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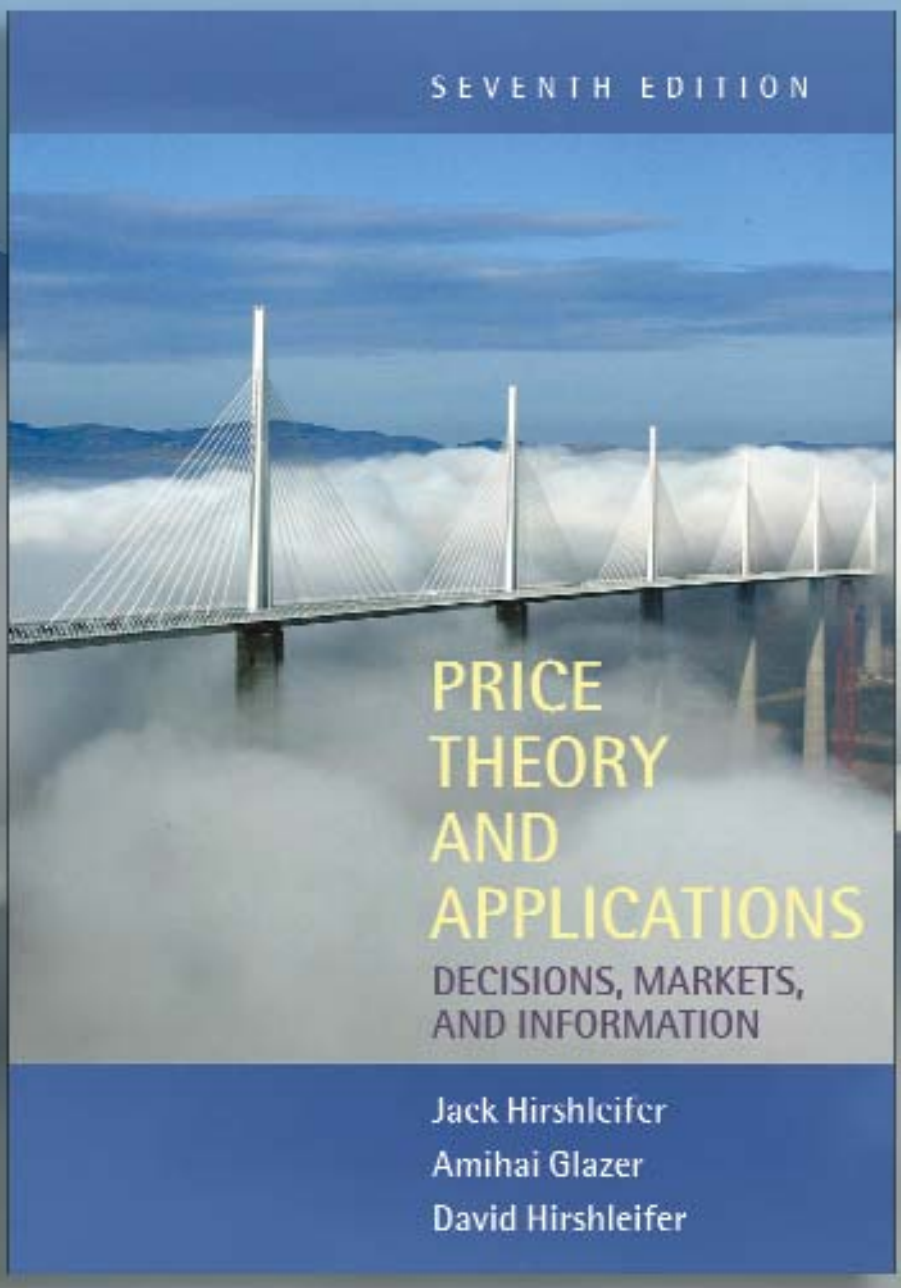

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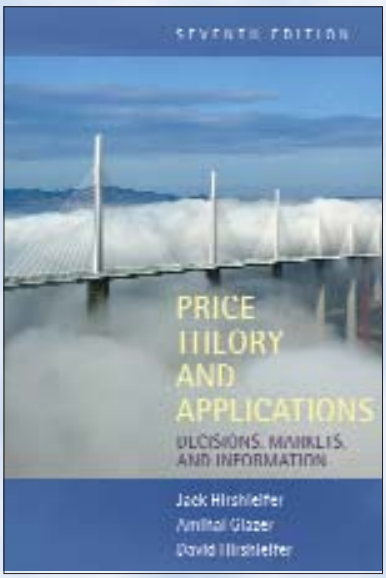
PRICE THEORY AND APPLICATIONS



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Jack Hirshleifer, Amihai Glazer and David Hirshleifer

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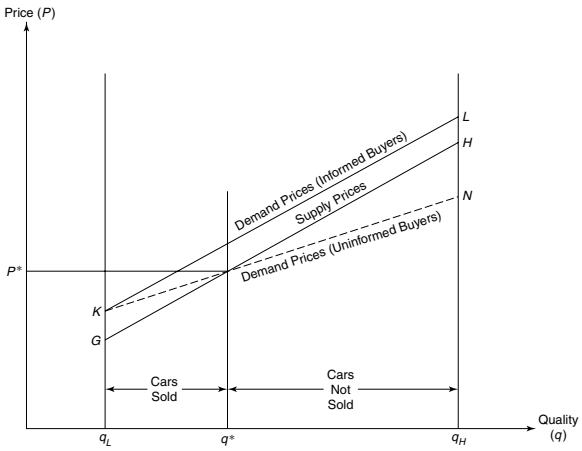

Figure 11.4. The "Lemons" Problem

GH shows the reservation supply prices of the existing owners of used cars, ranked upwards from the lowest-quality car to the highest-quality car. *KL* shows what the corresponding demand prices of the potential buyers would be, if buyers were perfectly informed about quality. Assuming equal numbers of owners and potential buyers, each wanting to sell or to buy a single unit, all the cars would be sold. But when buyers can observe only the *average* quality of the cars currently offered, their demand prices for any quantity on the market are shown by the lower curve *KN*. Point *N* is the buyers' demand price for a car of average quality in the entire population of cars. *KN* intersects *GH* at quantity q^* between q_L and q_H. In equilibrium only the cars with quality below q^* will be sold. The equilibrium price is P^*, where the reservation price of the marginal seller equals the reservation price of the marginal uninformed buyer.

The 'lemons' problem in used cars-- a real-world case of asymmetric information

broken transmission, an employer cannot be certain how well an applicant will perform on the job. All such instances create a problem of *adverse selection*. Low-quality goods or services ("lemons") r

Consider used cars. T
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problems. Were custom
bad cars. But if buyers c
and bad cars end up sell

In Figure 11.4 the h
represents price *P*. Supp

[4] George A. Akerlof, "The M
Journal of Economics, v. 84 (1

Table 10.8 General symmetric payoff matrix

	Left	Right
Top	a, a	c, b
Bottom	b, c	d, d

One might think that mixed strategies are a "purely academic" idea with no practical application. On the contrary, mixed strategies can be observed whenever intelligent play involves keeping the opponent guessing.

EXAMPLE 10.1 MIXED STRATEGIES IN TENNIS

Tennis serves are usually aimed to the receiver's left or right. (Center serves are unusual, at least in championship play.) Since the server needs to keep the receiver guessing, rational play dictates a mixed strategy. The best mixture will depend upon many factors: whether the players are right-handed or left-handed, possible weaknesses of forehands or backhands, individual peculiarities of play, the current point score, the direction of the sun, possible referee bias, and more.

Despite these complications, the *test* of an optimal mixed strategy is that all the pure strategies being played must on average be equally profitable. (If they were not, it would pay to choose the more profitable option more often.) In particular, for the player with the service, serves to the left and serves to the right should have equal success rates.

Mark Walker and John Wooders obtained data on all first serves in 10 important professional tennis matches – most of them final championship matches.[a] If the players were choosing rationally, in a given match there might be a large disparity between the percentages of left and right serves, but left and right serves should have been, on average, equally likely to win points.

Understanding strategy choices and their effects

Mixed strategies in championship play

		Mixture (%)		Win rates (%)	
Match	Server	Left	Right	Left	Right
74 Wimbledon	Rosewall	93	7	71	60
80 Wimbledon	Borg	37	63	70	66
80 US Open	McEnroe	61	39	61	56
82 Wimbledon	Connors	84	16	67	53
84 French	Lendl	37	63	73	69
87 Australian	Edberg	25	75	63	71
88 Australian	Wilander	26	74	80	63
88 Masters	Becker	63	37	72	65
95 US Open	Sampras	56	44	61	85
97 US Open	Korda	63	37	73	63
Average of differences		39.0%		10.4%	

Source: Adapted from Walker and Wooders, Table 1.

The results reported here refer to the service choices of the ultimate match winner when the score was at "deuce." The left-right mixtures are percentages that sum

†12. Why might elected state judges tend to find against out-of-state defendants more often than against in-state defendants?
†13. Why might elasticity of demand for a commodity affect whether government agricultural programs will tend to be designed to improve productivity, versus restricting output?

For Further Thought and Discussion

†1. We could regard the first section of the chapter as an "economic" approach to politics, considering government as a (more or less imperfect) provider of goods that citizens desire. Explain this approach to the political process. Are there other approaches?
†2. Would the fidelity of the political system to citizen desires be improved by any or all of the following: more frequent elections, more numerous legislatures, elected rather than appointed judges, the spoils system rather than the merit system in the civil service? Comment.
†3. If votes could be bought for money, would both the rich and the poor be better off, in accordance with the mutual advantage of trade? What is the objection to buying votes for money?
4. Under what political mechanisms or situations do majorities tend to exploit minorities? Under what mechanisms or situations is it the other way around?
†5. Which is more likely to gain legislative approval: a bill that redistributes cash income from the rich to the poor, or one that establishes a bureaucracy to provide services to the poor? Explain.
†6. Suppose there were a sudden unexpected increase in demand for a product now provided through the government sector. Would you expect any systematic differences in the price-quantity response as compared with a product provided through the private sector?
7. Under a system that might be called "open corruption," government officials (including judges) could sell their decisions to the highest bidder. How bad would this be?
†8. In rent-seeking competition there tends to be a higher intensity of struggle when the two sides have relatively equal valuations for the prize. Can you explain why?
9. Draw figures analogous to those in Figures 17.3, 17.4, and 17.5 where beliefs, opportunities, or preferences are not symmetrical. For example, suppose the Blues are sympathetic to the Grays but the Grays are hostile to the Blues.
†10. Under what conditions, if any, can the argument for appeasement make sense?
11. Can you give an intuitive explanation for why, when the degree of rivalry is greatest, the advantage lies with the second-mover, whereas when rivalry is least the advantage lies with the first-mov
12. According to the 19th c
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Thought-provoking review questions on government, politics, and conflict

two Marginal Cost curves. Assuming both Marginal Cost curves rise throughout as illustrated here, this is indeed the best division of the given output q between the two plants.

What if the MC_a and MC_b curves, each an increasing function of its own plant output, never intersect? This means that, for the specified total output q, one plant's Marginal Cost is *always* higher than the other's. Then the plant with the lower Marginal Cost should produce all the output.

EXERCISE 6.4

(a) Suppose the Marginal Cost functions for the two plants are $MC_a = 5 + 2q_a$ and $MC_b = 40 + q_b$. If the total output is $q = 25$, how should the outputs be divided? (b) What if the total output were $q = 15$?

ANSWER: (a) Setting the Marginal Costs equal implies $5 + 2q_a = 40 + q_b$. Making use of $q_a + q_b \equiv q = 25$ and substituting, the solution is $q_a = 20$, $q_b = 5$. (b) For $q = 15$, setting the Marginal Costs equal would indicate a negative output for plant b. This is impossible. The explanation, which can be verified by sketching, is that the MC_a and MC_b curves do not intersect when the required total output is $q = 15$. The best solution is to assign all output to the lower-cost plant in Albany, that is, to set $q_a = 15$ and $q_b = 0$. At $q_a = 15$ the Albany plant's MC_a is only 35, whereas MC_b is *never* less than 40.

Now consider the second part of equation (6.10). Output q cannot be taken as given, but must be chosen so that MC_a and MC_b both equal MR = Price. In Figure 6.4 the bold curve MC represents the *firm's* Marginal Cost function. It is the horizontal sum of the separate MC_a and MC_b curves.[18] Thus, setting $MC = P$ as illustrated in the diagram also implies setting $MC_a = MC_b = P$ in accordance with equation (6.10). The overall optimal firm output q^* and the separate optimal plant outputs q_a^* and q_b^* can be read off along the horizontal axis.

Exercises and solutions to the key concept of marginal cost

EXERCISE 6.5

Using the Marginal Cost data of the previous exercise, suppose the market price is $P = 45$. (a) Find the optimal outputs for the separate plants and for the firm as a whole. (b) What is the equation for the *firm's MC* curve in Figure 6.4?

ANSWER: (a) The conditions $MC_a = MC_b = P = 45$ imply $q_a = 20$ and $q_b = 5$, so $q = 25$. (b) The trick here is to remember that we are *summing quantities*. The separate plant Marginal Cost equations can be written $q_a = (MC_a - 5)/2$ and $q_b = MC_b - 40$. Summing over quantities, and remembering that the firm's MC is defined in terms of the equated values of $MC_a = MC_b$, we have $q = (MC - 5)/2 + MC - 40$. Solving, $MC = 2/3 \times (q + 42.5)$. As a check, setting this MC equal to $P = 45$ does confirm the solution $q = 25$.

[18] Notice that the MC_b curve for the higher-cost plant does not enter into the horizontal summation until MC_a equals the minimal (initial) level of MC_b. (For a somewhat similar geometrical construction see Figure 2.5, "Introduction of an Import Supply.")