and Advertising**

Q- Are more choices better?

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Advertising creates desire instead of responding to it: Some economists believe that advertising creates desire instead of responding to it. Do we really need over a hundred different types of breakfast cereal? Some argue that there is already too much choice in our society, and advertising convinces people that they need something that they truly never needed before. Were peoples’ lives incomplete until the clapper was invented? Has society become obsessed with consumption?

Advertising increases the costs of production: Besides the philosophical concerns about advertising, some economists have noted that advertising increases the costs of production and is often such a large portion of the costs of participating in some markets that it actually serves as a barrier to entry. Another social cost of advertising is that prevents people from doing more productive or desirable things.

No Right Answer

Many questions have no right answer; there are strong arguments on both sides of the advertising debate, and even the empirical evidence leads to conflicting conclusions.

Price and Output determination in Monopolistic competition

Monopolistically competitive industries are made up of a large number of firms, each small relative to the size of the total market. Thus, no one firm can affect market price by virtue of its size alone. But firms differentiate their products, and by so doing gain some control over price.

Product Differentiation and Demand Elasticity

Perfectly competitive firms face a perfectly elastic demand curve for their product because all firms in their industry produce the exact same product. A monopolistic competitor faces a downward-sloping firm demand curve. This type of curve is based on the notion that the firm can change its price without losing all of its business because buyers do not see any perfect substitute. The fewer the substitutes (i.e., the more product differentiation), the less elastic the demand curve will be. The difference is illustrated in the figure below:
A monopolistic competitor, in the short run, is like a monopolist because it is the only producer of its unique product. But unlike a monopoly, the monopolistically competitive firm faces competition from other firms producing good substitutes for its product.

**Price/Output Determination in the Short Run**

Since the firm has a downward-sloping demand curve, it will also have a downward-sloping marginal revenue (MR) curve. A profit-maximizing firm produces where marginal cost (MC) equals marginal revenue (q0 in the graph below) and charges the price determined by demand (P0).
In panel (a) of the figure, the monopolistic competitor will make a profit. However, like a monopoly, a monopolistic competitor is not guaranteed to make a profit in the short run. The firm may make a loss in the short run; its profitability will depend on the demand. This is shown in panel (b).

**Price /Output determination in the long run**

The action in a monopolistically competitive market occurs when the market moves to the long run. Since other competitors selling a similar good can enter the market, two changes will occur:

- Firm demand will decrease.
- Firm demand will become more elastic.

As more firms enter the market, the demand for any one firm will decrease, since the firm is now sharing the market with other firms.

A decrease in demand implies a leftward shift in the demand curve. Since the entering firms are producing substitutes for the existing firm’s good, the demand for the existing good will become more elastic. An increase in elasticity implies the demand curve is getting flatter. By combining these effects, as a monopolistically competitive market moves from short-run profits to the long run, the firm’s demand curve will move to the left and get flatter. Furthermore, the demand curve will continue to move until there are no more firms entering the market. Firms will stop entering the market when profits are zero.

This occurs when the demand curve just barely touches (i.e., is tangent to) the ATC curve, as shown in the figure above. Once the demand curve is tangent to the ATC curve, the profit-maximizing price is equal to the average total cost, and thus, profits are zero. In the long run, competition will drive monopolistically competitive markets.
competitive markets to make zero profits. The goal of the firm is to try to maintain as much short-run profit as possible by differentiating its product. Eventually, though, in the long run, economic profits will be zero.

If a monopolistic competitor is losing money in the short run, the opposite holds true. If the market is not profitable, firms will leave as the market moves towards the long run. When firms leave, there are fewer substitutes, so demand becomes more inelastic and increases since market demand is split up among more firms. The demand curve keeps getting steeper and moving to the right until it is tangent to the ATC curve, where profits become zero and no other firms want to leave the market. (This would occur at point A in panel (b) of the earlier figure.)

| 1. **Short run:** Under monopolistic competition, firm behavior is very similar to monopoly. |
| 2. **Long run:** In monopolistic competition, entry and exit drive economic profit to zero. |
| **a.** If profits in the short run: New firms enter market, taking some demand away from existing firms, prices and profits fall. |
| **b.** If losses in the short run: Some firms exit the market, remaining firms enjoy higher demand and prices |

**Economic efficiency and Resource allocation**

If profits are driven to zero in the long run, it is possible to think that this market is efficient. Remember that two central conditions must hold for a market to be called efficient. The market must be producing at the lowest possible cost and must be producing such that price is equal to marginal cost. Monopolistically competitive markets do neither of these things. But look again at the long-run equilibrium for a monopolistically competitive firm:
Note that the point of tangency between the demand curve and the average total cost curve (ATC) is not at the bottom of ATC. Thus, the monopolistic competitor produces, in the long run, at a price higher than the lowest average total cost.

Also note that price is higher than marginal cost, so there is the possibility of Pareto improvement if the firm would make more units. The firm’s effort to differentiate itself is the cause of the downward-sloped demand, and thus, the inefficiency. If the firm were to let demand keep shifting back and get flatter, then the market would become perfectly competitive and efficient.

Therefore, the merits of product differentiation are that differentiation comes with inefficiency. Are the benefits of product differentiation greater than the loss in consumer surplus due to inefficiency?

Monopolistically competitive firms have not been a subject of great concern among economic policy makers. Their behavior appears to be sufficiently controlled by competitive forces, and no serious attempt has been made to regulate or control them.

**Reasons for inefficiency**

1. **Excess capacity**
   3. The monopolistic competitor operates on the downward-sloping part of its \( ATC \) curve, produces less than the cost-minimizing output.

   4. Under perfect competition, firms produce the quantity that minimizes \( ATC \).

2. **Markup over marginal cost**
   - Under monopolistic competition, \( P > MC \).
   - Under perfect competition, \( P = MC \).
**Comparing Perfect & Monop. Competition**

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**Comparing Monopoly & Monop. Competition**

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<td>downward sloping</td>
<td>downward sloping</td>
</tr>
<tr>
<td>Close substitutes</td>
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**Oligopoly**

The next form of market organization is called oligopoly. A market is characterized as an oligopoly if there are a few firms who dominate the market and whose price-setting behavior has strategic effects on the market price and quantity.

Simply put, an oligopoly occurs when there are a few very big companies that completely dominate an industry. There are measures of how dominant the big firms are in an industry. These measures are called "Industrial Concentration Ratios," and high concentration ratios imply fewer firms hold the larger share of the market.

Since the largest firms control such a big share of the market, the behavior of one firm will have a strategic effect on all other producers. The complex interdependence that usually exists among firms in such industries makes oligopoly difficult to analyze. The behavior of any one firm depends on the reactions it expects of all others in its industry. Because individual firms make so many decisions, industrial strategies are usually complex and difficult to generalize about.

**Oligopoly Models**

Because many different types of oligopolies exist, a number of different oligopoly models have been developed. But all kinds of oligopolies have one thing in common: the behavior of any given oligopolistic firm depends on the behavior of the other firms in the industry comprising the oligopoly.

**The Collusion Model**

The collusion model argues that when there are few firms in the industry, it is possible for the firms to get together and act like a monopolist. A firm in an oligopoly could compete with the other firms, which means the profits go to zero, or it could get all the firms to act like one big firm and restrict production, while charging a high monopoly price.

When a firm group gets together to collude on price and output, they are referred to as a cartel. If a cartel is effective, it can be very profitable for the firms, as OPEC is for the oil industry. Certain conditions have to hold true for a cartel to work.

They have to be physically able to get all of the firms in the industry together and then be able to agree on a price and quantity for the whole industry. Such a meeting is illegal in the India. When firms collude, it is called "price-fixing" and it is a criminal act. (competition commission of india)

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When the firms end up price-fixing without any formal meeting, which is called tacit collusion, there may not be any easy legal recourse. Once the price and quantity are agreed upon, the cartel must decide how much each firm is allowed to make. Most importantly, the cartel must be able to prevent individual firms from cheating on the deal.

If the cartel price is very high, it is tempting for a single firm to go off and make a little more than they are allowed to make because the profit potential is huge. The problem is that if every firm sneaks off to make a little more, the market price will fall and eventually the price will drop to the competitive price. Generally speaking, cartels usually fall apart because of cheating. Even illegal drug cartels have faced plummeting profits in the face of overproduction.

**The cournot model and kinked demand curve model**

The second model of oligopoly is called the Cournot model. Augustin Cournot’s model of oligopoly states that given all other firms’ production, a single firm chooses the best possible amount to produce. The more the other firms produce, the less the single firm will want to make.

The other firms are also acting the same way, so as the single firm produces more, the other firms will produce less. Eventually, they will all be producing a quantity such that any change in any firm’s production will lower each individual firm’s profit. Typically, this quantity will be more than a monopolist’s quantity and less than a perfectly competitive market’s output.

Critics of this model note that each firm takes the other’s production as a given, and, in reality, firms are much more strategic and anticipate other firms’ behaviors.

**The Kinked Demand Curve Model**

The third model is the kinked demand curve model. This model argues that there is a single firm dominating the market, and if the firm lowers its price, other firms will also lower their prices. But if the firm raises prices, other firms will not raise prices. Graphically, the demand curve is "kinked" at price P*, which is the price of the dominant firm. This is shown in the figure below:
If the dominant firm raises its price and competing firms do not, the dominant firm will lose a lot of business to the lower priced rivals; demand is very elastic (the segment labeled d1) for price increases. If the dominant firm lowers its price, all the competitors will follow, and there will not be large quantity increases. Thus, the demand is inelastic (the segment labeled d2) for price decreases. There is a kink in the demand curve at $P^*$, the optimal price.

Note that the kink in the demand curve implies that the marginal revenue is no longer continuous (a connected line). At the quantity $q^*$, the MR has a "gap" from point A to point B. This means that there is a rather large range in which the MC could shift without causing a change in the optimal quantity or price.

The kinked demand curve model appeals to common sense. If the big firm lowers prices, other places seem to follow, but it never seems to happen the other way. The problem with the theory is the determination of $P^*$. Why is the price at $P^*$ to begin with? Also, critics have argued that the assumption that rivals follow price cuts and ignore increases is oversimplified, that real-world oligopolists are much more strategic.

The Price leadership Model

The price-leadership model of oligopoly assumes that there is one dominant firm in the industry that sets the price and then all the other firms in the industry behave like perfectly competitive price-taking firms. Once all the other small firms have chosen their desired quantity, the price leader will produce to meet the remaining demand at that price.
As the name implies, the price leadership model consists of a leader and a bunch of followers. The leader, however, is always mindful of the demand and will set prices low enough that a satisfactory demand remains after all the followers have made production decisions.

This model implies that the dominant firm is better off with larger amounts of the market share and less competition. As a result, the price leader may choose prices to minimize the participation of smaller firms. This pricing strategy is called predatory pricing.

As in the other oligopoly models, an oligopoly with a dominant price leader will produce a level of output between the output that would prevail under competition and the level that a monopolist would choose in the same industry. It will also set a price between the monopoly price and the competitive price.

**Game Theory**

The fifth model of oligopoly is not so much a model as a general theory used to examine strategy, called game theory. Game theory was developed relatively recently as a tool for examining strategic behavior. In this theory, firms often try to outsmart each other, but often will find that they are moving in circles. They often over-anticipate. Game theory examines how firms or people behave when they know that others can anticipate their behavior.

There are many game theory models that apply to oligopoly behavior. For example, there are only two firms making collectable "limited edition" commemorative dinner plates for the year 2000. If both firms choose not to make very many plates, they will both make a lot of money. But if one firm makes a lot of plates, while the other chooses to not make very many, the firm that produces a lot will make even more money. If they both make a lot of plates, then the plates will not be rare and they both will gain very little profit. Here is the game theory: Firm 1 says, "If I make a little, I know that Firm 2 will want to make a lot, so I will make a lot. But if Firm 2 knows that these are my choices, it knows I will make a lot, no matter what I say."

These strategy options can be summarized with a payoff matrix. A payoff matrix puts one player’s choices on the vertical axis and the other player’s choices on the horizontal axis and then fills in a table showing the payoff (in this case, profit) for each combination of strategies. Following is a payoff matrix for the dinner plate game.

**Firm 2’s Strategy**

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If both firms make few plates, they will be in the top left box of the table, each making $100. If one of the firms makes a lot of plates while the other makes a few, then the one that makes a lot will get $120 while the other gets $20. But if they both make a lot, they will only get $40 each, since they will have flooded the market. In this game, there is a dominant strategy, meaning a strategy that is best regardless of the other person’s actions.

In order to properly solve the game, it is necessary to find the game-theoretic equilibrium. Here is the solution for Firm 1. If Firm 2 produces few plates, Firm 1 should produce many plates, since it will make $120 instead of $100. If Firm 2 produces many plates, Firm 1, according to the table, should produce many plates because it will realize a profit of $40 instead of $20. Thus, no matter what Firm 2 does, Firm 1 should produce many plates. Knowing this, Firm 2 is better off producing many plates, since $40 is better than $20. In the end, both Firm 1 and Firm 2 make many plates, even though they would both be better off if they both made a few. Clearly this is an inefficient outcome.

This game is called a prisoner’s dilemma, and there has been much written about the strategies of this game. To better illustrate the prisoner’s dilemma, there was a contest in which people could write computer programs with strategies of how to play the game and then the computer programs played each other repeatedly. The winner of the repeated game was the program with the “tit for tat” strategy. This strategy says that a firm should do whatever its opponent did the last time they met. Thus, it is possible to have an outcome in this game where both firms get the $100 profit, but only if the same opponent is played repeatedly.

Games do not always have a dominant strategy, however. To illustrate this, take the same table, but change Firm 1’s potential profits:
In this case, Firm 1 would prefer to make few plates if Firm 2 made few plates, and would prefer to make many plates if Firm 2 made many plates. By looking at Firm 2, the game theory can be solved. If Firm 2 knows the preferences of Firm 1, then Firm 2 must compare the "both making few plates" option to the "both making many plates" option. Firm 2 is better off if both are making few plates, and so the equilibrium is that they both make few plates. This is called a Nash equilibrium, because each player's strategy was the best choice given the other player's strategy. If Firm 2 made few plates, then Firm 1's best move is to make few plates. If Firm 1 made few plates, it is Firm 2's best strategy to make few plates.

When there is some uncertainty about the strategy of another player, there is a strategy called the maximin strategy, which argues that a player should choose the strategy that maximizes the worst-case outcome that could occur when the other player chooses a strategy. This strategy was mentioned often when discussing Cold War options between the U.S. and the Soviet Union. Another way of wording this strategy is that a player should take an action that makes the best of the worst-case scenario.

All in all, game theory is an incredibly fascinating field of study, but it is very specific to the payoff structure of the market and so it offers little in the way of generalized theories of oligopolistic behavior.

Game theory analyses oligopolistic behavior as a complex series of strategic moves and reactive countermoves among rival firms. In game theory, firms are assumed to anticipate rival reactions.

**Dominant strategy** - In game theory, a strategy that is best no matter what the opposition does.

**Nash equilibrium** - In game theory, the result of all players' playing their best strategy given what their competitors are doing.

**Prisoners’ dilemma** A game in which the players are prevented from cooperating and in which each has a dominant strategy that leaves them both worse off than if they could cooperate.

**maximin strategy** In game theory, a strategy chosen to maximize the minimum gain that can be earned.

**tit-for-tat strategy** A company's strategy that lets a competitor know the company will follow the competitor's lead.

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**Contestable Markets**

The final and most competitive model is that of a perfectly contestable market. A contestable market looks like a monopoly or oligopoly but, in fact, is much more competitive. Perfectly contestable markets allow for easy entry and exit. How could a market that allows easy entry and exit have only one or two firms in it? If a market is making zero profit, no firms will enter it, regardless of whether there are 1 or 1 million firms already in the market.

Take, for example, the air route between Cincinnati, Ohio, and Lexington, Kentucky. Assume that Delta/Conair is the only airline that flies this route. This does not mean that Delta is making monopoly profits, since it is relatively easy for another airline to fly that route. Delta may choose to charge the perfectly competitive price in order to keep other airlines from entering the market. Why would Delta want to make zero profit? First of all, zero profit, remember, is not a bad thing. Secondly, since people tend to have strong airline affiliations, due to frequent flier accounts, once Delta has a flier on one flight, they can count on that person to fly many other flights that may be more profitable.

**Summary**

Overall, this has been a brief examination of the six different models of oligopoly. Each offers insights into how specific types of markets behave.

**Oligopoly and Economic Performance**

Oligopolies are more efficient than monopolies, but are generally less efficient than perfectly competitive markets. Profit-maximizing oligopolists are likely to price above marginal costs. Strategic behavior can lead to outcomes that are not in society’s best interests.

The same advantages and disadvantages of product differentiation and advertising examined in the monopolistic competition section of this chapter are also applicable when talking about oligopoly.

**Industrial Concentration and Technological Change**

It is typically the large firms that do the most innovation in the economy. Would it be best for the economy to limit their market power? As the text indicates, companies like AT&T, GE, and IBM are responsible for

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a significant portion of the research and development that move our economy forward. Are there some advantages, such as economies of scale in research and development, which exist for larger firms?

**The role of government: Regulation of Mergers**

**Regulation of Mergers**

- Measure of market structure - Herfindahl-Hirschman Index (HHI).

The HHI is calculated by finding the market share of each firm in an industry, then squaring that number, and finally, adding the numbers.

\[ H = \sum_{i=1}^{N} s_i^2 \]

where \( s_i \) is the market share of firm \( i \) in the market, and \( N \) is the number of firms. Thus, in a market with two firms that each have 50 percent market share, the Herfindahl index equals \( 0.50^2 + 0.50^2 = 1/2 \).

The Herfindahl Index (H) ranges from \( 1/N \) to one, where \( N \) is the number of firms in the market. Equivalently, if percents are used as whole numbers, as in 75 instead of 0.75, the index can range up to 1002, or 10,000.

- A HHI index below 0.01 (or 100) indicates a highly competitive index.
- A HHI index below 0.15 (or 1,500) indicates an unconcentrated index.
- A HHI index between 0.15 to 0.25 (or 1,500 to 2,500) indicates moderate concentration.
- A HHI index above 0.25 (above 2,500) indicates high concentration

For instance, if there were three firms in an industry, one with 50% of the industry, one with a 35% share, and the third with 15%, the HHI calculation would be:

\[ (50)^2 + (35)^2 + (15)^2 = 3,950 \]

By squaring the market share, the HHI is placing a higher value on firms that have higher market shares.
TABLE 13.5 Calculation of a Simple Herfindahl-Hirschman Index for Four Hypothetical Industries, Each with No More Than Four Firms

<table>
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<th>PERCENTAGE SHARE OF:</th>
<th>HERFINDAHL-HIRSCHMAN INDEX</th>
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<tr>
<td>Firm 1</td>
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</tr>
<tr>
<td>Industry A</td>
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<td>Industry B</td>
<td>80</td>
</tr>
<tr>
<td>Industry D</td>
<td>40</td>
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- “Coordinated interaction” is defined as “actions by a group of firms that are profitable for each of them only as the result of the accommodating reactions of others. This behavior includes tacit or express collusion, and may or may not be lawful in and of itself.”