Two‑part tariffs

Nikolaos Vettas

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Abstract

A two-part tariff is a pricing scheme according to which the buyer pays to the seller a fixed fee and a constant charge for each unit purchased. When it is used, the average price paid decreases as more units are purchased. Further, it is the marginal charge and not the fixed fee that determines how many units will be purchased. Therefore, a two-part tariff can be used as a vehicle for price discrimination and also for manipulating the incentives given to the buyers, allowing also the sellers to capture part of the residual surplus through an appropriately chosen fixed fee.

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1. *Introduction and Definitions*

A two-part tariff is a pricing scheme according to which the buyer pays to the seller a fixed fee and a constant charge for each unit of the product or service purchased.

There are several examples of two-part tariffs in retail markets, including amusement parks, various types of sports, museums, bookstores, discount shopping or other clubs, telephone services, access to website information and other. Two-part tariffs are also often used in wholesale markets where manufactures charge a lump-sum to a retailer for the right to carry their product plus a constant charge per unit ordered by the retailer. Many technology licensing agreements also tend to have this structure, specifying a fixed fee and a royalty for each unit produced.

A two-part tariff represents a special case of non linear pricing, with the distinguishing feature that the charge for each additional unit purchased – in other words, the marginal price – is constant. Under a more general multi-part tariff, the charge for each additional unit would be allowed to change according to the number of units purchased, with the marginal price being constant for a range of units and increasing or decreasing when a larger number of units is purchased. Under an even more general nonlinear pricing scheme, the marginal price could be continuously changing for each unit purchased. Further, linear pricing may be understood as an extreme case of a two-part tariff where the fixed fee is set to zero; the other extreme case is that of only a lump sum payment, independently of the units purchased.

2. *Key Characteristics*

There are two key implications when a two-part tariff is used. First, that the *average price* paid decreases as more units are purchased. Therefore, larger buyers pay less per unit than smaller buyers. Second, that for the buyer who trades according to a two-part tariff, the fixed fee represents a fixed cost. Hence the fixed fee does *not* determine how many units the buyer will purchase, but only whether he will enter into this trading transaction or not. The volume purchased will depend only on the marginal price. These two features of a two-part tariff represent the main reasons why such a pricing arrangement can be used. First, since the average price differs among buyers according to their usage, a two-part tariff can be used as a vehicle for price discrimination, in particular when these buyers will have to self select. Second, since a two-part tariff essentially allows the simultaneous use of two independent instruments, it could imply a more efficient trading transaction than linear pricing: the fixed fee may be used to transfer money from the buyer to the seller in a lump-sum (and, hence, less distorting) way, while the marginal price may be set independently to determine the optimal quantity traded.

3. *Price Discrimination and the Role of Information*

Let us now become a bit more concrete about the incentives implied by the use of two-part tariffs by a single (monopoly) seller. Suppose that the seller has constant marginal cost of production, c, and faces a buyer who values units at different levels, thus implying a standard downward sloping demand. If the seller could only employ a linear price, this price would be higher than c but lower than the maximum valuation of the buyer – this standard monopoly pricing would imply both a social welfare loss (or a deadweight loss) and also that the seller does not capture the entire consumers' surplus. In contrast, if the seller could employ a two-part tariff, he would optimally set the per unit charge to c and the fixed fee equal to the entire surplus that the seller would enjoy at that marginal price. In that case, perfect (first degree) price discrimination is achieved. The result would be a socially efficient allocation (that is, no deadweight loss) with the entire surplus being captured by the seller.

The situation described above would not change by much if there were multiple buyers, each with a downward sloping demand, assuming that the seller could identify the valuation of each buyer and also prevent resale among buyers. Then, the seller could charge a different two-part tariff to each buyer, with a per unit charge equal to c and a fixed fee equal to the valuation that each would enjoy at such a price.

However, when the value of each specific buyer is not known to the seller (but only the distribution of values in the population is known) or when arbitrage cannot be prevented, then perfect price discrimination typically cannot be achieved. In such a case, the seller may design a *menu* of two-part tariffs and allow the buyers to self select. That is, each buyer will choose the tariff that maximizes his own net surplus among all the tariffs available, at the same time choosing the quantity of the product that he will purchase under the tariff selected. The optimal design of the menu has to take into account the relevant 'participation constraints' (in particular, that the fees are not set at levels so high that the buyers will choose to not purchase at all) and 'incentive compatibility constraints' (so that the high value buyers do not select a tariff intended for low value buyers). When the buyers' values can be ranked by type, and under some further conditions, the menu of tariffs that maximizes the seller's surplus has the following features: all types buy less than the socially efficient quantity, except for the highest value type who purchases the efficient quantity; all types are left with some surplus ('information rents': taking advantage of the private information they have about their own values), except for the lowest value buyer from whom all surplus is being extracted by the seller; and the higher the quantity purchased, the lower the average price.

The picture described above is complicated when two-part tariffs are being used by rival oligopolists (see, e.g. Stole, 2007 and Armstrong and Vickers, 2010). In general, competition may diminish the ability of sellers to effectively price discriminate. At the same time, the ability to employ two-part tariffs endows the rival sellers with greater freedom to compete and, in the equilibrium of the corresponding game, profit for the sellers could be lower than the profit they could enjoy under linear pricing.

4. *Vertically Linked Markets*

One case where two-part tariffs are often used is when manufacturers (upstream firms, more generally) sell to retailers (downstream firms). In such a case, the key insight is that the marginal price (but not the fixed fee) charged by each upstream firm determines the marginal cost of the corresponding downstream firm and thus affects how it will behave in the downstream market.

When there is upstream and downstream monopoly, the use of a two-part tariff helps the trading partners avoid the 'double marginalization' that would otherwise emerge under linear pricing – this is possible with a tariff that sets the per unit price equal to the upstream marginal cost. Then the total profit of the vertical chain becomes equal to the profit that a vertically integrated monopolist would have. With upstream monopoly and downstream oligopoly, the upstream firms can use a two-part tariff that involves a marginal price higher than the upstream marginal cost, in order to soften competition among the downstream oligopolies – then the fixed fee can be used to capture the residual downstream monopoly profit and transfer it upstream (see e.g. Motta, 2006 ch. 6 for an overview).

When rival upstream firms can use two-part tariffs and the downstream market is oligopolistic, the upstream firms may have an incentive to either increase or decrease (possibly even below their own marginal cost) the marginal price specified in the two-part tariff. In such a way, they can offer some commitment to their retailers to either more or less aggressive behavior (whichever is unilaterally desirable) in the downstream market. As a result, the ability of upstream firms to use two-part tariffs may imply in equilibrium lower final prices and overall profits, than linear pricing, when downstream competition is in quantities (Fershtman and Judd, 1987 offer this insight in the context of managerial incentives and oligopolies, and Brander and Spencer, 1985 in the context of strategic trade policy; Saggi and Vettas, 1999 show how the marginal charge in each upstream firm's tariff depends on the number of the retailers).

5. *Brief guide to some basic references*

While the literature on the use of two-part tariffs has grown significantly the last couple of decades, here is a very brief guide to further reading. A seminal exposition of how two-part tariffs can be used by a monopolist to maximize profit has been offered by Oi (1971). Subsequent analyses of this problem include Ng and Wesser (1974) and Schmalensee (1981) and (on price discrimination and the welfare implications) Spence (1980) and Katz (1983). Comprehensive treatments of nonlinear pricing and price discrimination, including a discussion of the various uses of two-part tariffs, are offered by Varian (1989), Wilson (1993) and Armstrong (2007).

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Short bio

Nikos Vettas is a Professor at the Athens University of Economics and Business (2003-) with specialization in Industrial Organization, Microeconomic and Game Theory, Competition Policy and Regulation. Member of the *Economic Advisory Group for Competition Policy* of the European Commission, DG-Competition, (2004 -), Research Fellow at CEPR, London, (2004-), Associate Editor of the *Journal of the European Economic Association* (2008-), *Journal of*

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