Sessions 9-10

1. Market – main features, different forms, and types of competition
2. Markets and forest communities

Flow

1. Revenues and marginal revenues
2. Perfectly competitive markets
3. Monopoly markets
4. Monopolistic competition
5. Oligopoly
6. Markets and forest communities

1. Total revenues, Average revenues, and Marginal revenues of a firm

Under Competition

Quantity (in gallons)	Price	Total Revenue	Average Revenue	Marginal Revenue
(*Q*)	(*P*)	($TR = P \times Q$)	($AR = TR/Q$)	($MR = \Delta TR/\Delta Q$)
1	$6	$ 6	$6	
2	6	12	6	$6
3	6	18	6	6
4	6	24	6	6
5	6	30	6	6
6	6	36	6	6
7	6	42	6	6
8	6	48	6	6

2. Profit maximization

Profit maximization under competition

Quantity (in gallons)	Total Revenue	Total Cost	Profit	Marginal Revenue	Marginal Cost
(*Q*)	(*TR*)	(*TC*)	(*TR* − *TC*)	(*MR* = Δ*TR*/Δ*Q*)	(*MC* = Δ*TC*/Δ*Q*)
0	$ 0	$ 3	−$3		
				$6	$2
1	6	5	1	6	3
2	12	8	4	6	4
3	18	12	6	6	5
4	24	17	7	6	6
5	30	23	7	6	7
6	36	30	6	6	8
7	42	38	4	6	9
8	48	47	1		

2. Profit maximization under competition

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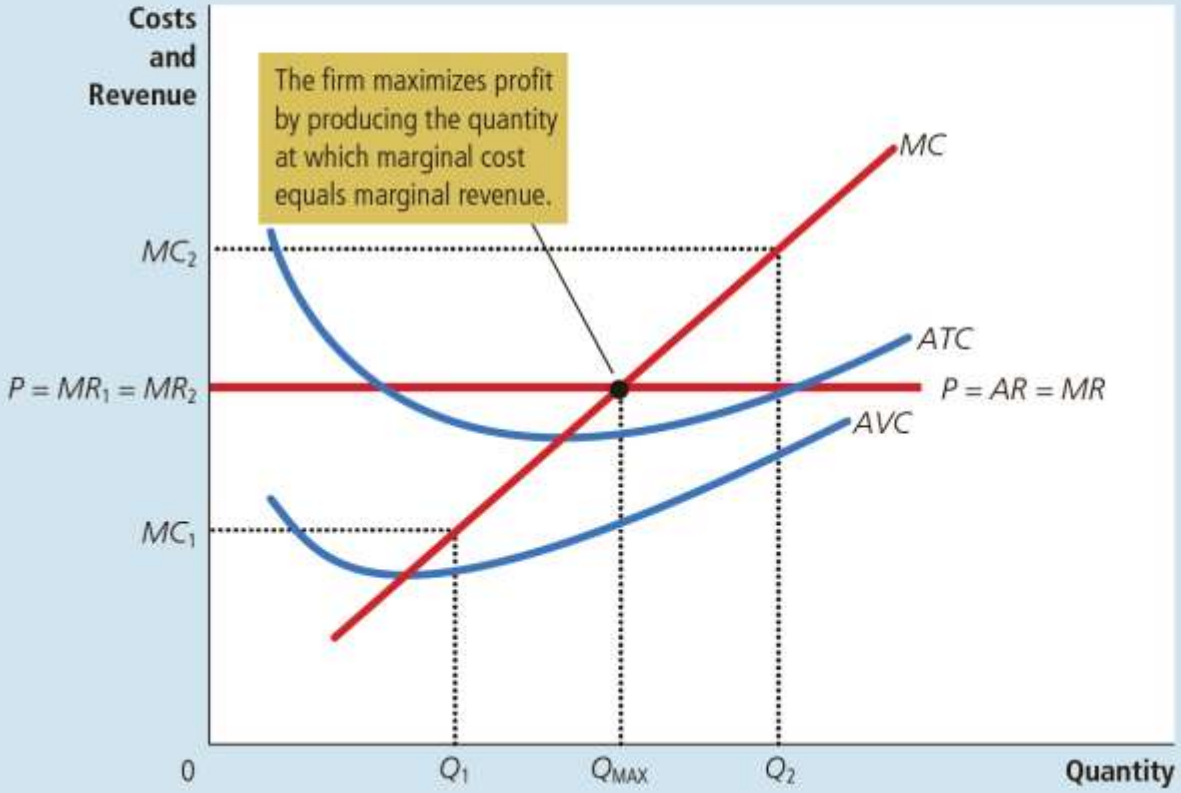
This figure shows the marginal-cost curve (*MC*), the average-total-cost curve (*ATC*), and the average-variable-cost curve (*AVC*). It also shows the market price (*P*), which for a competitive firm equals both marginal revenue (*MR*) and average revenue (*AR*). At the quantity Q_1, marginal revenue MR_1 exceeds marginal cost MC_1, so raising production increases profit. At the quantity Q_2, marginal cost MC_2 is above marginal revenue MR_2, so reducing production increases profit. The profit-maximizing quantity Q_{MAX} is found where the horizontal line representing the price intersects the marginal-cost curve.



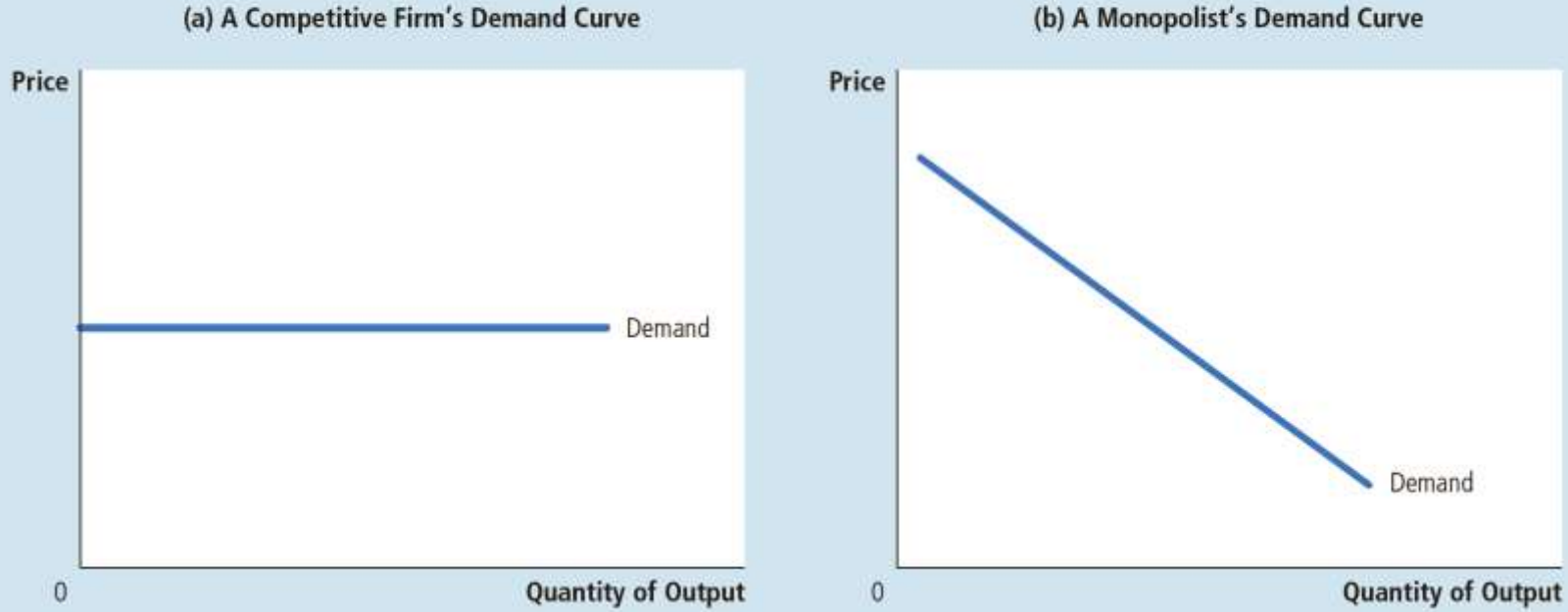
3. Monopoly

we analyzed competitive markets, in which many firms offer essentially identical products, so each firm has little influence over the price it receives. By contrast, a monopoly such as Microsoft has no close competitors and, therefore, has the power to influence the market price of its product. Whereas a competitive firm is a *price taker*, a monopoly firm is a *price maker*.

FIGURE 2

Demand Curves for Competitive and Monopoly Firms

Because competitive firms are price takers, they face horizontal demand curves, as in panel (a). Because a monopoly firm is the sole producer in its market, it faces the downward-sloping market demand curve, as in panel (b). As a result, the monopoly has to accept a lower price if it wants to sell more output.



3. Monopoly …

Profit maximization by monopolist

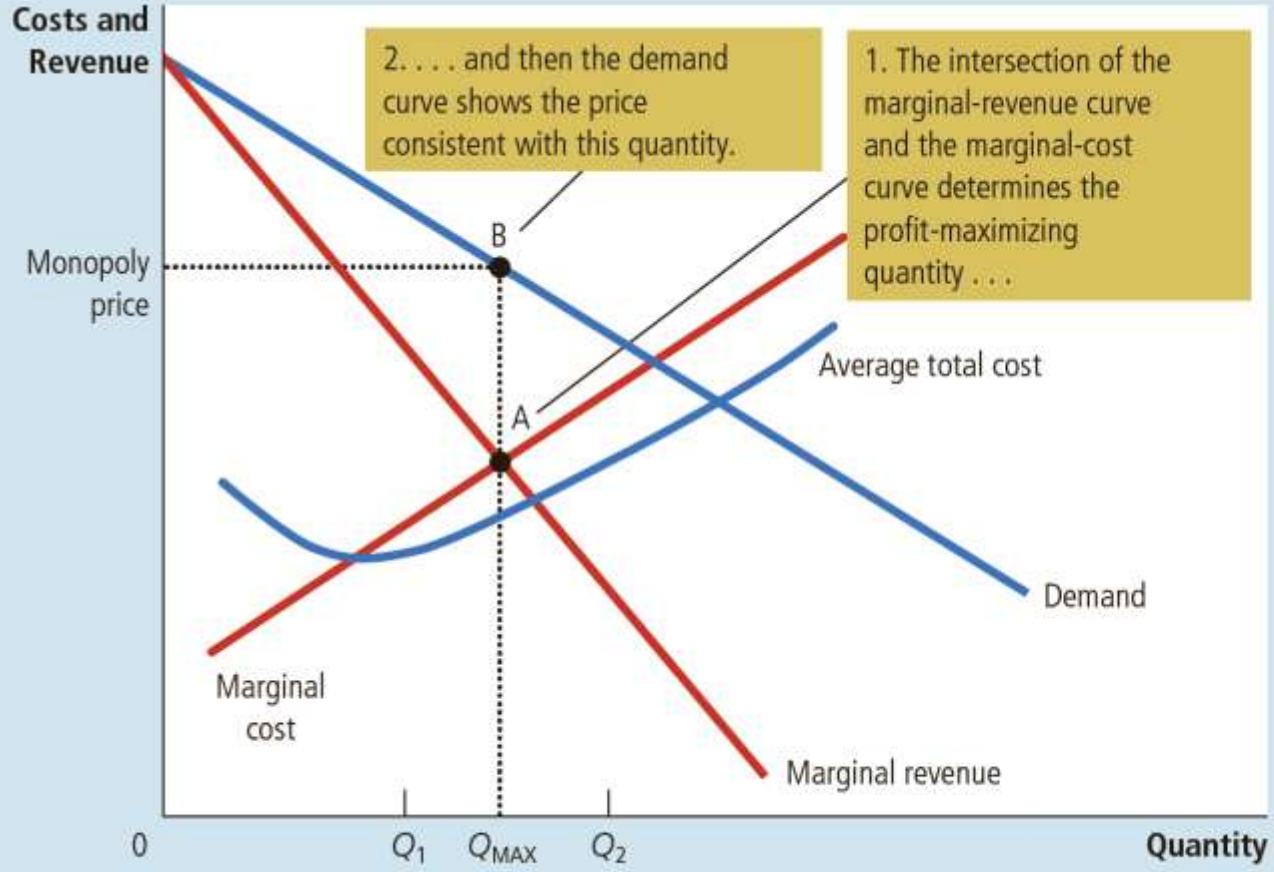


FIGURE 4

Profit Maximization for a Monopoly

A monopoly maximizes profit by choosing the quantity at which marginal revenue equals marginal cost (point A). It then uses the demand curve to find the price that will induce consumers to buy that quantity (point B).

For a competitive firm: $P = MR = MC$.
For a monopoly firm: $P > MR = MC$.

3. Monopoly …

Profit maximization by monopolist

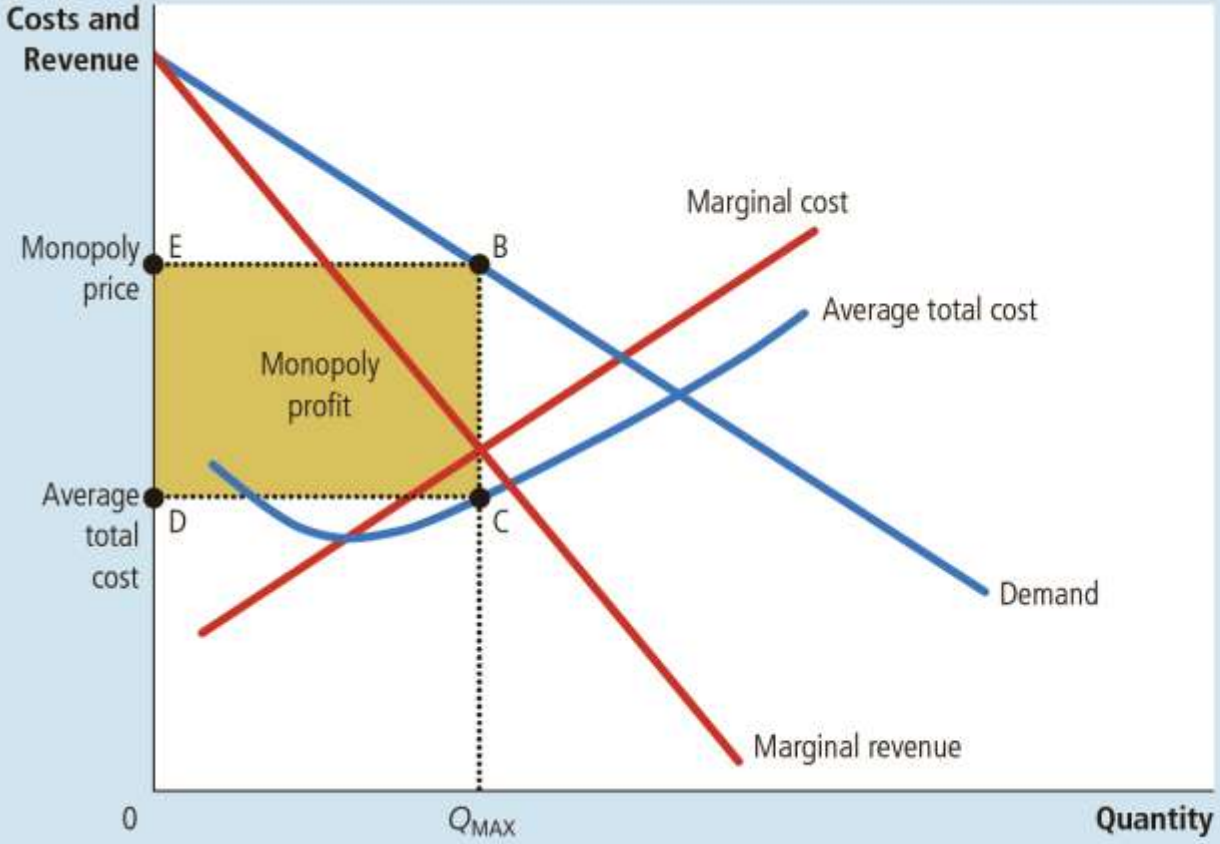


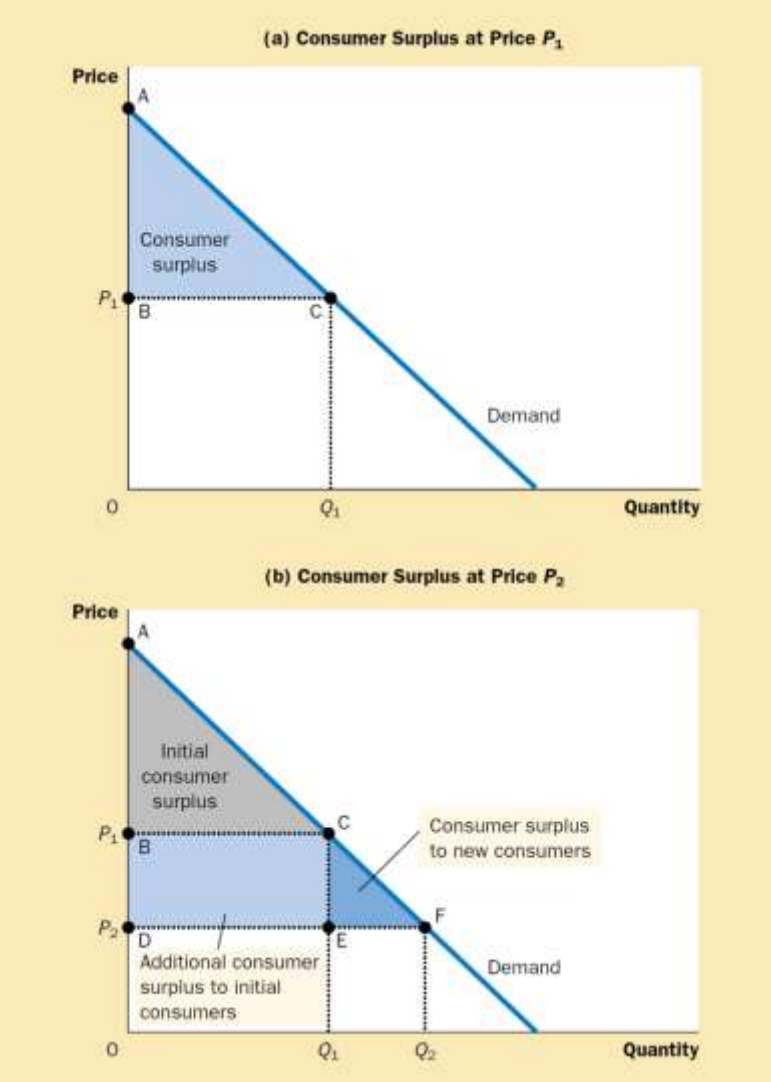
FIGURE 5

The Monopolist's Profit

The area of the box BCDE equals the profit of the monopoly firm. The height of the box (BC) is price minus average total cost, which equals profit per unit sold. The width of the box (DC) is the number of units sold.

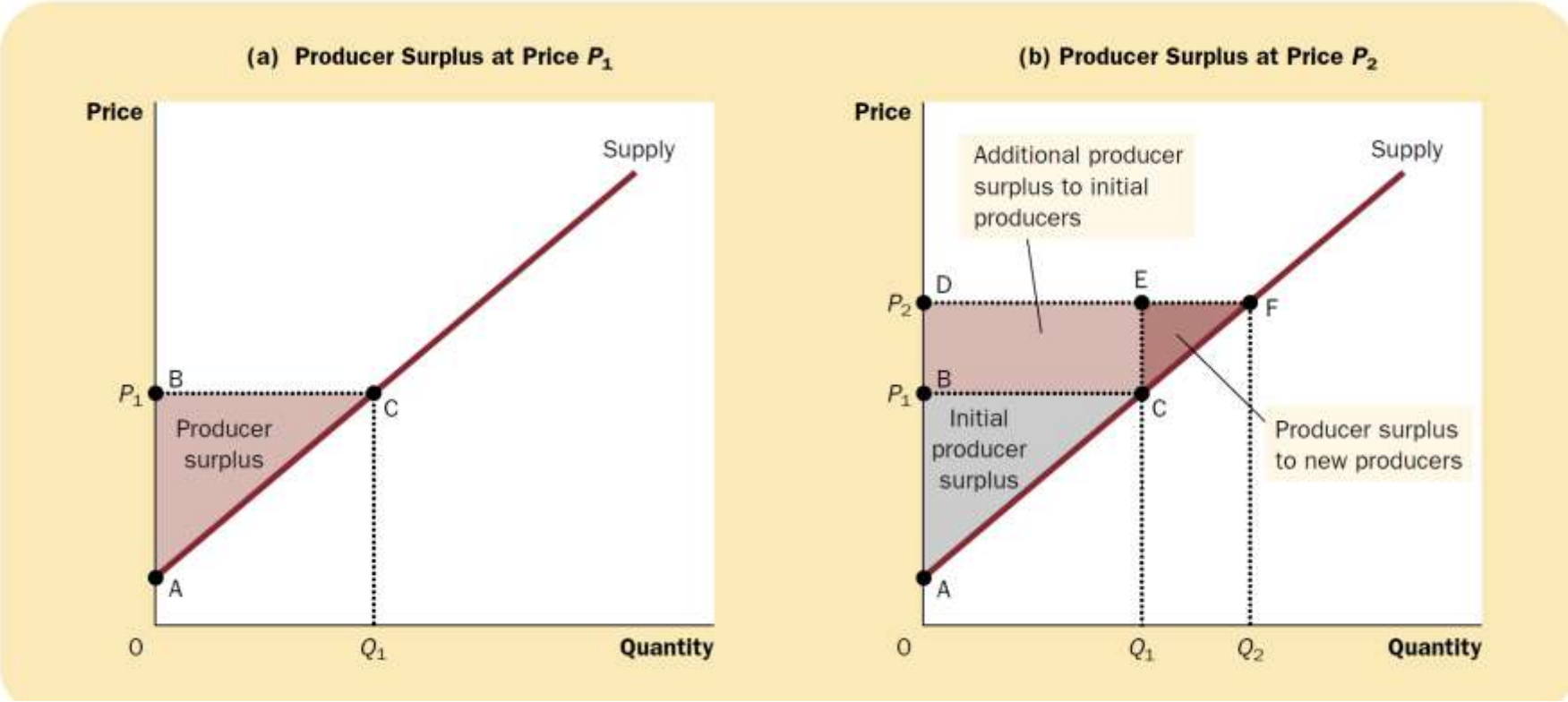
3. Consumers and producers' surplus

Consumer surplus



3. Consumers and producers' surplus

Producers surplus



3. If the monopolist was a benevolent planner…

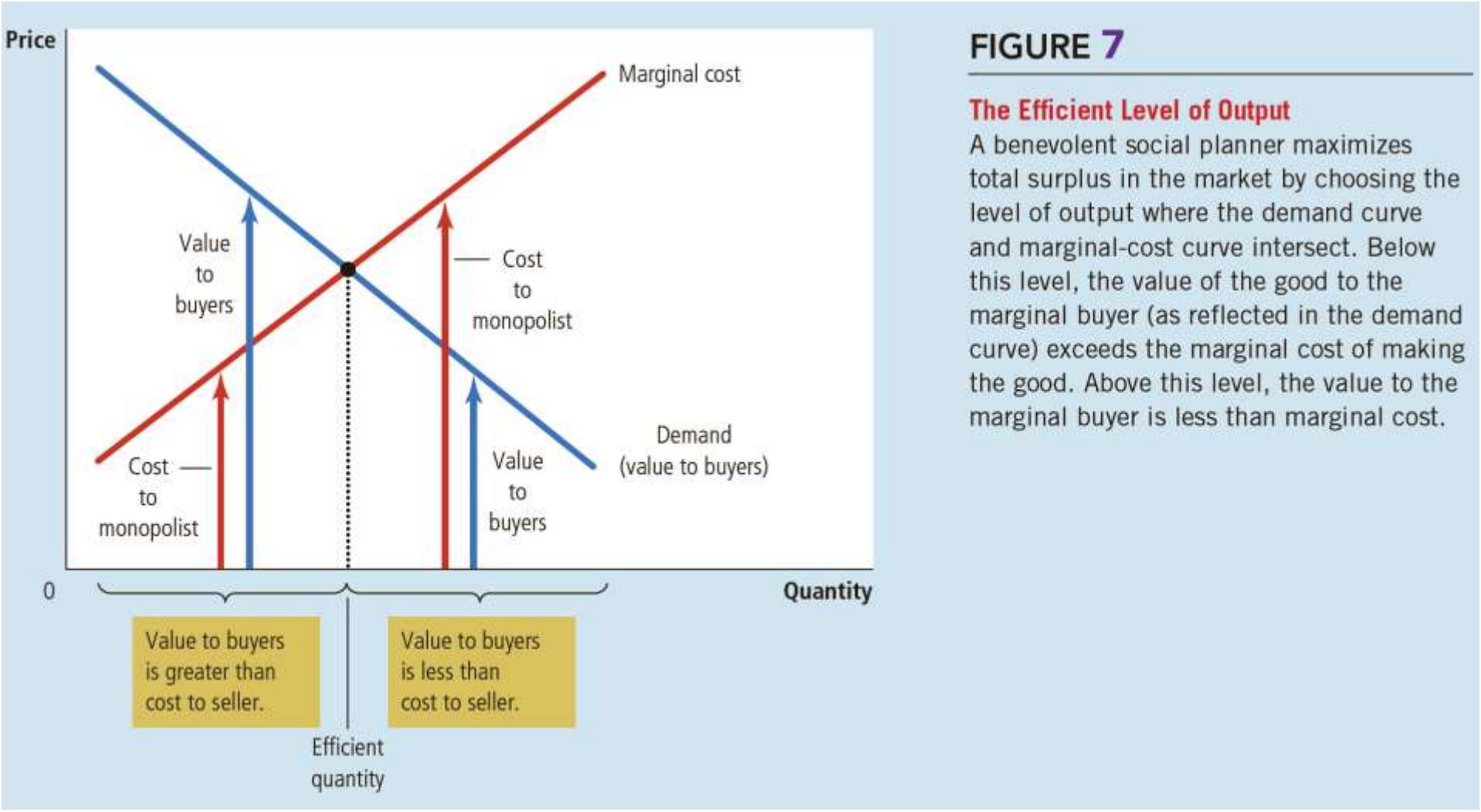


FIGURE 7

The Efficient Level of Output

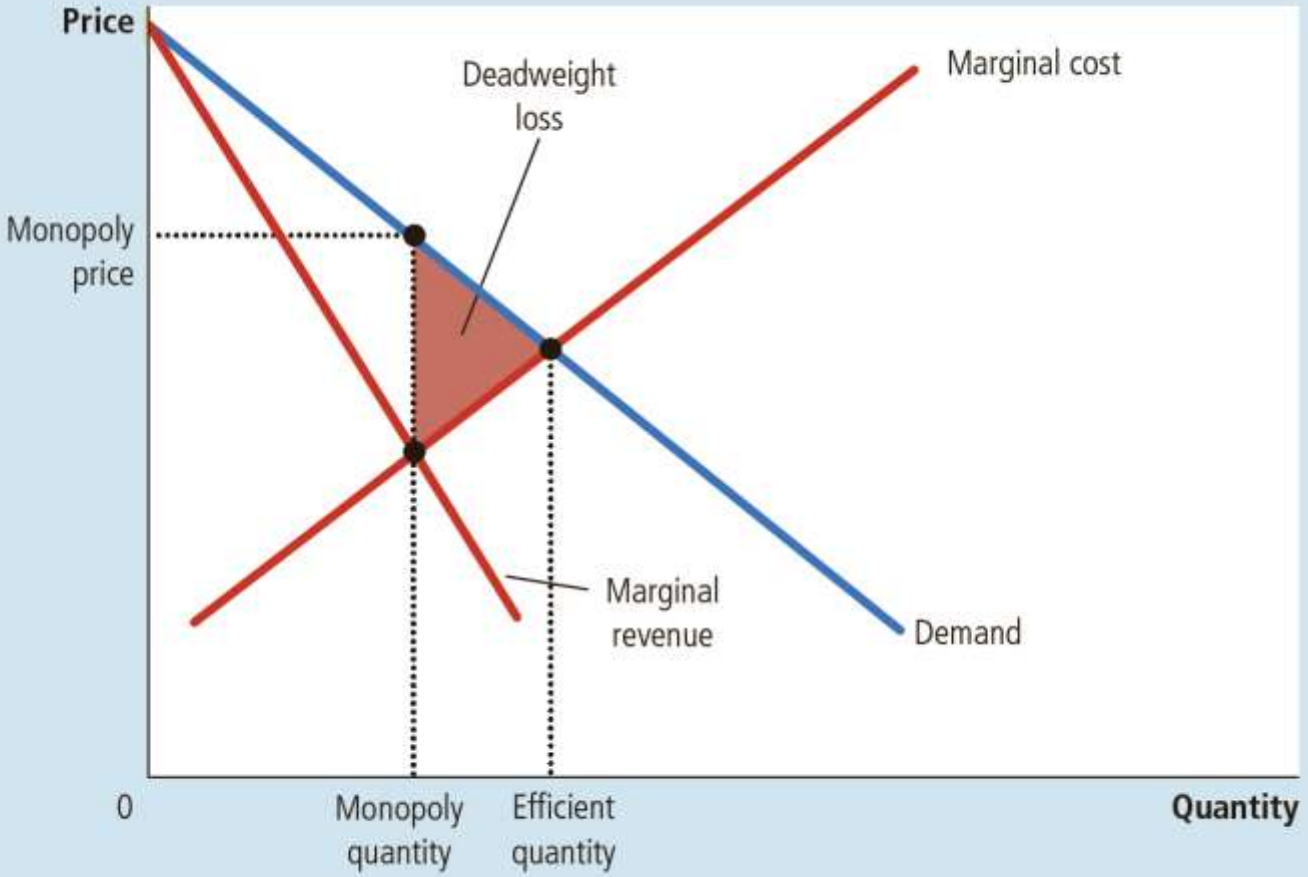
A benevolent social planner maximizes total surplus in the market by choosing the level of output where the demand curve and marginal-cost curve intersect. Below this level, the value of the good to the marginal buyer (as reflected in the demand curve) exceeds the marginal cost of making the good. Above this level, the value to the marginal buyer is less than marginal cost.

3. The welfare costs of monopoly

FIGURE 8

The Inefficiency of Monopoly

Because a monopoly charges a price above marginal cost, not all consumers who value the good at more than its cost buy it. Thus, the quantity produced and sold by a monopoly is below the socially efficient level. The deadweight loss is represented by the area of the triangle between the demand curve (which reflects the value of the good to consumers) and the marginal-cost curve (which reflects the costs of the monopoly producer).



4. Monopolistic competition

To be more precise, monopolistic competition describes a market with the following attributes:

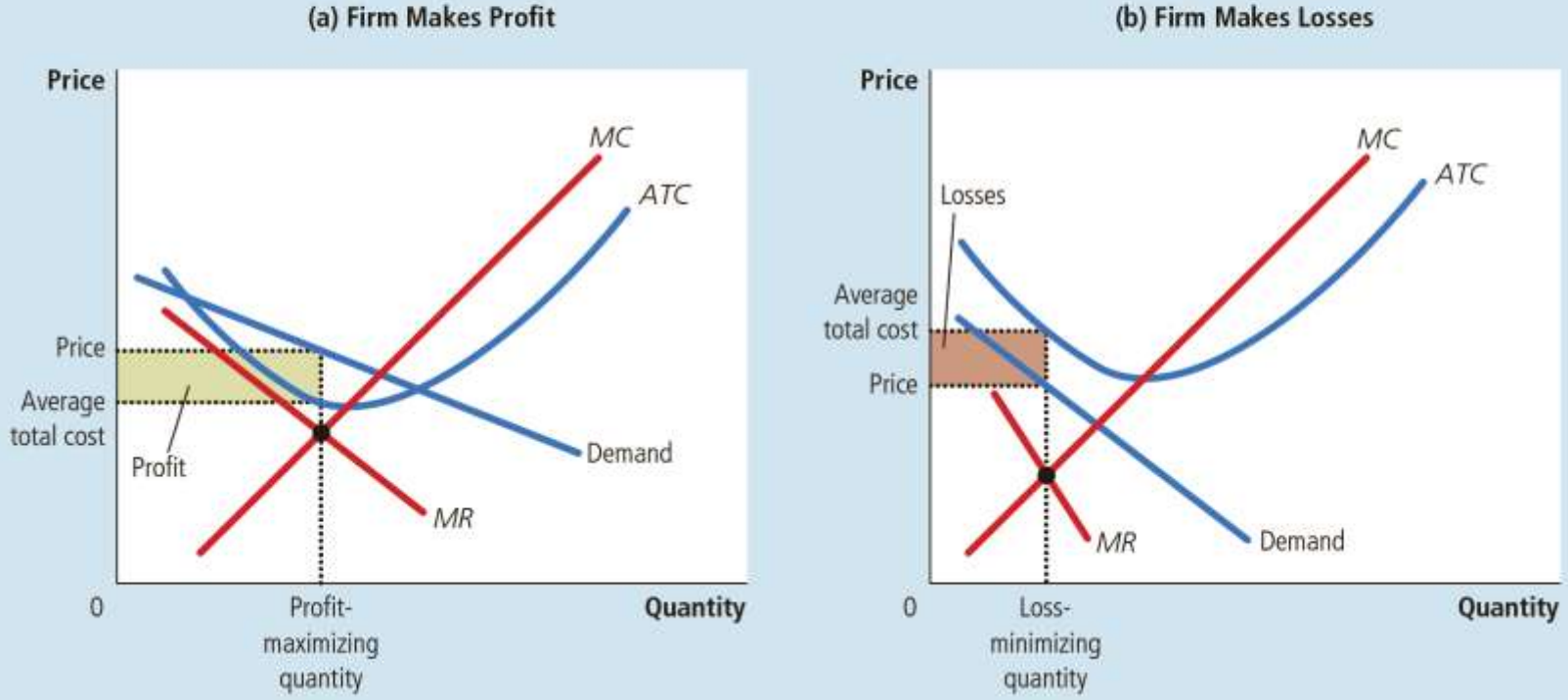
- *Many sellers:* There are many firms competing for the same group of customers.
- *Product differentiation:* Each firm produces a product that is at least slightly different from those of other firms. Thus, rather than being a price taker, each firm faces a downward-sloping demand curve.
- *Free entry and exit:* Firms can enter or exit the market without restriction. Thus, the number of firms in the market adjusts until economic profits are driven to zero.

4. Monopolistic competition…

Monopolistic competitors, like monopolists, maximize profit by producing the quantity at which marginal revenue equals marginal cost. The firm in panel (a) makes a profit because, at this quantity, price is greater than average total cost. The firm in panel (b) makes losses because, at this quantity, price is less than average total cost.

FIGURE 2

Monopolistic Competitors in the Short Run

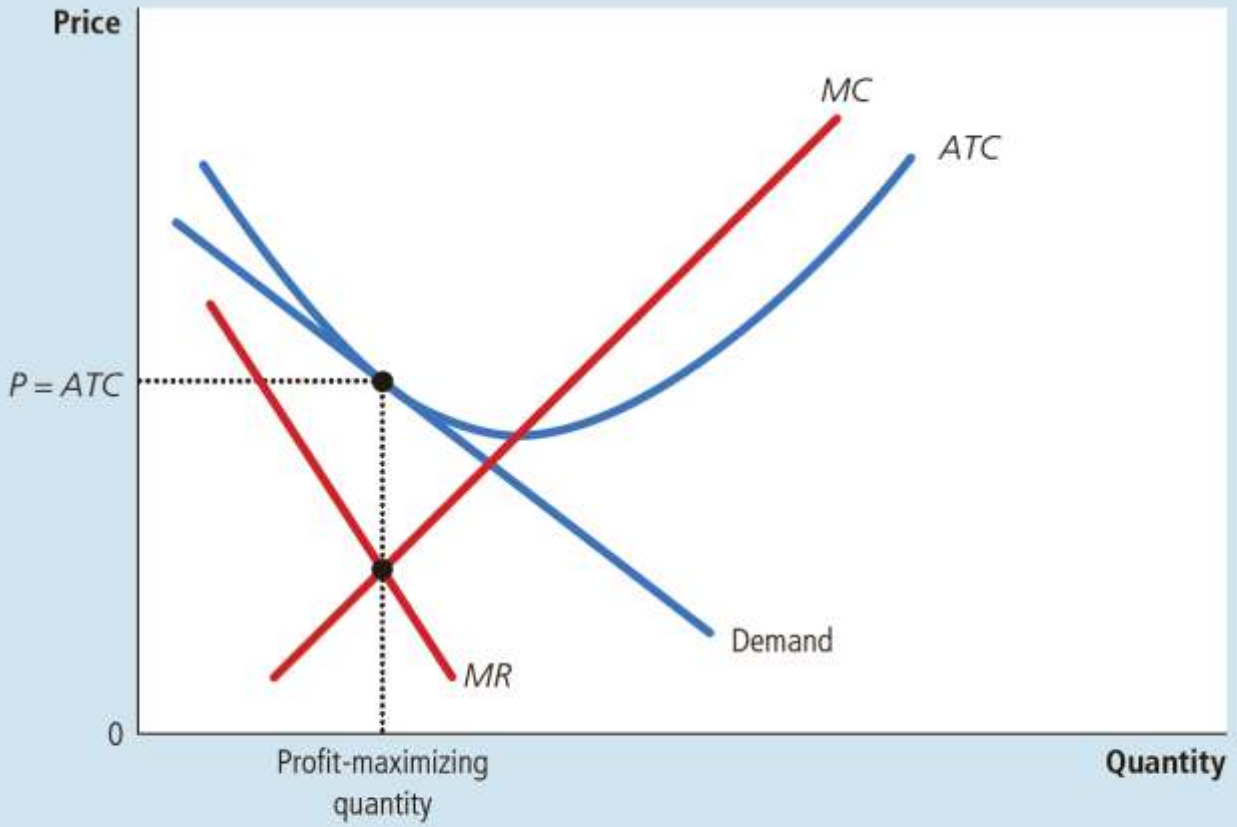


4. Monopolistic competition…

FIGURE 3

A Monopolistic Competitor in the Long Run

In a monopolistically competitive market, if firms are making profits, new firms enter, causing the demand curves for the incumbent firms to shift to the left. Similarly, if firms are making losses, some of the firms in the market exit, causing the demand curves of the remaining firms to shift to the right. Because of these shifts in demand, monopolistically competitive firms eventually find themselves in the long-run equilibrium shown here. In this long-run equilibrium, price equals average total cost, and each firm earns zero profit.

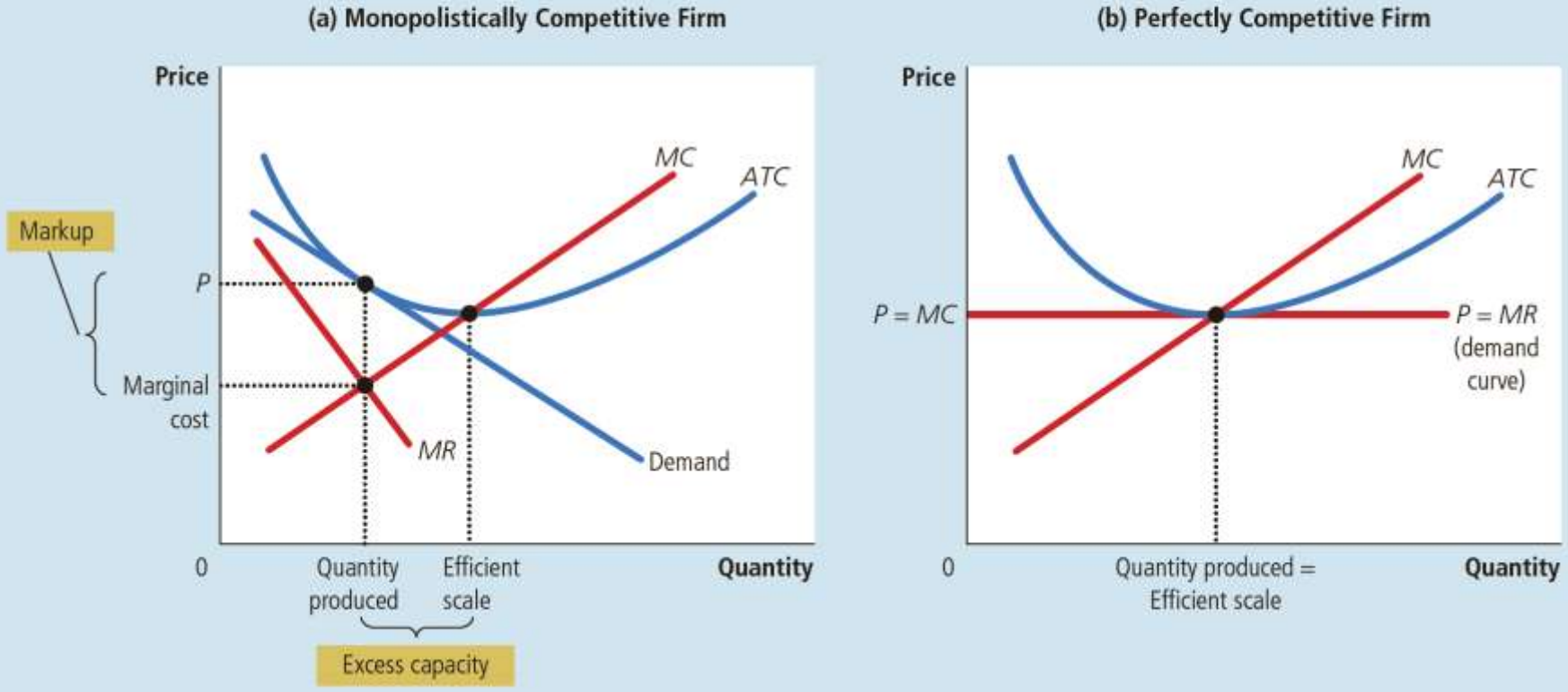


4. Monopolistic competition…

FIGURE 4

Monopolistic versus Perfect Competition

Panel (a) shows the long-run equilibrium in a monopolistically competitive market, and panel (b) shows the long-run equilibrium in a perfectly competitive market. Two differences are notable. (1) The perfectly competitive firm produces at the efficient scale, where average total cost is minimized. By contrast, the monopolistically competitive firm produces at less than the efficient scale. (2) Price equals marginal cost under perfect competition, but price is above marginal cost under monopolistic competition.



5. Oligopoly

In particular, we focus on a "game" called the **prisoners' dilemma**, which provides insight into why cooperation is difficult. Many times in life, people fail to cooperate with one another even when cooperation would make them all better off. An oligopoly is just one example. The story of the prisoners' dilemma contains a general lesson that applies to any group trying to maintain cooperation among its members.

The prisoners' dilemma is a story about two criminals who have been captured by the police. Let's call them Bonnie and Clyde. The police have enough evidence to convict Bonnie and Clyde of the minor crime of carrying an unregistered gun, so that each would spend a year in jail. The police also suspect that the two criminals have committed a bank robbery together, but they lack hard evidence to convict them of this major crime. The police question Bonnie and Clyde in separate rooms and offer each of them the following deal:

"Right now, we can lock you up for 1 year. If you confess to the bank robbery and implicate your partner, however, we'll give you immunity and you can go free. Your partner will get 20 years in jail. But if you both confess to the crime, we won't need your testimony and we can avoid the cost of a trial, so you will each get an intermediate sentence of 8 years."

5. Oligopoly…

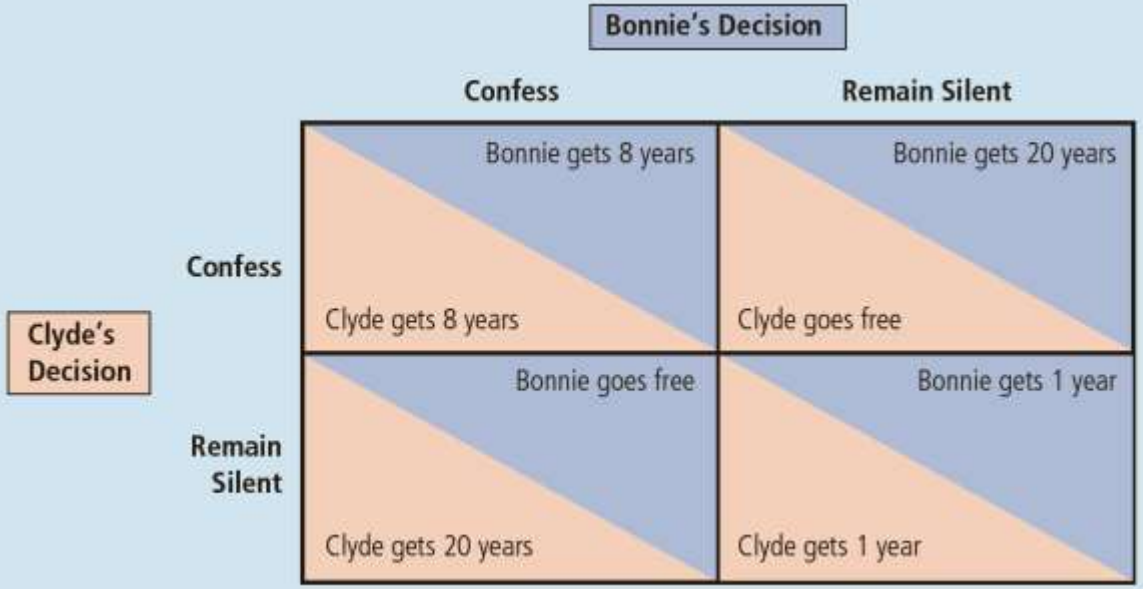


FIGURE 1

The Prisoners' Dilemma
In this game between two criminals suspected of committing a crime, the sentence that each receives depends both on his or her decision whether to confess or remain silent and on the decision made by the other.

Consider first Bonnie's decision. She reasons as follows: "I don't know what Clyde is going to do. If he remains silent, my best strategy is to confess, because then I'll go free rather than spending a year in jail. If he confesses, my best strategy is still to confess, because then I'll spend 8 years in jail rather than 20. So, regardless of what Clyde does, I am better off confessing."

5. Oligopoly…

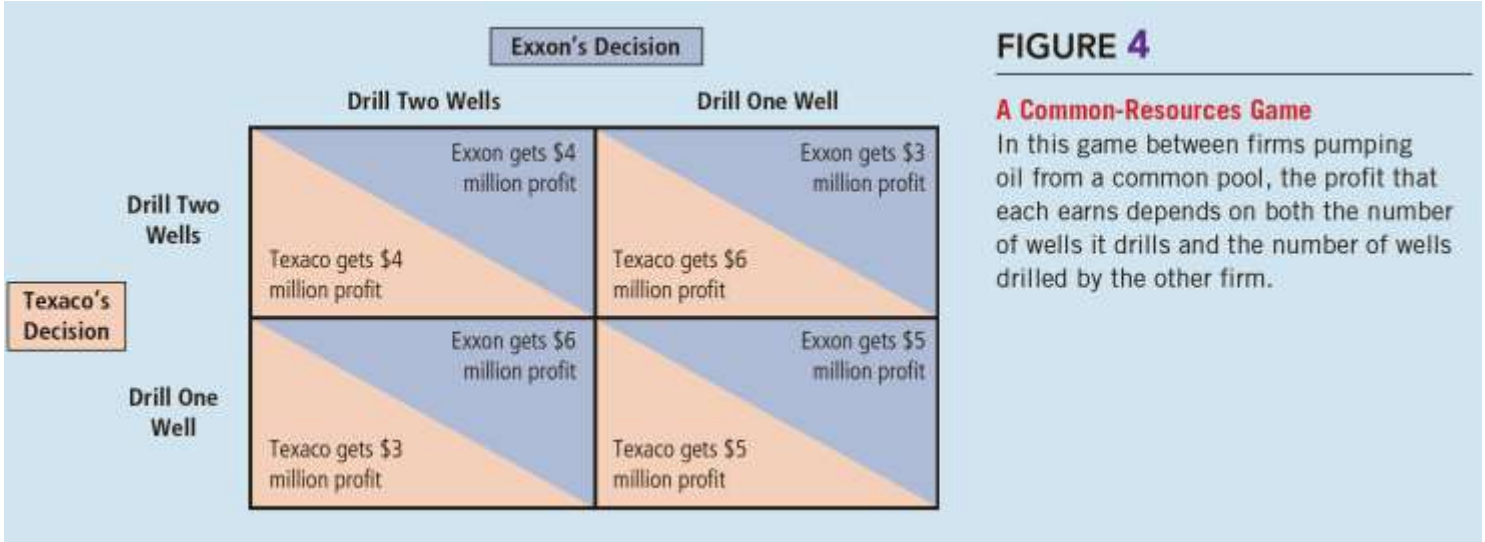


FIGURE 4

A Common-Resources Game
In this game between firms pumping oil from a common pool, the profit that each earns depends on both the number of wells it drills and the number of wells drilled by the other firm.

Imagine that two oil companies—Exxon and Texaco—own adjacent oil fields. Under the fields is a common pool of oil worth $12 million. Drilling a well to recover the oil costs $1 million. If each company drills one well, each will get half of the oil and earn a $5 million profit ($6 million in revenue minus $1 million in costs).

Because the pool of oil is a common resource, the companies will not use it efficiently. Suppose that either company could drill a second well. If one company has two of the three wells, that company gets two-thirds of the oil, which yields a profit of $6 million. The other company gets one-third of the oil, for a profit of $3 million. Yet if each company drills a second well, the two companies again split the oil. In this case, each bears the cost of a second well, so profit is only $4 million for each company.

Figure 4 shows the game. Drilling two wells is a dominant strategy for each company. Once again, the self-interest of the two players leads them to an inferior outcome.

6. Markets drive the specialization strategies of forest communities

A comparative analysis of 61 cases of commercial forest products (mainly 'NTFPs') systems in Africa, Asia, and Latin America provides lessons to help understand the role and potential of markets for forest products to contribute to livelihoods improvement

The study compared a standardized set of descriptors of the characteristics of the forest product, the raw material production system, the market system, and the socioeconomic, ecological and geographic environments for each case.

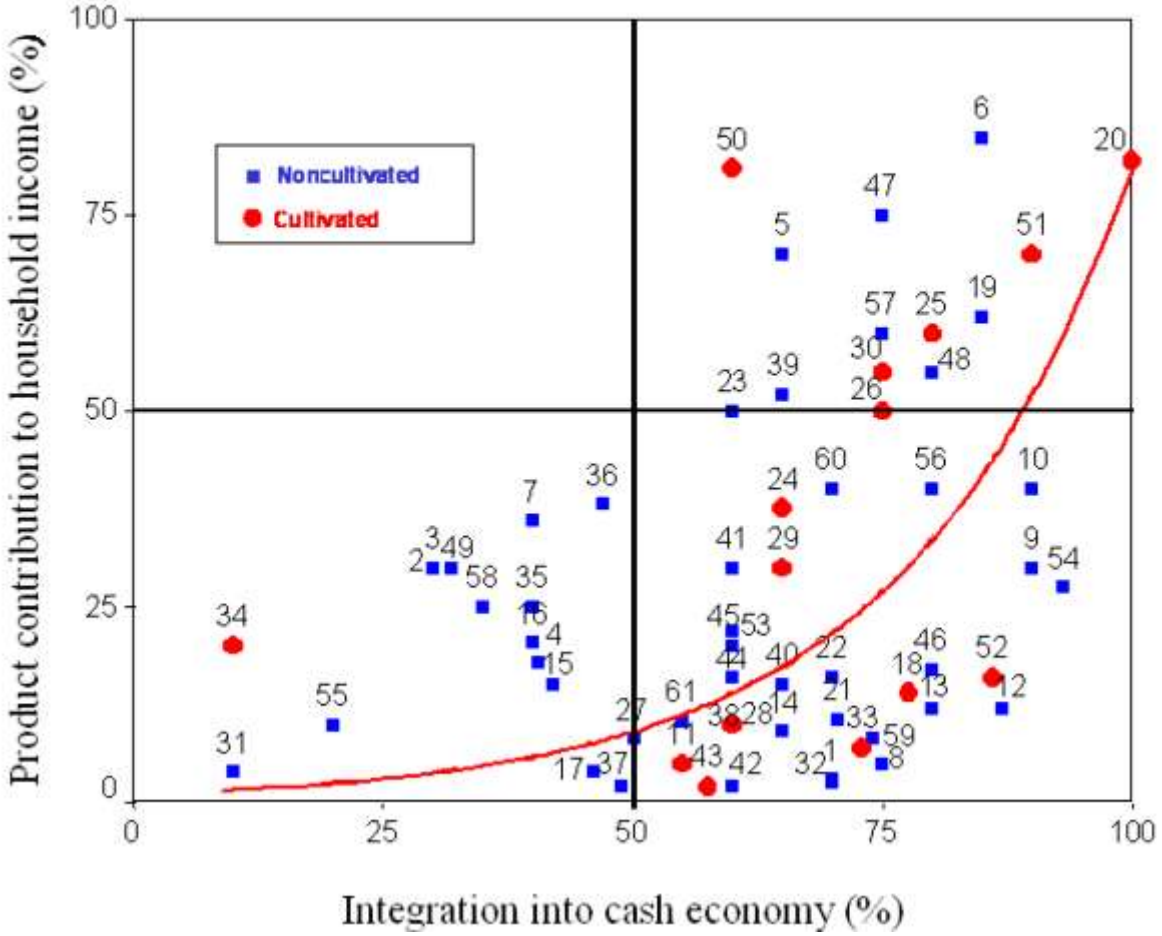
Ref: Ruiz-Pérez, M., B. Belcher, R. Achdiawan, M. Alexiades, C. Aubertin, J. Caballero, B. Campbell, C. Clement, T. Cunningham, A. Fantini, H. de Foresta, C. García Fernández, K. H. Gautam, P. Hersch Martínez, W. de Jong, K. Kusters, M. G. Kutty, C. López, M. Fu, M. A. Martínez Alfaro, T. R. Nair, O. Ndoye, R. Ocampo, N. Rai, M. Ricker, K. Schreckenberg, S. Shackleton, P. Shanley, T. Sunderland, and Y. Youn. 2004. Markets drive the specialization strategies of forest peoples. Ecology and Society **9(2): 4. [online] URL: http://www.ecologyandsociety.org/vol9/iss2/art4**

6. Markets drive the specialization strategies of forest communities

Economic theory predicts that a shift from a subsistence to a cash economy will stimulate specialization to maximize economic opportunities. The degree of integration into the cash economy should influence production strategies. To analyze these relationships, we used a regression of the total contribution of forest products, i.e., subsistence plus cash, to household income (y) as a function of the percentage of local household income earned in cash (x). An exponential curve proved a good fit ($\ln y = 0.044x$; R^2 0.86, $F\,(1,60) = 368.4$, $P = 0.000$), indicating an increasing contribution of individual nontimber forest products (NTFPs) to the household economy of producers as they move from low to high levels of commoditization.

6. Markets drive the specialization strategies of forest communities…

Fig. 1. A regression showing the change in the amount of household integration into the cash economy (percent of total) with the change in the amount a forest product contributes to household income (percent of total).



by the forest product (Fig. 1). A primary classification yielded three main clusters of cases[3], corresponding to:

1. 'Subsistence strategy' in which the producer household was weakly integrated into the cash economy (<50% of total income earned in cash) and in which the forest product contributed less than half of total household income
2. 'Diversified strategy' with high integration into the cash economy and low contribution from the forest product
3. 'Specialised strategy' with high integration and high contribution of the forest product.

The study also noted that commercial forest-product production is commonly integrated with other economic activities at the household level. In all of the cases studied, the producer household had some other economic activities and in most cases the commercial forest product contributed less than half of total household income. Households with higher incomes achieved this either through intensified production of higher-value forest products or from off-farm income (a very important means of poverty alleviation!).

6. Markets drive the specialization strategies of forest communities…

Table 1. Significant associations of key variables with household economic strategies. Values reported are median values. NTFP = Nontimber forest products; Kruskal-Wallis = Kruskal-Wallis nonparametric test (df = 2).

Variables	Household strategy			Kruskal-Wallis	
	Subsistence	Diversified	Specialized	χ^2	*P*-value
Land price at purchasing power parity (U.S.$/ha)	416.8	1195.2	1285.68	5.24	0.073
NTFP producers household income at purchasing power parity (U.S.$/yr)	2575	3119	4575	7.31	0.026
NTFP used by household	8	4	4	15.46	0.000
NTFP producers income to local average	0.86	1	1.11	6.78	0.035
Price of raw material (U.S.$/kg)	0.13	0.36	0.565	7.71	0.021
Value of production (U.S.$/ha/yr)	0.39	1.95	49.11	10.21	0.006
Value of production per person-day (U.S.$)	0.02	0.59	1.08	5.36	0.070
Estimated raw material trade in area (U.S.$/yr)	14,250	20,160	400,000	9.15	0.010

6. Markets drive the specialization strategies of forest communities…

Table 2. Significant associations for key variables in cases from three regions: Asia, Latin America, and Africa. Values reported are media values. NTFP = Nontimber forest products; Kruskal-Wallis = Kruskal-Wallis nonparametric test (df = 2).

Variables	Region			Kruskal-Wallis	
	Asia	Latin America	Africa	X^2	*P*-value
Population density (persons/km²)	75.1	22.3	11.1	10.65	0.005
Elevation of study area (miles above sea level)	600	200	400	8.30	0.016
Road density (km/km²)	0.44	0.17	0.12	5.56	0.062
Precipitation (mm)	1859	1950	944	11.02	0.004
Percentage of product harvested from wild population	40	97	100	8.06	0.018
Labor intensity in NTFP production (person-days•ha^{-1}•yr^{-1})	30	2	4	5.68	0.058
Land price at purchasing power parity (U.S.$/ha)	2640	675	368	16.30	0.000
Time to harvesting maturity (years)	7	10	15	6.86	0.032
Reproductive period (years)	5	7.5	20	13.64	0.001
Average household size	5	5.5	6	8.39	0.015
Local labor rate (U.S.$/day at purchasing power parity)	6.55	10.25	5.62	5.23	0.073
Number of economically harvestable individual per hectare	400	23	17	8.17	0.017
Value of production (U.S.$•ha^{-1}•yr^{-1})	6.82	2.74	0.43	9.02	0.011
Estimated raw material trade in area (U.S.$/yr)	220,000	70,000	8900	11.28	0.004
NTFP production area per household (ha)	5.9	45.6	132	10.77	0.005
Total trade (export + national)	11,230,000	2,003,000	555,000	11.26	0.003

6. Markets drive the specialization strategies of forest communities…

We expect that different environmental and development conditions will affect the way forests and NTFPs are used. The analysis of our sample shows that African cases tend to have lower household incomes and smaller trade volumes compared to other regions. They also have growing human populations and an expanding NTFP market demand that increases pressure on the resources. Resources are predominantly unmanaged. Producers' organizations tend to be informal, and there is little government intervention or private investment in the sector.

Asian cases tend to have lower rates of local population growth. In Asia, the forest products are also generally managed more intensively than in Africa, and so there are more cases with a stable resource base. Formal producers' organizations are more common in Asia than in Africa, and producers have a better understanding of their legal rights. Both government interventions and private investment tend to be more common in the Asian cases than in the cases in Africa.

The Latin American cases tend to have intermediate economic conditions and population trends, with more variability within the case set than in the other regions. The NTFP market trends in Latin America are also variable, with a higher frequency of unstable boom and bust situations. There is no clear pattern of management regime nor any stability of resource bases. Producers have a medium level of organization, and they are knowledgeable about their rights. There is some support from government and nongovernment organizations, but little private sector investment.

These findings are consistent with Homma's (1992) economic model showing an evolution toward intensive management and cultivation to meet the demand for NTFPs. However, specialization does not require monoculture plantations. Several of our cases within the specialized strategy set rely on managed-forest systems.

The End

Thanks