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Price discrimination - an unreliable indicator of market power

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Abstract

This paper argues that price discrimination commonly occurs in situations where firms do not have market power. We consider, using a simple example, how price discrimination can exist without market power, and follow this with a summary of the general conditions that allow this. As these conditions are not unusual in practice, the presence of price discrimination cannot be used by competition authorities as the prima facie indicator of market power that it is often assumed to be. Instead, a careful consideration of the particular facts and circumstances surrounding the price discrimination is required. Finally, we suggest some factors that are useful in differentiating between competitive price discrimination and price discrimination that may be an indicator of the existence of market power.

Introduction

This paper argues that price discrimination commonly occurs in situations where firms do not have market power. Indeed, under particular cost and demand conditions, firms will be forced to engage in price discrimination in order to offer competitive prices. As these conditions are not unusual in practice, the presence of price discrimination cannot be used by competition authorities as the *prima facie* indicator of market power that it is often assumed to be. Instead, a careful consideration of the particular facts and circumstances surrounding the price discrimination is required.

In outlining our case, we first define the concepts of price discrimination and market power, and then discuss the conventional justification for the use of price discrimination as an indicator of market power. We then consider, using a simple example, how price discrimination can exist without market power, and follow this with a summary of the general conditions that allow this. Finally, we suggest some factors that are useful in differentiating between competitive price discrimination and price discrimination that may be an indicator of the existence of market power.

Defining price discrimination

In general terms, price discrimination is broadly defined as firms selling equivalent goods at different prices in different transactions. For example, Scherer and Ross (1990) describe price discrimination as follows:

“No simple, all-inclusive definition of price discrimination is possible. Succinctly, price discrimination is the sale (or purchase) of different units of a good or service at price differentials not directly corresponding to differences in supply cost. ... this definition includes not only the sale of identical product units to different persons at varying prices, but also the sale of identical units

to the same buyer at differing prices ... , and asking the same price on transactions entailing different costs ...”¹

Price discrimination of various types is very common. Volume discounts for bulk purchasing and early booking discounts on holidays (that do not fully reflect cost differences), different prices for different classes of consumer on public transport, and different prices to different consumers at public entertainment (for example, going to the zoo or your local cinema) are all examples. As such, all sorts of common commercial pricing practices potentially qualify as price discrimination.

Defining market power

Bishop and Walker (2002) define market power as:

“... the ability of a firm or group of firms to raise price, through the restriction of output, above the level that would prevail under competitive conditions and thereby to enjoy increased profits from the action.”²

Similar definitions are employed by many competition authorities, including the UK Office of Fair Trading and the European Commission.³ The essence of market power is therefore the ability to increase price profitably above the competitive level, which requires the ability to restrict output below the level that would be observed in a fully competitive market.

The conceptual definition of market power is deceptively straightforward. In practice, it is devilishly difficult to identify precisely market power, largely because the benchmark is the situation that would apply in a fully competitive market.⁴ As the investigator can only observe the market as it is, not as it might be were it “fully competitive”, identification of market power tends to rely on often subjective judgements as to what a competitive market for the particular good or service in question should look

like, or on indirect and often imperfect indicators such as market shares or the level of barriers to entry.

Price discrimination and market power

As any competition law practitioner is aware, there are very few 'silver bullets' - single, infallible indicators - available when attempting to identify market power. However, one that competition authorities do at times turn to is the observation of price discrimination. For example, the UK Office of Fair Trading states:

“Such divergences are, nevertheless, likely to be temporary because *price discrimination is not sustainable in a competitive market*: if an undertaking were to try to maintain different prices for the same product it would be vulnerable to undercutting by competitors in the segment of the market where its prices were higher than the competitive level.”⁵ [Emphasis added]

A good example of how competition authorities use the observation of price discrimination as *prima facie* evidence of market power can be seen in the recent UK Competition Commission's mobile phone report released by Oftel on 18 February 2003:

“2.201. We discussed the difference between the prices of on- and off-net calls earlier ... we consider that *the marked differences in average contribution* made on these two call types *indicate a less than fully competitive market* in call origination.”⁶ [Emphasis added.]

The statements above are not unusual, and appear to be supported by economic textbooks that normally state that the conditions necessary for price discrimination are as follows:

- The seller must have some control over price, that is, there must be some degree of market power.
- The seller has to be able to segregate customers into groups with different price

elasticities of demand, that is, with a different “willingness to pay” for the service.

- Opportunities for arbitrage, that is, resale by low price customers to high price customers, must be constrained.

It is important to note that of these conditions, it is only the first - some control over price - that clearly requires market power. The second, which involves offering different prices to various groups (such as adults and children) can be undertaken by any firm, no matter how many firms are in the market or how competitive the market is, and clearly does not in itself require market power. The third depends on the particular circumstances. Many industries involve goods or services that are not suitable for arbitrage. For example, you cannot resell a haircut, and hairdressers do not need market power to prevent such activity. In other cases however, prevention of arbitrage may be enforced by firms exercising market power.

While textbook definitions of the necessary conditions for price discrimination do list market power as a necessary condition, it should be noted that in most instances the textbooks are concerned with price discrimination that allows firms to earn excess profits.⁷ This is clear from the fact that virtually all textbooks analyse price discrimination only within the context of monopoly. Market power is assumed from the outset, with the question of interest being whether price discrimination by a monopolist is likely to improve or reduce social welfare, compared with a non-discriminating monopolist.

Economic textbooks (and competition authorities) generally give little consideration to price discrimination that is needed to maximise volumes in order to minimise average cost and hence lower prices to all consumers. Such price discrimination does not involve market power, and is not imposed by firms on the market, but rather is imposed by the market on firms. The standard approach to price discrimi-

nation contains a very large implicit assumption that price discrimination means that the high priced segment of the market is paying *higher* prices than those that would prevail if the price discrimination did not exist. This is a critical assumption, as it is the link between the observation of price discrimination and the belief that it indicates the presence of market power. This might seem like a reasonable assumption, but in fact as a general proposition, it is not. The example in the following section illustrates why.

Price discrimination in competitive markets

Price discrimination involves firms setting “dissimilar conditions for equivalent transactions”. Most commonly, this means that different *margins*⁸ are earned on equivalent transactions. By definition then, if the discrimination were absent, the firm would earn the same margin on each transaction. This is not to say that all prices would be the same, but rather that any price differences could be fully explained by cost differences.

As we noted above, the standard assumption is that price discrimination always leads to some prices being set higher than they would if there was a uniform price.⁹ However, this is not the case. Consider the pricing of cinema tickets, in which price discrimination is the norm. For simplicity, assume there are only two customer segments, adults and children.¹⁰ The cinema has the option of setting a single price, or setting a price to each segment. Assume that if the cinema sets a single price, the price that covers its costs in the long run is £10 per seat. However, at this price, virtually no children attend the cinema so that all of the fixed costs of the cinema need to be recovered from adults only. If a lower price can be offered to children so that they will attend, then the cinema may be able to do better by offering two prices, assuming it can discriminate reasonably effectively between the groups. Suppose the cinema operator sets a price of say £3 per child, and the variable cost

of selling additional seats is £1. At this price, significant numbers of children attend, contributing £2 per child to help in the recovery of fixed costs. Children will generally attend at different times (afternoons rather than evenings) and see different movies, and so this is additional profit for the cinema.

At this point, the cinema has increased its profits. Of course, if the market is competitive, the story does not end there. Prices will be driven back to the point where costs are only just covered, which will tend to occur through competition focussed on the adults. This is because this is the most profitable segment of the market, in the sense that there is the most to be gained (or lost) through acquiring (or losing) adult customers.¹¹ If we make the assumption that one child attends for every adult that attends, then the cinema operator can lower the price of adult tickets to £8 per adult while still breaking even.¹² In the long run, this will be the new competitive equilibrium.

The point of this rather stylised example is that with price discrimination, *all* customers are now better off. Children can now attend that were previously excluded, while the price to adults has fallen. It is tempting to see a price of £8 for adults and £3 for children as a cross subsidy from adults to children, but this is not the case. In fact, in a competitive cinema market, all cinemas will have to offer this type of pricing. If a cinema attempted to set a single (average) price, too few children would attend, increasing the price that needed to be charged to adults, in turn making the cinema uncompetitive. A striking feature of the final market outcome is that not only are all consumers better off, but also the market has expanded. This is the exact opposite of the effect of monopoly, which restricts output and increases prices, making consumers worse off, either due to having to pay higher prices or from being excluded from the market.

General conditions

Price discrimination in a competitive market is not about increasing prices to captive customers. By definition, if the market is fully competitive then there are no truly captive customers: even if some customers must have the product, there are sufficient suppliers to ensure a competitive price. Rather, it is about capturing marginal contributions from low value customers who are highly sensitive to prices that would not otherwise be served if a single average price was offered to all consumers. When such a group exists and can be identified, volumes can be increased, reducing the level of contribution that has to be earned from each customer, including the high value customers. That is why price discrimination is not only stable in competitive markets, it is needed to ensure all customers pay the minimum price possible that still covers the costs of supply.

The reason that significant price discrimination characterises competitive industries with substantial fixed and common costs,¹³ such as airlines, hotels and cinemas, is that it can lower the price to all users of the service. It is most effective at doing this when:

- There are significant fixed and common costs to be covered, meaning that high value customers (with little sensitivity to market price) are able to benefit from low value customers being offered prices below average cost but above marginal cost, spreading the fixed and common costs that need to be covered over more customers.
- There are identifiable customers (that can then be segmented) who are prepared to pay more than the marginal (or avoidable) cost of the service, but relatively few of this group are prepared to pay the average cost.

- Serving the low value (or marginal) segment does not displace high value customers.

When these conditions hold, competitive markets with the above cost and demand characteristics will *require* discriminatory pricing, as it maximises the volume sold and minimises the cost to consumers - the normal result of competition.

A voice in the wilderness?

So far in this article we have argued that regulators who treat price discrimination as *prima facie* evidence of market power without further evidence are quite wrong to do so. In saying this, are we just a voice in the economic wilderness? We don't think so.

Economic theory suggests that in competitive markets (over the long run) prices will tend to a level that just covers the costs of production. However, in businesses with significant fixed and common costs, those costs need to be covered by the margin that is earned over the variable cost of supply. This may well be most efficiently achieved by price discrimination. It is well established in economic theory that “discriminatory” prices can be set that allow all consumers to be better off than when a single price is set.¹⁴ It would be odd if firms in a competitive market who were able to construct such a price scheme were not forced to do so by the market, given that this is the way that prices to all customers can be minimised. Therefore, equating competitive markets with only ever producing a single price outcome is, in our view, simply wrong.

Other experts in the area are also aware that it is not possible to draw an inference of market power directly from an observation of price discrimination. For example, the current Director General of the Office of Fair Trading in the UK, John Vickers states:

“The fact of price discrimination does not by itself allow an inference of market power, still less dominance. There are ample circumstances in

which competition and price discrimination are quite consistent.”¹⁵

Likewise, a recent article by Levine (2000) also concludes that the presence of price discrimination cannot be used alone to infer the presence of market power:

“Price discrimination and a price dispersion equilibrium very often occur in competitive markets as a way of recovering costs common to producing more than one unit of a good or service. In these instances, price discrimination is simply a way of distributing the burden of common costs among customers in the least output-restricting way. In a competitive market, all producers of goods or services involving substantial common costs will need to adopt discriminatory prices or product strategies to survive ... [In conclusion] ... While some price discriminating sellers can earn monopoly rents, price discrimination alone is not evidence of market power and should not be used to justify regulatory intervention.”¹⁶

Price discrimination and market power

In our view price discrimination is not the “silver bullet” for identifying market power that it is often assumed to be. It is therefore not sufficient for a competition authority to observe price discrimination and to therefore conclude that market power exists. However, there is no denying that price discrimination can be a sign of market power. The problem is how to distinguish reliably between price discrimination that indicates market power and price discrimination that does not indicate market power.

In the above discussion we have in essence argued that the key difference between price discrimination with market power and without is the issue of whether prices would be higher or lower for the high priced group absent the discriminatory pricing. In general, this is a difficult issue to assess, as it requires an estimate of what the market price would be *with-*

out the price discrimination. In some cases it may be possible to directly observe this. For example, if it is possible to observe a very similar but geographically distinct market that does not have the discriminatory price structure. However, such instances are likely to be rare and in general making the necessary judgment on what the price level would otherwise be will be difficult.

Instead, it will usually be necessary to consider indirect indicators of whether price discrimination is likely to be beneficial or detrimental to the high priced group(s). Some that are relatively easy to observe include:

- Evidence of a captive segment.
- Considering whether it is plausible that the low priced group is highly price sensitive.
- Examining the cost and capacity structure of the industry.
- Observing new entrant behaviour.

Whether or not the high priced group is captive (meaning that it has no choice of competitive suppliers or no close product substitutes) is a key issue. There are situations where it is reasonably clear that the low priced group or groups are getting very good prices (for example, air travel), and it is therefore thought that these groups are receiving some kind of a subsidy from the high priced group. This is unlikely to be the case if the high priced group is subject to the same degree of competition as the low priced group. First, there is in general no commercial logic in “cross-subsidising” from one segment to another in this fashion, nor is there business logic in competing hard for low value customers and not for high value customers. If it is clear that competition for the low price group is intense, and the same firms are competing for the high value group, then it would seem highly unlikely that the price discrimination represents market power.

Another useful check is to consider whether it is plausible that the low priced group is sufficiently price sensitive for a large percentage of the low priced market to cease to purchase if the low prices were increased. For example, it is probably reasonable to assume that increasing the price of children's cinema tickets towards the price paid by adults would lead to a significant reduction in volumes and revenues.

The cost and capacity structure of the industry is also important. Volume increasing price discrimination is most likely when there is spare capacity that is suitable for price sensitive customers. Most forms of transport are good examples of this.

A further test of whether a firm or firms need "market power" to apply the alleged anticompetitive price structure is to consider carefully the structure of prices offered by new entrants (if any exist). Clearly, if new entrants mimic the price structure of incumbents, then a firm does not need market power to offer the price structure under consideration. For example, the new generation of low cost airlines operating from secondary airports tend to price discriminate between customers on the basis of how far customers book in advance. This would suggest that such practices by airlines operating from hubs such as Heathrow could not be solely attributed to market power. Further, if high priced groups are paying excessive prices, entrants should be expected to aggressively target this segment. If they do not, then either the high price segment is captive (and the investigating authority should specify why this is so), or the "high price" segment is not actually paying high prices, relative to those that would prevail without the price discrimination.

Conclusion

The purpose of this article is not to argue that price discrimination cannot indicate market power. It can, and it can be a very useful and potentially reasonably objective measure in some cases. However, a competition authority cannot simply observe price discrimination and conclude without further examination that this infers either the existence of market power or a competition problem. Price discrimination might raise a valid question as to whether firms are individually or collectively exercising market power, but its observation alone cannot be used as substantive evidence that market power exists.

1 Scherer and Ross, *Industrial Market Structure and Performance* (3rd edition), 1990, at page 489.

2 Bishop and Walker, *The Economics of EC Competition Law: Concepts, Application and Measurement*, (2nd Edition), 2002, at 3.04.

3 The OFT refers to market power as 'the ability to raise prices consistently and profitably above competitive levels', Office of Fair Trading 414, *Assessment of Market Power*, September 1999, at 1.2. The European Commission refers to market power as "the power of the undertaking concerned to raise prices by restricting output without incurring a significant loss of sales or revenues.", European Commission's *Draft Market Analysis Guidelines for Telecoms*, at para 65.

4 Note that this definition of market power is different to the textbook definition, which defines market power as the ability to price above marginal cost. However, this is not an interesting or useful definition from a competition policy perspective as on this definition virtually all firms have market power since virtually all firms need to price above marginal cost in order to cover their fixed costs.

5 Office of Fair Trading 414, *Assessment of Individual Agreements and Conduct*, September 1999, at 3.6.

6 Available at: www.oftel.gov.uk/publications/mobile/ctm_2003/index.htm

7 See, for instance, Scherer and Ross, *Industrial Market Structure and Performance* (3rd edition), 1990.

8 Margin refers to the difference between price and the marginal (or variable) costs of production. It is the amount that is earned on each transaction that then contributes to any fixed and common costs (including such costs as central administration, marketing and so on) and to the firm's overall profit. For this reason, it is sometimes referred to as the *contribution*, or *contribution margin*.

9 This is the scenario assumed in the OFT quotation above claiming that price discrimination cannot be sustained in competitive markets.

10 We assume that all input costs, such as the prices of the differing films that the two segments might attend are the same. Relaxing this assumption would complicate the analysis, but does not change the result. Likewise it is assumed that capacity constraints are not an issue, which is a realistic assumption in the long run.

11 To see this, note that at this moment cinemas have introduced discriminatory pricing, and found it profitable. However, because cinemas are competing, they will reduce prices in order to win more customers. Consider two cinemas that are competing directly for customers: one chooses to discount the child rate, the other the adult rate. The result will be a severe loss of income for the cinema that discounts to children: it wins more children, but at very low prices, and loses most adults while the cinema that discounts to adults will win lots of (very profitable) adult business. The dominant strategy is therefore to compete for adults.

12 This price is calculated by lowering the price to adults, which would have been £10 (absent the discrimination), by the amount of *contribution* from each child of £2 (given that we have assumed, for simplicity, that there is a one-to-one

relationship), thus giving a price of £8. We have also assumed that the demand in the adult segment is perfectly inelastic. This is purely for the sake of keeping the numbers simple.

13 Common costs are those costs that are incurred jointly in the provision of more than one service, and that cannot therefore be attributed to any particular single service. An example would be the lease costs of an aircraft, which are incurred so that airlines can offer both business class and economy class services.

14 For those interested in a technical demonstration of this, in addition to the cinema example we gave earlier, we recommend Chapters 4 and 6 of *The Theory of Public Utility Pricing*, Brown and Sibley, 1986. In particular, refer to Chapter 6 pages 164-165 for a simple example of how regulatory intervention to remove a bulk discount tariff can lead to an average price greater than any price that the firm was offering before the intervention.

15 Competition Policy And Innovation, A speech to the International Competition Policy Conference, Oxford By John Vickers, Director General of Fair Trading, 27 June 2001, www.of.gov.uk.

16 Michael Levine, *Price Discrimination Without Market Power*, Discussion Paper No. 276 2/2000, Harvard Law School, www.law.harvard.edu/programs/olin_center/papers/pdf/276.pdf.

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