

Two-Part Pricing

*This note examines a form of sophisticated pricing called **two-part pricing**. Prior to class, please prepare your answers to the problem on page 6. You do not need to hand in your work on this problem; however, please be prepared to state your answers and explain how you did it during class.*

Two-part pricing is a clever way to implement a price discrimination strategy. This strategy seeks to extract all of a consumer's surplus from his or her participation in the market. This strategy is widely used, as it can increase a firm's profits even beyond monopoly pricing that you studied in 603.

How is this possible? Two-part pricing uses an upfront fee (many times called an "entry", "access", or "membership" fee), and an additional price for each unit of product consumed (a price per use). Examples include razors and razor blades, cameras and film, health club memberships, amusement/theme-park pricing, and cellular phone pricing.

The problem that arises in implementing two-part pricing is to set the most profitable combination of the upfront fee (entry fee) and the additional price for each unit purchased. Figure 1 shows the situation with one consumer (or a group of identical consumers). The optimal strategy is simple: set the entry fee at T (the consumer surplus) and the price-per-use (P) at marginal cost (MC). The profit in this case is:

$$\begin{aligned} \text{Total revenue} - \text{total cost} &= (TR_{\text{Entry}} + TR_{\text{Use}}) - (\text{variable cost} + \text{fixed cost}) \\ &= (T + F) - (F + \text{fixed cost}) \end{aligned}$$

since the revenue from charging a price-per-use is the same as the total variable cost in this example. The total profit = $T - \text{fixed cost}$.

Note that this yields the same result as first-degree price discrimination.

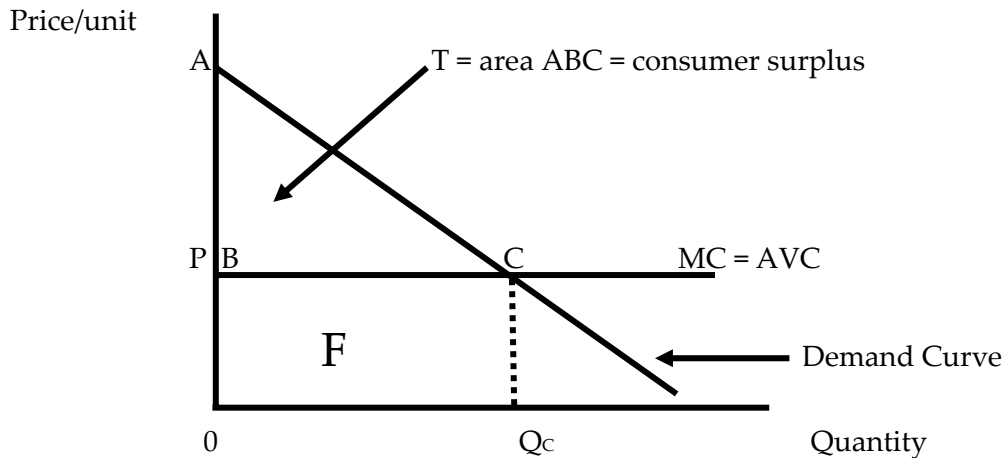


FIGURE 1. *Two Part Pricing with a Single Consumer*

Note that, with a single consumer (or set of identical consumers), the optimal price-per-use equals marginal cost regardless of the shape of the marginal cost curve. The entry fee still equals consumer surplus. Figure 2 shows this, with a rising marginal cost curve. The only difference from Figure 1 is that the firm now makes some additional profit because its marginal cost is lower than the price-per-use for each unit less than Q_c . The additional profit is area BCE.

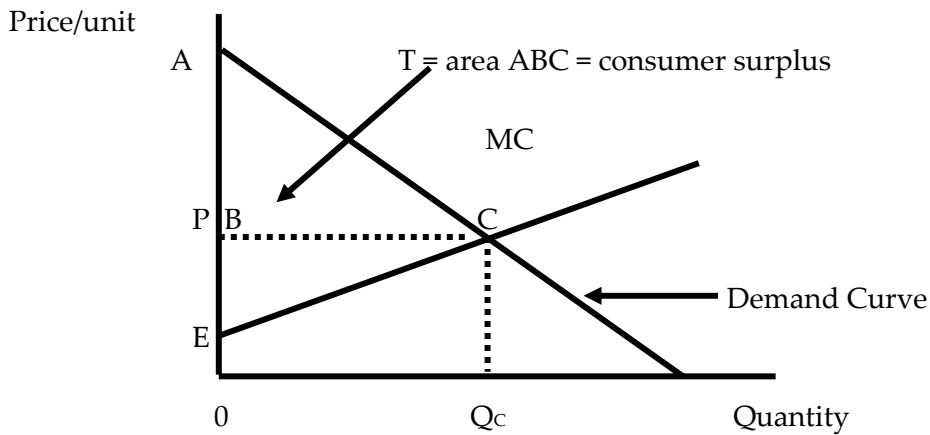


FIGURE 2. *Two Part Pricing with Increasing MC and a Single Consumer*

The two-part pricing strategy is most effective when consumers have similar demand characteristics. We illustrate the strategy with an example problem.

Example: Tennis Club Memberships

You manage a tennis club and wish to restrict membership to those consumers with a high demand (serious players). You estimate there are about 1,000 such players, and that the relevant demand function for each player is

$$Q = 6 - P$$

where Q is the court hours per week and P is the per-hour court use price. Fixed costs are \$5,000 per **week** and the marginal cost is \$0 (there are lots of courts).

(a) At what price should you set the **annual** membership fee to maximize profits, and what will your average weekly profits be?

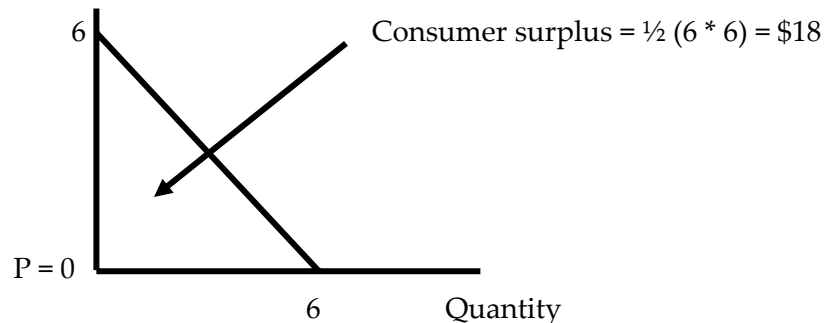
(b) Compare the total profit with this two-part price to the profit the club would earn if you used standard monopoly pricing. This means having an upfront fee of zero, and choosing the usage price to maximize profit.

(c) How would your answer to (a) change if the marginal cost of providing an hour of tennis was $MC = \$1$, instead of zero?

Analysis for (a)

Step 1: Calculate the total consumer surplus for each consumer.

Since marginal cost is \$0, you can maximize the membership fee (and still cover your marginal costs) by setting a usage price of \$0 and setting the fee at consumer surplus:



So: The manager should charge each consumer (just under) \$18 per week as the membership fee, and allow all players who pay the membership fee to use the courts for free.

Step 2. Now calculate the weekly total profit:

$$\Pi_{\text{Week}} = \text{TR} - \text{TC} = (1,000 * \$18) - \$5,000 = \$18,000 - \$5,000 = \mathbf{\$13,000}$$

Step 3. Calculate the annual profit and annual membership fee:

$$\Pi_{\text{Year}} = (\$13,000 / \text{week}) * (52 \text{ weeks/year}) = \$676,000 / \text{year}$$

$$\begin{aligned} \text{The annual membership fee} &= (\$18 / \text{customer per week}) * 52 \\ &= \mathbf{\$936 / \text{person per year.}} \end{aligned}$$

Note that there is no usage fee because the marginal cost is \$0. *You should be clear about why setting the usage price fee equal to MC maximizes profits here.*

Analysis for (b)

This is the same type of monopoly pricing question you encountered (toward the end of) MGEN 603 during pre-term. If the fixed fee is zero, then profit is

$$\begin{aligned} \Pi_{\text{Week}} &= \text{total revenue} - \text{total cost} \\ &= P * \text{total demand} - \text{variable cost} - \text{fixed cost} \\ &= P * (1,000 * Q(P)) - \text{fixed cost} && (\text{since } mc = 0) \\ &= P * (1,000 * (6 - P)) - \$5,000 \end{aligned}$$

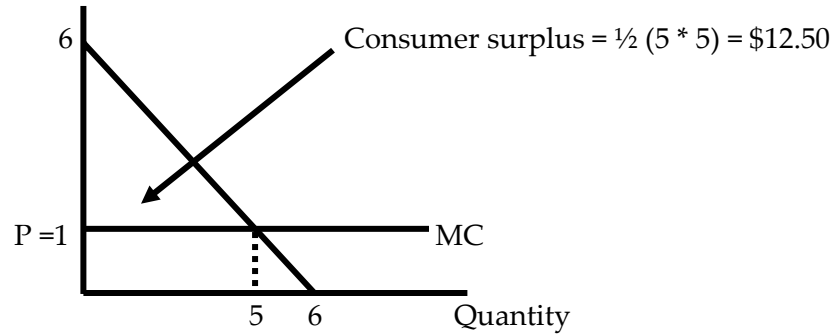
Marginal revenue is $MR = 1,000 * (6 - 2P)$, so setting $MR = MC$ (which is zero) and solving for price gives the answer: The monopoly price is $P^M = \$3$. Profit under standard monopoly pricing is then $\mathbf{\$4,000 / \text{week}}$, or $\mathbf{\$208K}$ per year.

The Key Point. A firm using two-part prices can make at least as much profit as it could using uniform pricing—even monopoly pricing. Often, it can make much more.

Remark. We distinguish between the usage price when two-part pricing is used, versus the optimal price when no upfront fee is used (that is, standard monopoly pricing, P^M). To do so, the standard monopoly price is sometimes called the *best uniform price*.

Analysis for (c)

If the marginal cost is \$1, then consumer surplus is \$12.50. See the graph below:



Step 1: Set the membership fee at $CS = \$12.5$; the usage price at $P = \$1$.

Step 2: Weekly profit is now:

$$\begin{aligned}\Pi_{\text{Week}} = TR - TC &= TR_{\text{Entry}} + TR_{\text{Use}} - \text{variable cost} - \text{fixed cost} \\ &= (1,000 * \$12.5) + (1,000 * 5 * \$1) - (1,000 * 5 * \$1) - \$5,000 \\ &= \$7,500\end{aligned}$$

Step 3: Yearly profit and annual membership fee:

$$\Pi_{\text{Year}} = (\$7,500 / \text{week}) * 52 = \$390,000 / \text{year}$$

$$\begin{aligned}\text{The annual membership fee} &= (\$12.5 / \text{customer per week}) * 52 \text{ weeks / year} \\ &= \$650 / \text{customer per year}.\end{aligned}$$

Two Part Pricing with Non-Identical Consumers

When demand across consumers is not identical, the optimal strategy is more complicated. In this case, the usage fee cannot be set at marginal cost if you are to serve multiple consumer types. *Often, the usage fee is set greater than marginal cost.*

The key tradeoff facing managers is that a lower entry fee means more consumers will initially purchase the product or service, and returns from subsequent use will increase. However, as the entry fee is lowered, the profitability derived from the entry fee is reduced.

Most managers solve the pricing problem with a trial and error approach. If the demand curves for consumers are known, however, the problem can be solved analytically. The optimal strategy is best illustrated through a problem. The problem below will be the basis for our discussion of two-part pricing in class.

Problem to Prepare for Class

Note: You may use Excel in answering this question. This problem will be the basis for our discussion in class; you do not need to hand in your solution. For class, please be prepared to state your answers and how you solved it (or, at least, explain as far as you were able to get).

Suppose again that you manage a tennis club. However, you know that there are two different types of potential club members: High-demand types (serious players), and low-demand types (casual players). The demand for court time of a serious player is

$$Q^S = 6 - P$$

where Q is the court hours per week and P is the per-hour court use price. The demand for court time of a casual player is lower:

$$Q^C = 4 - P.$$

Suppose that there are 1,000 serious players and another 1,000 casual players in the local market. Fixed costs are \$5,000 per week, and marginal cost is \$0.

(a) Suppose first that you do not use two-part pricing. What is the optimal monopoly price to charge per hour of court use, if you cannot charge an upfront membership fee? (You must charge the same price per hour to both types of players). How much profit will this make?

(b) Find the profit-maximizing two-part pricing strategy. What is the optimal membership fee (per week) and the optimal usage price? *Note: You must offer the same membership fee and usage price to all potential customers (you can't tell them apart ex ante).*

(c) Suppose that you could acquire the club from its current owner for \$10,000 per week, and then set a new membership fee and court-use price as you see best. Is buying the club a profitable investment? (Assume all financing costs are included in the \$10k/week price. That means you may ignore discounting here.)

Managerial Implications

1. *The Key Point.* Generally speaking, two-part pricing works well when consumers desire to make repeat purchases (or visits) from the same seller, for the same type of good or service. When it is feasible, two-part pricing will typically yield higher profits than even the best uniform pricing strategy (monopoly pricing).

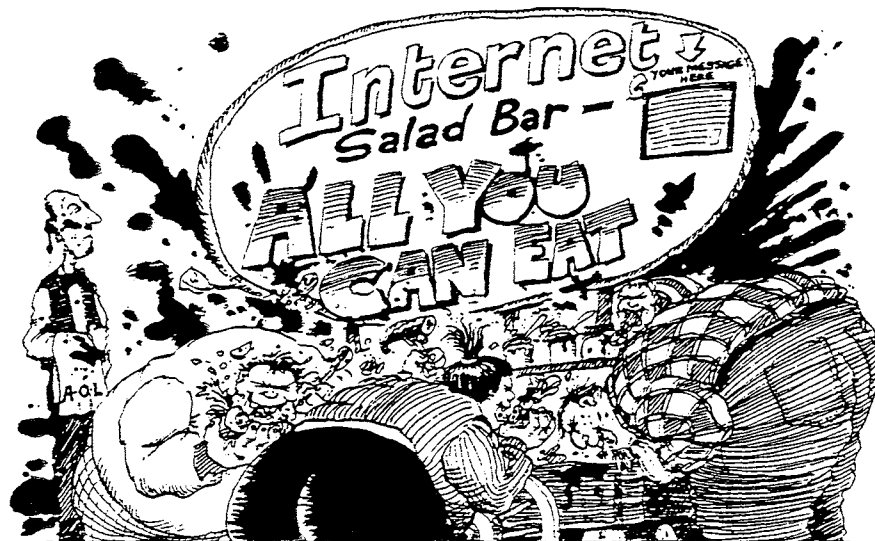
2. *Practical limitations.* There are two. One is the need to be able to “identify” whether each particular customer has paid the fixed fee or not when he/she makes purchases (or uses a service) later. This is why Costco has membership cards, amusement parks stamp your hand (or don’t let you out), and so on. The second practical limitation is that two-part prices have little value if the consumer is buying at most one unit of the good. There is not much point in charging a two-part price for a new car if you run a Honda dealership, for example, or if you are running a restaurant for tourists who are unlikely to return.

3. *Cost considerations.* The key long-run tradeoff managers must consider is between a high entry fee (lower number of consumers demanding service but greater profit per consumer) and a lower entry fee (higher number of consumers demanding service but lower profit per consumer). In thinking about this tradeoff, the cost of serving each customer should come into play (see the AOL article, below).

4. *The “price menu” strategy.* One extension managers use (remember this is often a trial and error process) is to offer consumers a “menu” of several two-part price options, and let consumers reveal their reservation prices. This is what mobile phone companies do in offering a choice between packages with a low monthly fee and a small allowance of “free minutes,” or packages with a high monthly fee and a large allowance of “free” minutes. Non-profit museums and other organizations do much the same thing, offering consumers the choice between a “membership” that allows “free” unlimited visits, or a higher per-visit admission price if a visitor does not pay the membership fee.

Application: ISP Pricing

AOL introduced the two-part pricing strategy (with a zero usage price) into the internet access service industry back in 1997. It has proven a big success, and is now the dominant (almost exclusive) form of pricing by internet service providers to residential consumers in the U.S. Consider the attached article from *The Economist*, “Making a Business of the Buffet.” What did AOL do wrong at the start? What should they have done differently?



Internet service providers

Making a business of the bit buffet

Is offering Internet users an all-you-can-eat menu a recipe for bankruptcy or long-term success?

SELLING access to the Internet looks easy enough. The number of customers, already in the tens of millions, is doubling each year. Providing them with some software, a telephone number they can dial from their computer and a link to the Internet is so simple that a technically literate teenager can offer such a service from a bedroom—as some have. For that, you can charge customers \$240 a year, more than most spend on their local telephone bill. The Internet service industry earned revenues of \$1.4 billion in America alone last year, an amount that is expected to rise to nearly \$30 billion by 2000.

Yet most specialist Internet service providers (ISPs) are losing their shirts (see chart). In the past year alone, America Online (AOL), the biggest, lost \$477m. CompuServe, the second, lost \$103m; the losses of the third, Microsoft's MSN, are not disclosed by its parent company but are reckoned to be as big. Robert Massey, CompuServe's president, recently resigned, citing the stress of his job; over the past quarter the firm has lost 100,000 customers from its main service, and laid off 500 employees.

These three all offer their own information and entertainment services as well as access to the Internet. But even the smaller ISPs which provide simple Internet access are bleeding: PSINet lost \$55m last year, for instance, and Netcom \$44m.

Much of the problem has been a price war, sparked by AOL's decision in early December to offer a \$19.95 flat fee ("all-you-can-eat") pricing system. AOL boomed, but at a cost. Within two months, more than 1m

new members joined, and at the same time many of the existing ones doubled their usage. That overwhelmed the service, which had about a third as many modems per user as most of its competitors. As AOL's 8m customers struggled with engaged signals, some aggravated the problem by remaining on-line permanently (since local calls are not charged by the minute in America, it cost nothing extra to do so). This led to a vicious circle, where even moderate users were forced to sit on-line simply to get a connection. AOL's flat-fee system seemed to have blown up in its face.

In fact, most ISPs, including MSN, have recently been offering flat fees, usually without riots. Unlike AOL, they have had enough modems to meet most of the demand. But building that extra capacity has cost them any profits they might have wrung from their subscribers.

Please hold

AOL has pacified its furious subscribers (and fended off the class-action suits they were threatening) by promising to invest \$350m in new infrastructure. But its troubles have highlighted the whole industry's financial crisis, which most firms lay at the feet of flat fees. Which is too bad for them, for though companies may moan, consumers love flat fees. ISPs must therefore

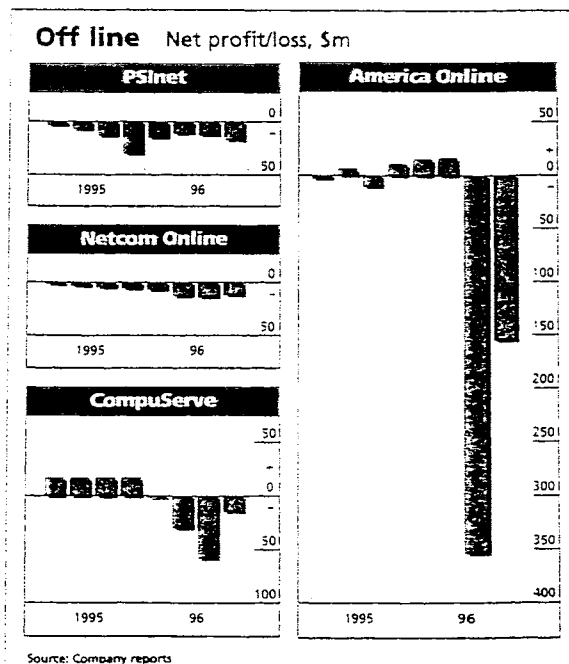
choose: they can keep low flat fees as a loss-leader for other services; or they can offer internet access alone, but raise the price in exchange for a better service to the discriminating user.

Most of the big service providers, including AOL, MSN and AT&T's WorldNet, are choosing the first option: the all-you-can-eat buffet (although they may look for ways to persuade extra-greedy users to pay more). They are also trying to fine-tune their network spending so they can more-or-less break even on providing basic access.

So how can they earn decent returns? The answer seems to be by selling subscribers other products with higher margins. In late February, AOL announced that Tel-Save Holdings, an American long-distance telephone company, was paying \$100m in cash in exchange for an agreement by AOL to offer Tel-Save's services to its subscribers for at least three years. By 2000 AOL hopes that nearly half its revenues will come from advertising, commissions and profit-shares with those firms that offer services and products on its network (the share is less than 15% now).

MSN plans to make money the same way, by using its access business as a break-even (or even slightly loss-making) way of bringing traffic to its content "channels" (which range from a travel service to a Star Trek site). It can sell advertising on these channels and make money from transactions there. AT&T hopes that its Internet service will help it to recruit long-distance and mobile-telephone customers, by offering package deals and the like.

Smaller ISPs, that do not have other businesses to milk, are now choosing the second option: higher flat fees or pay-as-you-go. But to justify higher fees, they must



Source: Company reports

BUSINESS

offer better service than their big rivals, most of which have at some time or another annoyed their customers. Netcom, one of the larger independent ISPs, with about 500,000 subscribers, has already announced plans to move away from flat fees: in exchange for usage-based fees, it will offer higher quality connections and services aimed at small business.

A more polarised industry will create problems for companies such as CompuServe, whose own content is too thin to sell much advertising, yet whose costs are higher than a bare-bones provider (the firm hopes to keep its subscribers by emphasising its international reach and business services). Polarisation will also lead to a vast number of takeovers, as the strongest firms fill the niches. Forrester Research, a Boston consultancy, reckons only 100 out of America's 4,400 ISPs will be left by 2000.

Shake-outs happen in all new communications industries. Mark Roberts of Montgomery Securities, a San Francisco investment bank, points out that the one soon to occur in the Internet will be particularly savage because it depends on the fickle and cut-throat consumer market (businesses such as mobile telephones and fax machines began in the corporate market). The strongest survivors will be those that find a way to combine the steady revenues of telecoms with the higher margins of media and advertising. At the moment, most ISPs would be happy with either.
