

# The Pros and Cons of Low Prices

Konkurrensverket  
Swedish Competition Authority

Konkurrensverket  
SE-103 85 STOCKHOLM  
tel +46 8 700 16 00  
fax +46 8 24 55 43  
*konkurrensverket@kkv.se*

©2003 Konkurrensverket/  
Swedish Competition Authority  
Individual chapters © 2003  
the contributors  
ISBN-91-88566-30-7  
Printed in Sweden by  
Elanders Graphic Systems  
Göteborg 2003

## **Preface**

"The Pros and Cons of Low Prices" is the second in the Swedish Competition Authority's Pros and Cons series following last year's "The Pros and Cons of Merger Control." The book will be officially released on December 5, at a seminar in Stockholm where the authors will present their work and high-ranking officials from competition authorities around the world will act as discussants.

I would like to express my gratitude to the all the authors who have contributed; without you we would not have a book at all. The editor, Professor Einar Hope also deserves a lot of credit for taking care of the scientific review. Finally, I would like to thank Arvid Nilsson at the Swedish Competition Authority for managing the entire project.

Stockholm, October 2003

*Claes Norgren*

*Director-General*

## Table of contents

	The contributors.....	5
1.	Introduction <i>By Einar Hope</i> .....	9
2.	Principles relevant to predatory pricing <i>By William J. Baumol</i> .....	15
3.	Testing for predation by a multiproduct retailer <i>By Andrew Eckert and Douglas S. West</i> .....	39
4.	Defining a price squeeze in competition law <i>By Paul A. Grout</i> .....	71
5.	Below cost pricing in the presence of network Externalities <i>By Adriaan ten Kate and Gunnar Niels</i> .....	97

## The contributors

**William J. Baumol** is Professor of economics at New York University, and senior research economist and professor emeritus at Princeton University. The author of more than 35 books and hundreds of professional articles, he has been president of the American Economic Association and three other professional organizations. His fields of specialization include economic growth, entrepreneurship and innovation, industrial organization, antitrust economics and regulation, and economics of the arts. Among his recent publications is *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism*.

**Andrew Eckert** is Assistant Professor of Economics at the University of Alberta. Before joining the University of Alberta, he was a staff economist at the Competition Bureau. His research focuses on issues in industrial organization and law and economics. He has studied the theory and empirical evidence regarding price volatility in retail gasoline markets, and examined predatory pricing policy regarding airlines. His current research looks at patterns of exit by firms from spatial markets, and the harmonization of international environmental law.

**Paul A. Grout** is Professor of Political Economy at the University of Bristol and Director of the Market Organisation and Regulation Programme of the Leverhulme Centre for Market and Public Organisation. He has published extensively on regulation, privatisation, competition policy, industrial organisation, and delivery of public services by the public and private sector. Current research interests include analysis of: planned obsolescence, public private partnerships, promoting competition in the presence of essential facilities, various aspects of EU competition policy, empirical studies of the behaviour of competition authorities and the impact of political interference on stability of enterprises. He has

advised many government bodies and major companies and on regulation and competition policy.

**Gunnar Niels** is Managing Consultant and head of the Competition team at OXERA, Oxford, an economics consultancy specialised in competition policy and regulation. He has advised numerous companies during competition law proceedings in Brussels, the UK and other jurisdictions. Before joining OXERA in May 1999, Gunnar was deputy head of the Economics Directorate at Mexico's Federal Competition Commission. He has published several articles on predatory pricing and other competition and trade issues in journals such as the Antitrust Bulletin, European Competition Law Review, Competition Law Journal, Journal of Economic Surveys and Journal of World Trade.

**Adriaan ten Kate** is theoretical physicist from the Free University of Amsterdam (1966). PhD in economics from Erasmus University Rotterdam (1983). Published several books and a host of articles about physics, linear programming, input-output analysis, trade policy and industrial organization, among other fields. Worked for fifteen years in the Mexican Ministry of Foreign Trade and Industrial Development. Participated in the negotiation of the Northamerican Free Trade Agreement. Since 1995 Chief Economist of the Mexican Competition Commission. ELO rating of 2180 from the International Chess Federation.

**Douglas S. West** is Professor of Economics in the Department of Economics, University of Alberta at Edmonton, where he has been teaching economics since 1981. He received a Ph.D. in Economics from the University of British Columbia in 1979 and a B.A. from the University of Michigan in 1975. His fields of research and teaching include industrial organization, competition policy, spatial competition analysis, and urban economics. He has published papers on market preemption, predation, vertical restraints, competition in shopping centre, retail gasoline, and video store

industries, and the economic effects of privatizing liquor retailing in Alberta. Professor West has worked in a consulting capacity on competition matters for a variety of private firms and public agencies, including Caterpillar Tractor Co., the Canadian Competition Bureau, the Capital Health Authority in Edmonton, and the Australian Competition and Consumer Commission.





## 1. Introduction

"The Pros and Cons of Low Prices" is about predatory pricing; an issue that has intrigued and bewildered the competition policy community for a long time and where conflicting views are held. The reason for this state of affairs is basically fairly simple in economic terms: Low prices can be a symptom of vigorous competition, which competition policy should be benign to. But if then prices in a given instance become in a sense "too low", this might be an indication of the abuse of market power by an incumbent predator, trying to drive competitors out of the market or hindering potential competition from entrants into the market, which competition policy should be hostile to, if this market behaviour reduces the competitive pressure on prices in a longer term perspective. The problem and the challenge for competition policy are to draw the fine line between pro-competitive pricing behaviour on the one hand and predatory pricing as an instrument of abuse on the other, and to establish sufficiently precise and comprehensive criteria for predatory pricing to be defined as an act of abuse of market power that can stand up e.g. in court proceedings in actual cases.

The debate on predatory pricing in the competition policy literature and at the judicial enforcement level in case decisions has, of course, focused on developing a coherent theoretical framework of analysis. Much attention has been devoted, however, to the problem of deriving empirical measures or indices that can be applied in competition policy analyses in practice as tests of predation, like e.g. the Areeda-Turner test or the recoupment criterion. No general consensus seems yet to have been established, though, neither with regard to the theoretical foundation for predatory behaviour nor with the applicability of specific empirical measures or tests of such behaviour in practice.

Recently, the issue of predatory pricing in competition policy has got new impetus from a number of sources of which I would like to single out three: a) contributions from game theory and the theory of

strategic market behaviour that have challenged and enriched the analysis of such behaviour in traditional microeconomic models, b) the debate on the design of a competition policy for “innovative” markets, i.e. markets characterized of continuing innovation, intellectual property instead of tangible assets, network effects, demand complementarities, etc, challenging the inherently static and non-strategic view of competition policy analysis in general and predation analysis in particular, and c) extending the analysis of predatory pricing from a primarily one-product setting to multi-product settings. Interesting advances have been made in the treatment of predatory behaviour from incorporating these aspects into competition policy analysis, at both the theoretical level and the empirical test level.

The purpose of this book is to assess predatory practices from a competition policy perspective and the implications of recent theoretical and empirical developments for a consistent treatment of such practices in competition policy. We have solicited contributions from experts in the field, covering the main streams of development and discussing policy issues related to predation in the light of these developments.

In the first article, William Baumol gives an overview of the theory and practice of predatory pricing and discusses some basic principles that should be taken into account when considering “low” prices. He lists requirements or necessary conditions for prices to be deemed predatory and assesses the property of various empirical tests that have been proposed to test for predation. When discussing contributions from the literature on strategic market behaviour, he focuses on the predatory reputation model and the financial market model. Finally, he offers some critical remarks on the “failing firm” argumentation in merger analysis in relation to predation. In the end he warns against “the comforting view that predation very rarely or never occurs in reality” ... and emphasizes the need for careful analysis to tackle the problem of predatory behaviour in competition policy.

If a multiproduct retailer decides to adopt a loss-leading strategy by setting “low” prices on certain high profile products, is this to be considered predatory pricing in relation to those products, or may such pricing behaviour lead to lower prices in general if demand complementarities to other products sold by the retailer are taken into account? This is the question, on a commonly observed pricing phenomenon in the retailing sector, posed by Andrew Eckert and Douglas S. West in their contribution. They maintain that, although multiproduct pricing issues have been treated in the theoretical literature on predatory pricing, this seems to have been ignored in practical competition policy to the effect that there exist no satisfactory predation tests in a multiproduct setting, incorporating demand linkages across products. After surveying predation policies and case law in Canada, the US, the UK, and the EU, respectively, and the commonly used predation tests, they develop an approach to assessing multiproduct predation through a number of competitive scenarios and propose specific tests for predation under demand complementarities. Testing for predation under multiproduct conditions is typically a complex and demanding task for a competition authority, including getting access to relevant data and information. They therefore argue for a case by case approach, at least until a more general applied algorithm is developed.

While Eckert and West focus on predatory pricing in a horizontal setting, Paul A. Grout analyses predation issues in vertical relationships. More specifically, he discusses the so called “price squeeze” test in competition policy, i.e. a situation where a vertically integrated firm sets a high price for its upstream supply to downstream competitors while at the same time setting a low price internally in the vertical chain so as to exclude or restrict potential competition; cf. e.g. the well known *United States versus Alcoa* case in the aluminium industry some decades ago. The price squeeze test has recently come under renewed scrutiny, partly as a consequence of the deregulation of formerly vertically integrated and monopolized network industries, like e.g. the electricity and telecommunications industries. Grout reviews various definitions of

a price squeeze test used in the competition policy literature and in actual cases, and illustrates the problems of testing for a price squeeze through a series of examples of possible market structures. A crucial issue relates to the definition of relevant costs for interfirm comparisons and the proper common cost allocation under multiproduct conditions. He discusses the implications for competition policy of a price squeeze test on the basis of the potential conflict between efficient pricing, including discriminatory pricing, on the one hand and the concern for avoiding predatory pricing for the protection of “inefficient” competitors on the other.

In testing for predation, the network dimension is faced squarely in the last paper by Adriaan ten Kate and Gunnar Niels. They consider predatory practices in markets characterised by network externalities and assess the implications for competition policy of the competitive effects of such externalities. In network markets a “winner takes all” situation may arise and aggressive pricing strategies are often used by competitors to obtain a critical mass of activity in relation to the economies of scale and scope defined by the underlying cost function. When is a below cost pricing policy “legitimate” in efficiency terms and when is it predatory? The authors analyse this question under various conditions and circumstances, starting out by defining what they call a fulfilled-expectations equilibrium demand system. They use this analytical framework to analyse a market structure: a) with a monopolistic network provider supplying a durable or a non-durable network good, respectively, b) one network good supplied by several competitors, and c) monopolistic competition between networks. In assessing the implications for competition policy of network pricing behaviour they point to the inherent dynamic nature of network markets and sound a note of warning against a too interventionistic competition policy to combat seemingly predatory practices under positive network externalities.

The contributions in this book represent by no means the final word on the complex issue of predatory pricing in competition policy. We hope, however, that they shed new light on some

important policy dimensions of this subject and that they will contribute to a revival of interest in predatory practices as a concern for competition policy, leading to a more well-founded and coherent treatment of such practices by competition authorities.

*Einar Hope*

*Editor*



## 2. Principles relevant to predatory pricing

*William J. Baumol*<sup>1</sup>

### 2.1 Introduction

Predatory pricing is a difficult issue for monopolies policy. On the one hand, it must, by definition, entail a direct attempt to undermine competition. On the other hand, the symptoms of vigorous competition are very easily and understandably misinterpreted as manifestations of predation, misleading the courts themselves to act in a way that prevents competition in a mistaken attempt to defend it. The basic problem is that low prices are, with good reason, generally considered a good thing, but a predatory price is, so to speak, too much of this good thing—it is a price that, in some sense, has been reduced too far. But how far is “too far?” More than that, the great resemblance between predation and vigorous competition constitutes an open invitation to inefficient firms to attempt to subvert the antitrust agencies into granting them *protection* from the competition that they are incapable of meeting in the market, perhaps even providing the supposed victim of predation a substantial monetary award (damages) for its misuse of the antitrust process.

Evidently, the public interest can be substantially affected by all this and, consequently, the economic and legal literature contain many explorations of the issues and attempts to arrive at defensible

---

<sup>1</sup> Professor of Economics, New York University, and Professor Emeritus, Princeton University. Much of this article draws on material in my forthcoming book with Daniel G. Swanson (Baumol and Swanson, 2005).

and definitive criteria that are easy to use and promise unambiguous results. In general outline, these proposed criteria are often closely related, though the devil lies in (the differences in) the details. Most often advocated are the Areeda-Turner criteria, with minor variants, and in the U.S. these are widely but not universally accepted by the courts.

Here, I will describe the form of the mainstream criteria of predation that I advocate and will explain their logic. As suggested, these criteria entail what may be regarded as minor modifications of Areeda-Turner, though the underlying reasons are rather different from theirs. I will end with a brief characterization of the most recent branch of writing on the subject: the strategic pricing analysis.

## 2.2 In general terms, what is predatory pricing?

Put intuitively, “predatory pricing” refers to the adoption of prices whose only logical purpose is the elimination of a competitor or prospective competitor. It is a price that offers no advantage to the firm that adopts it unless it prevents the entry of rivals, forces some competitors to exit, or “disciplines” some rivals, frightening them into a weakening of their competitive activities. In widely used terminology, this is summed up by saying that such pricing (1) threatens competition and (2) has *no legitimate business justification*. Here, it is crucial to recognize that merely because an act by a firm threatens the welfare or even the existence of a competitor, it does *not* follow that the act is predatory or even anticompetitive. For, obviously, vigorous competition is *always* undesired by rivals, whose profits and prices must be reduced to meet that competition and who must work harder in other ways to retain their position in the market. Indeed, when a rival is substantially inefficient, vigorous competition will *usually* threaten its existence. But that is just what the public interest requires.

Notice that I have avoided suggesting that predation is to be judged in terms of the *intentions* of the suspect firm. We have no



good way to determine what the management of a firm really had in mind when it made some decisions, and economists have no particular professional qualifications for delving into anyone's mental state.

### **2.3 Three requirements for price legitimately to be deemed "predatory"**

The discussion of the previous section immediately suggests two possibly testable criteria that can help to determine whether a particular price or set of prices can legitimately be considered predatory. The first is whether the price is or is not a threat to the survival of an efficient competitor. The second is whether the price or prices in question do or do not have a legitimate business justification.

On the first of these criteria, it is clear that the price in question must in some sense be "too low" if it is to fail the requirement. It must be low because a high price by the firm in question will generally be beneficial to competitors and certainly will not constitute a threat to them. It must be *too* low because, as I have said, prices that are simply low are generally considered to be desirable because they benefit consumers; indeed, one of the acknowledged benefits of competition is that it forces prices downward. This once again brings out the main problem that arises when an attempt is made to prevent predatory prices: the objective is to keep prices from being set at too low a level, while nevertheless preserving all the competitive pressures to drive prices downward. The key questions, then, are whether there is a well defined borderline between prices that are legitimately low and prices that are excessively low and, if so, how does one determine that borderline in practice? Clearly, that borderline must relate to the point at which any lower price becomes a threat to a competitor.

But matters are yet more complicated than this would suggest. Survival of firms is not always in the public interest. A competitor whose costs are substantially and unnecessarily high—that is, one

whose costs are far higher than those of its rivals in producing identical or very similar products- is clearly an inefficient supplier. It can only survive if prices are substantially higher than those that would be sufficient to keep its rivals in business. Hence, it can survive only by what may be deemed to be exploitation of its customers, through prices that are well above those that could prevail in the absence of the inefficient enterprise. Similar observations apply if that firm is inefficient in the sense of an inability to produce at similar cost products equal in quality to those of its rivals. It follows that the relevant standard for determining whether a price is too low is whether that price is a threat to *efficient* rivals. Survival of inefficient firms is not socially beneficial, and prices that threaten their existence is precisely what one would expect even in the most competitive of markets.

But even that requirement is not enough or, at least, it does not bring out one other important component of the matter. Suppose the suspect firm selects a price that would be profitable to it even if no competitor were forced out of the market or prevented from entering. Then, whatever the level of that price, it must surely be deemed legitimate. Such a price must evidently be deemed to constitute "legitimate business practice" because while the firm is obligated to avoid actions whose *only* benefits are obtainable through the destruction of rivals, it is surely not constrained to avoid actions whose benefits to itself do not stem from such destructive effects. That is, if price  $p$  is profitable to Firm X *whether or not all of its rivals survive*, it constitutes a legitimate business act. Firms do frequently fail, and do so for many reasons, and it is not the responsibility of Firm X to ensure that rival Y remains alive. Such a responsibility is tantamount to a rule that prevents X from competing or at least from competing vigorously—the reverse of what it is in society's interest for X to do. Note, then, that the "legitimate business practice" test of purportedly predatory pricing does not depend on whether or not all rivals survived. All that it requires is that survival or its absence be irrelevant to the profitability of the price under investigation. If Firm X can be shown to benefit from price  $p$ , whichever of these two

scenarios (universal competitor survival or failure of some or all competitors) applies, then the price is legitimate because it would have paid Firm X to select that price, no matter whether its rivals live or die.

Thus, we have two requirements for price really to be predatory: It must be sufficiently low to threaten the continued existence of an efficient rival, and it must not constitute legitimate business practice. These are both *necessary* conditions for the price in question to be predatory, and neither by itself is *sufficient* for condemnation of that price. That is, failure of either one of these requirements to be satisfied is, by itself, enough to prove that the price in question is *not predatory*. A moment's consideration will show why this is so. First, if the price is so high that it does not threaten the survival of *any* efficient competitor, then in what sense can it be said to be "predatory?" Second, if the price  $p$  of Firm X promises profits to X even if every rival survives and prospers, surely there is no reason to force X to avoid selection of  $p$ .

In addition to these two necessary conditions for a price to be predatory, the courts in the United States have generally held that there is a third necessary requirement, referred to as "dangerous probability of recoupment" through supercompetitive prices that become possible after exit of a rival. This condition stems from the following scenario. Firm X adopts price  $p$  for  $m$  months and, as a result, forgoes profits of  $T$  dollars. If this low price drives out enough rivals and X is then able to raise its price to  $p^* > p$  yielding positive economic profits ( $p^*$  higher than the competitive price  $p^c$ ) sufficient and sufficiently enduring to yield incremental profits exceeding the  $T$  dollars forgone earlier, then it will have recouped its forgone profit "investment" in the predatory process. But suppose there is something, such as ease of entry into the market, that prevents X from adopting price  $p^*$  or from keeping price that high for very long. Then, the courts have said, the allegedly predatory price will have been, in effect, an act of charity to consumers of Firm X's product. X will not and could not have gained any monopoly power in the process. On that basis, the U.S. courts have often held that price  $p$

cannot be considered predatory if there is no dangerous likelihood of recoupment.

If we accept each of these three requirements as a legitimate necessary condition for prices to be predatory, the key question that remains is how one can test in practice whether those conditions were or were not satisfied when  $p$  was the prevailing price.

## **2.4 Does the suspect price threaten survival of legitimate rivals?: The Areeda-Turner test**

Many courts now recognize as a defensible criterion a test devised by Professors Phillip Areeda and Donald Turner more than a quarter-century ago. The basic formulation is easily described. A price is deemed to fail the test if it is lower than the corresponding *marginal cost*, and to pass the test if it is greater than or equal to that cost.

In practice, the Areeda-Turner test is somewhat different from this. It is usually interpreted to hold that a firm's prices are not predatory unless they are less than the corresponding *average variable cost*, rather than marginal cost. A price that is at least equal to a floor constituted by average variable cost is then not deemed predatory. The reason for this modification, suggested by the authors of the rule and accepted by the courts, is that in reality firms very rarely possess data on or even estimates of their marginal costs. As a result, the test as originally formulated would have imposed a difficult burden of evidence provision on both defendants and plaintiffs and would often have proved unworkable. As an approximation, explicitly recognized not to be very close or very reliable, it was suggested that the courts adopt average variable cost (AVC) as a substitute for marginal cost, because AVC data are often available. In any event, AVC is normally much easier to estimate than marginal cost, since the latter cannot be deduced from a single observation, but must entail evaluation of the effect of a *change* in output on the total cost of the firm. Thus AVC was, in effect, reluctantly adopted by the authors

and the courts, as a more workable if inaccurate substitute for what they deemed the truly applicable figure.

The Areeda-Turner argument for the appropriateness of marginal cost as the basis for their test was straightforward. Marginal cost is the level toward which price will be driven by market forces in the theoretical world of perfect competition. Therefore, any price no lower than this figure must be considered legitimate since it could prevail in the most competitive of market structures. While that is true, one may well question its pertinence for the practical world of antitrust litigation, where firms typically are characterized by scale economies. In the presence of scale economies, as is well known, marginal cost pricing is suicidal because it does not yield revenue sufficient to cover total cost. Is it really proper, then, to transfer the marginal-cost criterion—which is applicable to the perfectly competitive markets for which issues of monopoly are inherently irrelevant—to the large-firm cases normally dealt with by the courts?

I have taken the position that such a leap is questionable at best. Rather, I have maintained that there is a far more defensible foundation for the Areeda-Turner test. But, curiously, the defense works not for marginal cost but for what was offered as the inferior AVC substitute. I shall argue next that the really defensible test exonerates prices equal to or greater than the corresponding AVC, and leaves undefended prices lower than this. The argument relies on the premise that no firm will be willing to charge low predatory prices for a very long period, given the large forgone profits that these low prices are sure to entail. Then, in the short run, we have the easily defended proposition that a price equal to or above AVC will not drive any efficient and rational rival out of the market.

As standard economic analysis recognizes, such prices will never lead to the exit of a profit-seeking competitor that is at least equally efficient, i.e., whose average variable costs are at least as low as those of the firm under scrutiny. An efficient rival, when facing such prices, will always find it more profitable to remain in the market than to exit. The logic of this assertion is clear. Here the term “variable cost” is to be interpreted as a cost that a firm can escape by

leaving the market, so that if the rival in question were to exit it would save itself only the variable costs that it would incur by remaining in the market. But along with that limited saving, it will forgo the revenues it would obtain by staying in that business. If price were indeed above the average variable cost, it follows that by exiting the firm would give up revenues greater than the costs it escapes. Evidently, an act that reduces revenues more than it cuts costs must inevitably reduce profits or exacerbate losses. Consequently, no price cutter can expect to drive out an efficient rival by means of its low prices so long as those prices remain above the rival's average variable costs. But, by definition, if a rival is efficient, its costs will be no higher than those of the alleged predator. Consequently, if the prevailing price is above the costs of the defendant in a predatory pricing litigation, they must surely exceed those of an efficient plaintiff. This is, in my view, the most pertinent implication of evidence that the prices at issue pass the Areeda-Turner test. Such evidence suffices to show that the price was not a threat to any efficient rival.

Thus, suppose Firm A adopts a price that is well below its profit-maximizing level, but covers all of the variable costs of the product and makes some substantial contribution to recovery of its fixed and sunk costs. Then, by no stretch of the imagination can it drive out or frighten into submission a rival firm that is equally efficient. This must be true even if the price in question does entail a sacrifice relative to what the incumbent firm could earn if it adopted the profit-maximizing price. For, even then, it seems clear that such a price must be deemed not to be predatory, though no further pertinent information is available.

The conclusion is unambiguous. A price above average variable cost is no threat to an efficient competitor, and is consequently not predatory. The proper test of whether the questioned acts threaten competition compares average variable cost with price because economic analysis shows that if  $P > AVC$  it does not pay a firm to exit, and by definition of an efficient competitor, for any given level of output,  $AVC(\text{competitor}) \leq AVC(\text{incumbent})$ . Hence, if  $P > AVC$

(incumbent), it follows that  $P > AVC$  (competitor) whenever that competitor is no less efficient than the incumbent. I conclude from all this that the Areeda-Turner test based on AVC rather than marginal cost shows whether the price at issue is or is not a threat to an efficient competitor during the plausible period of predation. In short, it is a workable test of the first of the three necessary conditions for price to be predatory.

## 2.5 On the legitimate business purpose requirement

We have already indicated what we mean by the term “legitimate business purpose” when its absence is used as a second necessary requirement for a set of prices to be deemed predatory. A pricing decision or any other action by a firm that is legitimate in this sense is defined as one that can be expected to add to the firm’s profits (a) in the long run and (b) whether or not it is followed by the exit of a current rival or the decision of a prospective entrant to stay out of the market. That is, a legitimate business act must, first, be one that can reasonably be expected *ultimately* to add to net earnings, though it may or may not entail some initial profit sacrifice. Second, that act’s promise of profit must not be contingent upon the elimination of an actual or prospective rival; it must be likely to pay off even if no rival exits or fails to materialize. Of course, future exit may occur for other reasons, and even though the suspect firm engaged in no predatory act. The issue is not whether this will actually happen, but whether a long-run profit contribution is likely to follow in the scenario, actual or hypothetical, in which no exit takes place.

In sum, we have a clear-cut definition of legitimate business practice, and one that in theory yields a well-specified test. But there are two fundamental impediments to provision of the requisite evidence in practice. The first is that the relevant profit may lie in the long run, which is at best very difficult to foresee. The second is that genuinely mistaken business decisions are by their nature

unprofitable, yet it is surely improper to interpret them as predatory acts.

That the test must entail long-run and not short-run profitability should be clear upon consideration of the matter. Otherwise, the introduction of any new product, with its characteristic losses during its early stages, would have to be deemed a predatory act. As a hypothetical example that is more clearly pertinent, consider an incumbent that is forced by below cost entry for a limited period to reduce its prices below any pertinent cost, as the only possible way to avoid being driven from the field. Suppose its management recognizes that the entrant has selected prices that do not cover its costs, and concludes that it will soon be forced to raise its prices and that thereafter the two firms can coexist profitably if this incumbent firm survives the initial bargain price of the entrant. If somehow all this could be verified, it would surely follow that no predatory act had occurred when the incumbent matches the entrant's price despite the short-run losses entailed for the incumbent. In sum, it is only long-run profit performance that is critical in evaluation of the legitimacy of a business practice. But how does one calculate the long-run profit consequences of the act in question? And if one is forced to wait very long to arrive at the answer, what good can it then do? If the act is eventually found to be predatory, but the targeted competitor is long dead and gone, how does one make restitution and, more important, how does one restore the long-lost competitiveness of the market?

These difficulties are aggravated substantially by the fact that businesspeople, like others, can confidently be expected to make mistakes. Neither the introduction of the Edsel automobile nor that of New Coke turned out to be good investments either in the long run or the short. But no one can reasonably interpret these missteps to have been acts of predation. The same can be said of many of the dot-com collapses. One cannot presume that someone outside the firm, say a judge or a jury, would have made better decisions. Thus, failure to bring profits even in the long run is not unambiguous



evidence that the pertinent business decision was illegitimate and should be deemed anticompetitive.

How then does one infer whether a pricing decision constituted legitimate business practice? The answer, as already suggested, is that there is no generally effective way. The best one can hope for is the recorded judgment of a qualified and personally uninvolved observer, expressed at the time the decision was arrived at, indicating that it was a reasonable decision that promised to contribute to the long-run well-being of the firm, even if no entry was prevented and no rival was forced to exit. We see that while this element of the issue of predation is surely relevant, its usability is often very limited as a way of judging a set of prices or some other decision alleged to have been anticompetitive. This should make clear once again why the courts have instead tended to focus on the relation of prices to costs and the Areeda-Turner test to determine whether the prices constituted a threat to efficient competitors.

## 2.6 A word on recoupment

The last of the three necessary conditions that must be satisfied before a price can legitimately be deemed predatory is that there must be a reasonable prospect of recoupment of at least whatever initial costs to the firm were entailed in the firm's adoption of the price in question, that recoupment taking the form of *monopoly* profits (i.e., super-competitive profits) made possible by reduction (as a result of the suspect price) in the number of competitors facing the alleged predator. In practice, the workability of this criterion will vary from case to case. Sometimes it will be fairly obvious that super-competitive profits can be earned by the incumbent once rivals are driven from the field, while in other circumstances the opposite will be evident.

One other observation may be helpful at this point. For a claim of predation to be plausible, barriers to entry into the market must neither be extremely high nor extremely low. If they are very high,

there is little incentive for an incumbent firm to undertake the sacrifice of profits required for predation, because those high barriers are likely to keep rivals out without further assistance from the incumbent. On the other hand, where barriers are very low, temporary extraction of the high profits required for recoupment is apt to be an irresistible lure to entrants who will be tempted to flock into the market and soon bring the excessive prices to an end. This is made even more likely where a previous rival has been driven out earlier, leaving behind plant and equipment that becomes available to future entrants at bargain prices.

## **2.7 Recent contributions to the literature re. predation: Strategic pricing**

There is, of course, much more to the policy-oriented literature than this brief characterization has been able to recount, and a variety of alternative or supplementary criteria have been proposed, ranging from the addition of a fourth necessary condition (the requirement that the alleged predator be shown to possess market power) to evidence on intention and evidence on intertemporal patterns of price behavior (e.g., did the incumbent lower prices after entry and then re-raise prices unjustifiably after the exit of the rival?).<sup>2</sup> But, given space limitations here, I will confine my discussion of other pertinent analyses to the recent literature on what is called “strategic pricing,” i.e., what may be described as predatory moves and countermoves that fit comfortably with the orientation of game theory. The strategic theories rest on rather sophisticated and complex theoretical foundations that confirm their logic and consistency. However, the character of their analysis is readily translated into common-sense terms.

The strategic pricing literature has provided many valuable insights, but perhaps the primary contribution of these recent

---

<sup>2</sup> See, e.g., Williamson (1977), Joskow and Klevorick (1979) and Baumol (1979).

writings on the economic theory of predation is their demonstration that predatory behavior is a possibility worthy of attention. They have shown, contrary to some earlier doctrine, that there are circumstances in reality in which predatory behavior can be made to pay, contrary to the earlier contention by some analysts that the entire notion is implausible. In addition, these writings have provided a number of examples drawn from reality in which predation can plausibly be taken to have occurred.<sup>3</sup> And, a balanced view of the strategic theorists' accomplishments for practice and policy would, I believe, conclude that they have also effectively provided more substance to the concept of recoupment, as will be shown below. Both of these features help in achievement of the evident intention of some of the proponents of the strategic approach to even the balance, making it at least somewhat more likely that plaintiffs in a reasonable predation case will have a chance of succeeding. However, the analysis seems less persuasive in its efforts to devise unambiguous criteria for testing whether or not some strategic form of predation has actually occurred in any concrete situation.

As is well recognized, there is an old line of argument claiming that predatory pricing is generally irrational and consequently unlikely. The argument, in essence, is that predatory pricing must entail initial losses (or at least forgone profits) for the predator, who will only be willing to incur them for a limited period, so that any intended (efficient) victim will have the incentive to outwait the process. These temporary losses will be covered by a willing money

---

<sup>3</sup> See, e.g., Brodley, J.F., Patrick Bolton and M.H. Riordan, "Strategic Theory and Legal Policy," *Georgetown Law Journal*, 88, August 2000 at 2244-2248. Much of the discussion of this section is based on that article. It is noteworthy, however, that for a number of the cases cited, different generations of economists have reached very different conclusions (thus, see, e.g., Elzinga, K.G. and D.E. Mills, "Predatory Pricing and Strategic Theory," *Georgetown Law Journal*, 89, 2001 at 2475 and their dispute with Brodley *et al.* about a number of cases in which predation was alleged). Each using methods sophisticated for the time, some have rejected the allegation that the actions in question were predatory, while at a later date others reached the opposite conclusion. What this shows, once again, is that categorical conclusions on such issues are by no means easy to obtain.

market in recognition of the likely long-run profits available to the holdout “prey.” Moreover, the firm that is considering an act of predatory pricing will recognize that even if it drives out one competitor that will only invite another who will have better prospects than the first, because the assets of the original competitor will be available to the next competitor at bargain prices. All of this is taken to mean that a claim that pricing has been predatory in a particular instance is inherently questionable.

This argument has always seemed a bit too easy. First, even if predation were usually irrational, business firms are easily shown to be as prone to at least occasional irrationality as are professors or lawyers or anyone else. Perhaps competition may provide a punishment that fits the crime and eventually drive out firms with irrational predatory managements, but even so, much damage to competition and the public interest can be done in the interim. Moreover, capital markets are clearly imperfect in reality and this plainly makes it possible to drive out poorly financed rivals, actual and prospective, even if their future would otherwise be promising. It should also be noted that there are a number of instances in which the odor of predation is strong. This seems so, for instance, when an entrant airline with its six-plane fleet, operating on several routes, proposes to also move into a route coveted by a large incumbent airline, whereupon the latter announces that it will open for business along several of the entrant's previously uncontested routes. Analogous examples in which predatory *pricing* is the issue are also easily imagined. There is reason in these scenarios for the authorities to provide the entrant effective recourse against such overaggressive acts by a powerful incumbent. Yet, the courts have tended generally to be skeptical about claims of predation, at least partly on the grounds provided by the older theory.

The newer strategic theory argues that the earlier model is too narrow and ignores at least two features of the market. First, an intended predator can hope to succeed in its objective by denying information to a competitor or, more likely, an entrant, or even by inducing the latter to accept misinformation. The denial or distortion

of information can also be aimed at others than the rival, most clearly to sources of financing, which can thereby be induced to deny funds to the intended victim. Second, the proponents of strategic theory point out that even if a predator loses out in the market directly affected, even in the long run, the loss can at least sometimes be offset by resulting monopoly gains of sufficient magnitude that are obtainable elsewhere.

This already suggests two persuasive strategic predation scenarios that are offered by strategic analysis: the predatory reputation model and the financial market model. Each has a very straightforward story.

### **A. Reputation for toughness<sup>4</sup>**

The reputation scenario basically involves a firm operating in a number of markets, all of them threatened by entry, and already facing entry in one or several of these markets. Actual entry occurs in one (or a few) of the predator's markets, and the latter responds with sharp price reductions that others are likely to notice, and that they are apt to suspect of being below any pertinent cost. The goal is not only to drive out the first entrant, but to frighten *all* potential entrants into the predator's other markets, leading them to believe that they will face the same fate if they begin operations in competition with the predator. Even though the predator never recoups his forgone profits in the market where the initial entry occurred, he can reasonably hope to prevent profit reductions in his other markets that are more than sufficient in total to make up for the initial sacrifice.

This is the basic reputation-predation story, though it has some variants. It depends on four premises: first, that the predator has a number of recoupment sources in addition to the arena in which the price cutting occurs; second, that the incumbent really has no

---

<sup>4</sup> On this see, e.g., Milgrom and Roberts (1982) and Baird (1994).

intention of incurring additional losses in other markets if entrants do ignore the threat implicit in his initial tough response, because otherwise the recoupment mechanism will break down; third, that potential entrants into the other markets can nevertheless be led to believe that the predator will respond in an equally predatory manner if they should actually undertake entry; and fourth, that one can expect most or all other entrants then to be deterred from invasion of the incumbent's territory.

Whatever one may conclude about details of the scenario, it certainly brings out at least one important observation. Recoupment need not be confined to the market in which predatory behavior occurs. One can well picture incumbents who fear that one successful entry event will lead to another and that the ultimate result will be financial catastrophe, or at least loss of all supra-competitive profits. One can well conclude that there will be a great temptation to nip the entire prospective sequence of entrances in the bud by strong initial countermeasures. Thus, in addition to showing rigorously that such a course of predation can possibly be rational, the analysis draws attention to attributes of the predatory process that can make it attractive to the predator and inherently more plausible. On the other hand, reality presents us with many examples where failure not just by one entrant, but by many, seems to have had little deterrence effect. For example, restaurants and airlines are industries in which the hope of entrants seems never to die. Though these fields are figuratively littered with the corpses of past entrants (as well as those of past large incumbents), the stream of new venturers seems never to dry up, except perhaps during periods of recession in the economy.

It is also important at this point to bring in an important caveat. Even if there were a perfectly clear borderline between a predatory reputation and a reputation for tough but legitimate competitive responses to entry, the superficial similarities between the two make it very possible that one of these will be mistaken for the other. A management that is determined never to retreat in the face of entry, and to do whatever is legitimately permissible in response, does not

commit an objectionable act by acquiring a well-earned reputation for toughness. It can, on the contrary, be held that this reputation is socially beneficial, because it makes clear to entrants what sort of response they must expect to have to contend with. It can enable those who will choose nevertheless to enter, to plan their course of action more effectively, and it can prevent waste of sunk resources by overoptimistic entrants who are likely to retreat at the first sign of substantial competitive opposition by the incumbents.<sup>5</sup>

## **B. Financial market predation**

Financial market predation is behavior that is designed to induce prospective providers of funds to believe that investment in entrant ventures is riskier than it really is. The basic strategy entails actions to destroy early entrants in order to suggest that survival of future entrants is unlikely. In several basic ways the logic of an act of financial market predation is similar to that of predatory reputation-building. Both assume that the predator will limit the sacrifice of profits by confining its predatory response to one or a few entrants as a warning to others (in this case as a warning to the sources of financing). In both cases, the victims of the deception must believe, on the contrary, that there is a substantial probability that the predator will repeat its behavior whenever entry threatens or in a substantial share of such cases or, alternatively, that most future entrants will prove to be as shaky a proposition as the first entrant has been made to seem by the predator's intervention. In both types of predation, the recoupment payoff is made possible by the high profits in other markets that are preserved by widespread or even universal removal of the entry threat by the success of the predator's intervention in a much narrower arena.

---

<sup>5</sup> This is, of course, the key public interest problem that besets the prevention of predation – the problem of doing so without discouraging vigorous price competition. It is a criticism that has been raised in relation to the strategic approaches to analysis of predation in particular. Thus, see, e.g., Elzinga and Mills (2001) especially p. 2494.

It is difficult to deny that this type of predation is possible and that it can sometimes be profitable, providing full recoupment and more. And that is enough to make the case for those who espouse the strategic analysis of the predation issue, because it shows that one cannot simply proceed on the premise that rational acts of predation are highly improbable, if not impossible. But, as those who use the strategic approach are careful to emphasize, their models do not prove the opposite—that rational predatory acts are a common phenomenon. Rather, evidence must be supplied in each case to confirm the applicability of the model proffered by those who claim that predation has occurred. And it should be noted that this will often prove more difficult than may be anticipated, because while capital markets are, indeed, indisputably imperfect, the imperfection does not always entail unwillingness to supply funds on the basis of questionable evidence. The apparent propensity of the capital markets to supply funding liberally to a spate of entrants into markets such as (my repeated-example industries) restaurants and air transport, where experience suggests that embarking on business is apt to prove a disastrous act, surely suggests that it will not generally be an easy task for a predator to turn off all sources of funding for future entrants.

### **C. Other strategic predation approaches**

Predatory reputation building and financial market predation are two examples of the broader class of strategic predatory approaches. Since their mechanisms have so much in common, and because any list of variants is likely to be incomplete, there is little point in saying much more on the subject here. I mention only two other examples, without expanding on either of them. These are what have been called “demand-signaling” and “cost-signaling” predation. Their object is to deny the prospective entrant reliable information that it needs to make a rational decision on whether to enter a particular market. In particular, where a potential entrant hopes to test the



waters by preliminary entry into a “test market,” the predator can undertake to muddy those waters (to belabor the metaphor) by the adoption of uneconomic prices and other practices that distort the volume of customers available to the entrant. Not only can this mislead the entrant about the state of demand, but if costs are significantly affected by volume, it can distort the information on cost that the test market provides. Even if the entrant is aware of the predator’s intervention and knows that the result is the misinformation that emerges from the test market, it may be discouraged from full entry simply because it lacks the data that would be needed to give it confidence in such a risky decision.

The basic implications of such possible predatory approaches are the same as those of the others. They extend the set of possibly feasible predatory schemes, but they do not relieve a complaining party from the obligation to provide compelling evidence that the scenario applies.

## 2.8 A few remarks on acquisition of the assets of a failed competitor

In the parts of the competition policy literature where it discusses the permissibility of mergers, it sometimes defends acquisition by a “dominant firm” of the assets of a failed or failing firm on the grounds that those assets would otherwise be left idle and thus constitute an economic waste. There are several questions here that must be answered before the validity of this defense can legitimately be evaluated. The first and most obvious is whether other purchasers who will make effective use of the assets are really unavailable. Evidently, if such potential buyers do exist (and not merely buyers who will purchase the assets for their scrap value) then the argument loses its force. Second, there is the question of the usage of the term “dominant firm.” If it merely means that the enterprise that wants the assets is a large firm, even the largest in the industry, this can be irrelevant, because such a big market participant may or may not possess any monopoly power, and may not be able to acquire any with the help of those assets. This will be true, for example, if good supply substitutes exist in abundance or if entry into the market is cheap and easy. On the other hand, if the rival has failed or is failing *demonstrably as a result of predatory behavior of the prospective purchaser of the assets*, the transaction should generally be prohibited because it would then constitute a reward for that anti-competitive behavior.

Ultimately, the acceptability of the proposed acquisition would seem most appropriately tested by its predictable consequences for monopoly power in the market. If it does not threaten to add materially to the acquiring firm’s monopoly or market power, thereby undermining the competitiveness of the market, then the acquisition can be presumed to have been proposed because of its promised contribution to efficiency, and it should be permitted. But where it does threaten to add substantially to such market power, it should be opposed and forbidden by the authorities. But these are,

of course, the standards that should apply to evaluation of *any* proposed merger or acquisition.

## **2.9 Concluding comment**

There seems to me to be little reason to accept the comforting view that predation very rarely or never occurs in reality. It is a peril to the competitiveness of the economy sufficiently to merit vigilance and vigorous countermeasures, but only if based on careful analysis. This last injunction is critical because prevention of activities that seem superficially to be predatory but actually are legitimate manifestations of vigorous competition can have consequences as anticompetitive as acts of predation themselves. This is the unavoidable Scylla-Charybdis problem posed by the issue. The purpose of this paper is to help explore how one can hope to avoid both dangers to the counter-monopolization ship.

## References

- Areeda, Phillip, and Donald Turner, "Predatory Pricing and Related Practices under Section 2 of the Sherman Act," *Harvard Law Review* 88 (1975): 637-733.
- Baird, D.G. et al. *Game Theory and the Law*, (1994).
- Baumol, William J., "Quasi-Permanence of Price Reductions: A Policy for Prevention of Predatory Pricing," *Yale Law Journal* 89 (1979): 1-26.
- Baumol, William J., "Predation and the Logic of the Average Variable Cost Test," *Journal of Law and Economics*, Vol. 39, No. 1, April 1996, pp. 49-72.
- Baumol, William J., and Daniel G. Swanson, *Antitrust for the New Economy* (forthcoming 2005).
- Brodley, J.F., Patrick Bolton and M. H. Riordan, "Strategic Theory and Legal Policy," *Georgetown Law Journal*, 88, August 2000 at 2244-2248.
- Elzinga, K.G., and D.E. Mills, "Predatory Pricing and Strategic Theory," *Georgetown Law Journal*, 89, 2001,
- Joskow, Paul L., and Alvin K. Klevorick, "A Framework for Analyzing Predatory Pricing Policy," *Yale Law Journal*, 89 (1979): 213-70.
- McGee, John S., "Predatory Price Cutting: The Standard Oil (New Jersey) Case," *Journal of Law and Economics*, 1 (1958): 137-69.
- Milgrom, Paul and John Roberts, "Predation, Reputation and Entry Deterrence," *Journal of Economic Theory*, 27, 280 (1982).

Parloff, Roger, "Fare's Fair," *American Lawyer* 65 (October 1993):  
60-66.

Telser, Lester G., *Economic Theory and the Core*, Chicago and London:  
University of Chicago Press, 1978.

Williamson, Oliver E., "Predatory Pricing: A Strategic and Welfare  
Analysis," *Yale Law Journal*, 87 (1977): 284-340.



### **3. Testing for predation by a multiproduct retailer**

*Andrew Eckert and Douglas S. West*

#### **3.1 Introduction**

Few sectors of the economy receive as much attention regarding potentially predatory behavior as retailing. In Canada, the United States, and many European countries, allegations of predatory pricing in gasoline retailing or grocery retailing have resulted in numerous antitrust cases and government and industry studies. In addition, many jurisdictions have responded to popular concern regarding predation by retailers by adopting new laws, or proposing amendments to existing laws, that target certain pricing behavior by firms in specific industries.

An important characteristic of retailing is that retailers frequently sell multiple products. In many cases, predation is alleged with respect to a small subset of products that the retailer sells. For example, a grocery chain may be accused of predatory pricing over a small subset of a large number of grocery items, or through the pricing of gasoline sold at outlets located on store property. In general, however, the demand a multiproduct retailer faces for one product will depend upon the prices set on other items. A retailer may therefore have an incentive to set a “low” price on certain high profile products, thus increasing demand over a wider set of items. Such loss-leading behavior can lead to prices on individual products that are much lower than what the retailer would charge if the effect on the demand for other products was ignored. To the extent that this loss-leading is non-predatory, it may therefore represent an

explanation for low prices that does not depend on anti-competitive conduct.

Unfortunately, while modern predatory pricing tests provide some guidance on the treatment of costs for multiproduct firms in a cost-based predation test, the tests currently used by competition authorities say little about how to deal with the demand linkages across products. Practically, this means that governments do not have clearly articulated tests of predatory pricing that can be applied in the retailing sector.

The purpose of this paper is to consider how a predatory pricing test would be affected by the assumption that the alleged predator is a multiproduct retailer. It is argued that although the theoretical economics literature has considered this problem and proposed solutions, this discussion seems to have been forgotten or ignored in formulating current policy. Under the approach presented in this paper, in addition to a consideration of other elements as required by the relevant jurisdiction, a price-cost comparison will be conducted as an initial screen for an individual product or reasonable group of products, based on circumstances, ignoring demand complementarities across products. If the firm passes this initial screen then the test ends. If the firm fails this price-cost test, one would then proceed to analyze whether the magnitude of pricing below cost was necessary for the firm to fully exploit the demand complementarity, or whether higher prices would have sufficed. This analysis would likely be complicated, possibly involving detailed statistical analysis of the retailer's behavior in other markets.

The remainder of this paper is organized as follows. In Section II, we begin by reviewing any guidance in this matter provided by government guidelines, industry studies, and case law. In Section III, the theoretical and predation policy economics literature on the subject is reviewed. Section IV provides a detailed discussion of how an allegation of predatory pricing would be analyzed under several specific scenarios. Section V concludes.



### 3.2 Government predation policies and case law

While most countries have laws equipped to deal with predatory pricing by a multiproduct retailer, few governments have articulated how such a case would be analyzed. This section surveys the existing laws and any government documents that shed light on the application of these laws in the context of a multiproduct retailer, and discusses the relevant case law.<sup>1</sup>

#### ***Government policy and guidance***

##### *Canada*

Under the Canadian *Competition Act*, complaints of predatory pricing can be addressed with reference to two different sections of the *Act*. Under Section 50(1)(c), engaging in “a policy of selling products at prices unreasonably low, having the effect or tendency of substantially lessening competition or eliminating a competitor, or designed to have that effect” is prohibited as a criminal offense. Alternatively, Sections 78 and 79 of the *Competition Act* are civil provisions designed to prevent an abuse of a dominant position. Section 78 sets out a non-exhaustive list of anti-competitive acts, including “selling articles at a price lower than the acquisition cost for the purpose of disciplining or eliminating a competitor”. Other forms of predation can also be addressed under the abuse provisions.

The Competition Bureau has provided guidelines on Section 50(1)(c), which were recently revised and released in draft form (see Director of Investigation and Research, 1992, and Competition Bureau, 2002, respectively). The Bureau has also released guidelines on Sections 78 and 79 (Competition Bureau, 2001(a)). These sets of

---

<sup>1</sup> A comprehensive comparison of general predatory pricing standards in various countries is provided in Niels and Ten Kate (2000).

guidelines describe the general approaches taken by the Bureau in assessing allegations of predatory pricing. While the guidelines differ on the approach to some issues (e.g., the need to show that the alleged predator is dominant, the need to demonstrate the possibility of recoupment, the assessment of legitimate business justifications, and the anticompetitive effects of the alleged predation), this is due in part to differences in the wording of Sections 50(1)(c) and 78/79. Both of the more recent guidelines rely on a comparison of the prices of the products or services in question to their avoidable costs. Little guidance is provided regarding how such a comparison would be carried out in the case of a multiproduct retailer.

The Competition Bureau has released guidelines regarding the application of the abuse of dominance provisions to the retail grocery industry (Competition Bureau, 2001b), which include a brief discussion of predatory pricing. The Bureau indicates that below cost pricing on fifty or fewer products would not be considered sufficient to lessen competition substantially, but provides no justification for that particular threshold other than reference to experience in previous unnamed cases. The Bureau also indicates that if below cost pricing is the result of competition between large supermarkets, and that competition leads to the exit of higher cost competitors, such conduct would not be an abuse of dominance. Finally, the Bureau indicates that a new entrant may be capable of predatory pricing, and thus analysis is not restricted to predatory pricing by established incumbents in the market in which predation is alleged.

### *United States*

Predatory pricing cases in the U.S. can be taken forward under Section 2 of the *Sherman Act*, which deals with monopolization and attempted monopolization, and the *Robinson-Patman Act*, which addresses price discrimination. The standard approach to a predatory pricing case, as developed through jurisprudence, combines a price-cost comparison with an examination of whether the costs of the predation to the predator will be recouped through

the exercise of future market power. Many courts have adopted the Areeda and Turner (1975) price-cost test for predation: a price below average variable cost is regarded as predatory. In addition, many U.S. states have their own below cost pricing laws that can be used to address predatory pricing. These laws are either of general application or they apply to specific products such as gasoline.<sup>2</sup> While in some states the elements that must be established are similar to those from federal jurisprudence, in other states the requirements differ.<sup>3</sup>

To our knowledge, there are no guidelines or policy documents of the Department of Justice regarding the analysis of predatory pricing cases in general or regarding predation by multiproduct retailers specifically. Some guidance in the case of a multiproduct retailer is provided by jurisprudence, as discussed below.

### *The U.K.*

Section 18(1) of the *Competition Act* (the Chapter II provision) of the United Kingdom prohibits the abuse of a dominant position. Guidelines issued by the Office of Fair Trading indicate that after establishing that an alleged predator is dominant in a market, the analysis would focus on a price-cost comparison.<sup>4</sup> This would be followed by a consideration of evidence of intent if prices fall between average variable and average total costs. The guidelines indicate that since Chapter II applies to firms that can be shown to be dominant in a market, recoupment would be expected if the firm is dominant in the market in which predation is alleged and need not be proven separately. In addition, the guidelines state that under European Court jurisprudence, establishing recoupment and the

---

<sup>2</sup> In some states, below cost pricing laws also deal with pricing for purposes other than predation. For example, in California, pricing below cost is prohibited when such pricing represents loss-leading for the purpose of promoting the sales of other merchandise.

<sup>3</sup> The effect of state below cost sales statutes on price levels is discussed in Calvani (1999).

<sup>4</sup> See Office of Fair Trading (1999).

feasibility of predation would not necessarily be required in making a case.

The guidelines make little mention of the specific case of multiproduct retailing, except for noting that “a policy of loss leading might be objectively justified and would not therefore normally be predatory.”<sup>5</sup> However, studies by the Office of Fair Trading (1997) and the Competition Commission (2000) on retailing and supermarket behavior consider the possibility of predatory pricing by multiproduct retailers. In the Competition Commission’s study of supermarkets, the Commission concludes that supermarkets do engage in below cost selling of certain frequently purchased items, but does not conclude that this pricing is predatory. The Commission does not indicate that a recognized legal test of predatory pricing was carried out, but refers to evidence that supermarkets compete on the prices of certain products (which are advertised and whose prices are closely watched by consumers) below marginal cost, recovering these losses through above-cost prices on other items in the store. The Commission concludes that although this below cost pricing was not predatory, it was still harmful to competition by harming smaller grocery stores and convenience stores.

The Office of Fair Trading (1997) discusses how an allegation of predation should be analyzed in a retailing setting. The OFT argues that in retailing, a price-cost comparison will be of little use. The reasons given are that (1) larger retailers may obtain volume discounts from manufacturers, possibly allowing them to drive smaller retailers out of the market without pricing below cost, and (2) due to possible loss-leading behavior, pricing below cost on individual items may be profitable without being predatory.<sup>6</sup> The OFT argues that instead of a price-cost comparison, in the retailing sector an analysis of an allegation of predation should examine two elements: (1) whether the alleged predator deviated from its short

---

<sup>5</sup> *Id.* at 12.

<sup>6</sup> However, the OFT claims that loss-leading may yield its own negative results.

run profit maximizing behavior in any way, and (2) whether predatory pricing would be rational. Unfortunately, the OFT does not provide any guidance for how the first element would be examined, and it does not explain how short-run profit-maximizing behavior can be tested without a comparison of prices to costs.

Finally, the OFT does consider, in a context other than retailing, the problem of an alleged predator who sells multiple products with demand complementarities. In the OFT's guidelines on the application of the *Competition Act* to the telecommunications sector (Office of Fair Trading, 2000, p.30), the OFT acknowledges that "where there is strong complementarity, in applying the relevant tests it may be more appropriate to take into account the costs and revenues of all the complementary services rather than require each individual service to cover its costs." There is no indication that such an approach would be taken in other sectors, or how complementary revenues can be measured.

### *European Commission*

Article 82 of the Amsterdam Treaty (previously Article 86 of the Rome Treaty) addresses the abuse of a dominant position, including pricing abuses. While guidelines regarding the application of Article 82 to predatory pricing cases by the Commission do not appear to exist, the structure of the analysis that emerges from jurisprudence seems to be similar to that outlined by the Office of Fair Trading: a cost comparison, plus evidence of intent if prices are between average variable and average total costs.<sup>7</sup>

---

<sup>7</sup> Indeed, the OFT guidelines cite the European Court jurisprudence as the source of the test presented in its guidelines.

### *European below-cost pricing laws*

In addition to laws regarding the abuse of a dominant position, several European countries address predatory pricing by a multiproduct retailer through below cost pricing laws. These laws apply to the pricing of individual items, and may or may not have additional requirements, such as evidence of dominance of a market. For example, the Irish *Restrictive Practices (Groceries) Order* of 1987 prohibits selling grocery goods at prices below the net invoice prices of the goods, and considers no market structure conditions or legitimate business justifications (with the exception of goods whose minimum durability date has expired).<sup>8</sup> Alternatively, the German *Act Against Restraints of Competition* prohibits an undertaking with superior market power from offering “goods or services not merely occasionally below its cost price, unless there is an objective justification for this.”<sup>9</sup> Such a provision would appear to resemble at least superficially certain predatory pricing tests, in that in addition to a price-cost comparison, a consideration of market power and legitimate business justification is required. Guidelines regarding the application of this provision were not available at time of writing.

### **Case law**

In most countries there is little jurisprudence regarding predatory pricing in general, and predatory pricing by a multiproduct retailer in particular. The notable exception is the U.S., where private litigation has resulted in a large number of cases, both under federal antitrust law and state below cost pricing law.

---

<sup>8</sup> This order has recently survived an attempt to have it repealed. In arguing for the repeal of the grocery order, the Irish Competition Authority (2000) contends that the order prohibits legitimate loss-leading behavior. This argument is also made in Walsh and Whelan (1999).

<sup>9</sup> See page 17 of the *Act Against Restraints of Competition*. The first application of this prohibition was against Wal-Mart, regarding the pricing of staples such as milk and butter.

For the most part, jurisprudence provides little guidance regarding the application of price-cost tests in predatory pricing allegations involving retailing, since many such cases are decided on the basis of the possibility of recoupment, market definition, or evidence of a likely anticompetitive effect.<sup>10</sup> With respect to multiproduct firms, U.S. courts have indicated that in the analysis under the *Sherman Act*, below cost pricing on individual items is likely to be insufficient to eliminate a multiproduct rival. (See Denger and Herfort (1994) for a discussion of the jurisprudence on this point and a list of relevant cases.) Rather, below cost pricing should be shown for the product line or for a relevant product market, to establish that such pricing would prove a threat to a rival.

The possibility that below cost pricing may be loss-leading instead of predatory has received little attention by the courts in *Sherman Act* cases. However, in one such case, *Lormar, Inc. v. Kroger Co.*, the court ruled that since using loss-leaders for promotional reasons is common in the grocery industry, pricing below cost is insufficient evidence of predatory intent.<sup>11</sup> The court did not suggest how a test for predatory pricing could take loss-leading into account.

Loss-leading as an explanation for below cost pricing has received some recent attention under state below cost pricing laws. In *American Drugs, Inc. v. Wal-Mart Stores, Inc.*,<sup>12</sup> Wal-Mart was sued under Arkansas' *Unfair Practices Act* for below cost pricing on certain pharmaceuticals. Wal-Mart lost the initial trial, but won on appeal. The trial court's conclusion is based on the finding that Wal-Mart

---

<sup>10</sup> See for example *Speedway/SuperAmerica, L.L. C. v. Phillips Truck Stop, Inc.*, 782 So. 2d 255 (Ala. 2000); *Ghem, Inc. v. Mapco Petroleum, Inc.*, 767 F. Supp. 1418 (N.D. Tenn. 1990); *McGuire Oil Co. v. Mapco Petroleum, Inc.*, 763 F. Supp. 1103 (S.D. Ala. 1991); *Star Fuel Marts, L.L.C. v. Murphy Oil USA, Inc.*, No. CIV-02-202-F (W.D. Okla. 2003) (order granting preliminary injunction); *Bathke v. Casey's General Stores, Inc.*, 64 F. 3d 340 (8<sup>th</sup> Cir. 1995); *Indiana Grocery, Inc. v. Super Valu Stores, Inc.*, 864 F. 2d 1409 (7<sup>th</sup> Cir. 1989); *Rebel Oil Co., Inc. v. Atlantic Richfield Co.*, 51 F. 3d 1421 (9<sup>th</sup> cir. App. 1995); *Tennessean Truckstop Inc. v. Mapco Petroleum, Inc.*, 728 F. Supp 489 (M.D. Tenn. 1990).

<sup>11</sup> *Lormar, Inc., et al. v. The Kroger Co.*, 1979-1 Trade Cas. (CCH) ¶ 62, 498 (S.D. Ohio 1979).

<sup>12</sup> *American Drugs, Inc. v. Wal-Mart Stores, Inc.*, E-92-1158 (Oct. 1993). A detailed discussion of this case is provided in Boudreaux (1996).

priced certain individual items below cost. The Court also found that intent to injure competitors and destroy competition could be inferred from circumstances such as the number and extent of below cost sales, Wal-Mart's stated pricing policy and its stated purpose for the policy, Wal-Mart's use of in-store price comparisons with other retailers, and how Wal-Mart's prices varied across markets according to competition.

Wal-Mart's appeal was based on three points: (1) the court erred in finding that Wal-Mart sold products below cost *for the purpose of injuring competitors and destroying competition*; (2) the court should have considered whether consumer baskets of products were priced below cost, as opposed to individual items; and (3) the Court's interpretation of Arkansas' *Unfair Trade Practices Act* violated the Arkansas and U.S. Constitutions. The Supreme Court of Arkansas agreed with Wal-Mart on the first point, and reversed the decision. The Supreme Court stated that "In the case before us, the loss-leader strategy employed by Conway Wal-Mart is readily justifiable as a tool to foster competition and to gain a competitive edge as opposed to simply being viewed as a strategem to eliminate rivals all together." The Supreme Court did not comment on the last two points of the appeal. Therefore, we do not know whether the Supreme Court would have supported the lower court's finding that pricing below cost need only be shown for individual items.

In another recent case, however, a court has been less receptive to business justifications for pricing below cost given the state below cost pricing prohibitions. In *Star Fuel Marts v. Murphy Oil USA, Inc.*,<sup>13</sup> a preliminary injunction was granted under Oklahoma's *Unfair Sales Act*, prohibiting below cost sales of gasoline by Sam's East, a Wal-Mart subsidiary which sells groceries in a wholesale club format. The court held that pricing below cost is prima facie evidence of intent to injure competitors and to lessen competition substantially, and also of a tendency to destroy or substantially lessen competition. In

---

<sup>13</sup> *Star Fuel Marts, LLC. v. Murphy Oil, Inc.*, No. CIV-02-202-F (W.D. Okla. 2003) (order granting preliminary injunction).



addition, Oklahoma's *Unfair Sales Act* prohibits pricing below cost that tends to deceive consumers into believing prices on other products will be low. The court held that "inherent in the below cost sale of one commodity among hundreds or thousands sold at the same establishment is the implication that the pricing of the item which is sold below cost is indicative of pricing generally at the same establishment."

Therefore, loss-leading cannot be considered a defense, and is in fact an offence (if it misleads consumers) under Oklahoma law.

### ***Summary***

In general, neither competition agencies nor jurisprudence have articulated how a test of predation would be carried out in the case of a multiproduct retailer, although some suggestions and observations have been made in several jurisdictions. According to government statements and jurisprudence, price-cost comparisons should not be carried out for individual items, since below cost pricing on a single item or a small number of items would be insufficient to eliminate a rival. This appears to conflict with below cost sales laws in many jurisdictions, which focus on individual items. As well, loss-leading is recognized in some countries as a possible justification for below cost prices, although some jurisdictions prohibit or express concern over loss-leading pricing that misleads consumers regarding general price levels on other products. Countries that consider loss-leading to be a business justification for below cost pricing have not specified how predation tests can differentiate between predatory pricing and legitimate loss-leading.

### 3.3 Predation and the multiproduct firm

The preceding review of government predation policies and relevant case law shows that the possibility of predation by multiproduct firms is a very real concern. However, there seems to be a lack of precision in the guidance that has been given with respect to the test for predation in the multiproduct firm context. Economists are at least partly responsible for this lack of precision given that much of the theory and policy analysis dealing with predation has been carried out in the context of single product firms. However, there have been a few notable exceptions.

Areeda and Turner (1975) seem to have had some awareness of the multiproduct problem, but they address it under the heading of “predatory investment in new product lines”. They note that a monopolist investing in a competitive product line might contribute more to profits than is shown by the estimated revenue-cost relationship on that line alone. They recognize (at page 722) that “the ability to offer a fuller line of complementary products may increase the sales of each, either because consumers prefer to deal with a single seller or because the fuller line enhances the seller’s image”. They conclude that even if a new investment in a competitive line would appear to be less profitable than additional investment in the monopoly line (after taking risks into account), it should not be deemed predatory so long as the expected return equals or exceeds the “normal” return for the product line concerned. While acknowledging that the predation case for a monopolist’s investment that is expected to generate below cost returns is stronger, Areeda and Turner reject a predatory investment rule because of their belief that the possibility of such an investment is too remote. Areeda and Turner have likely erred in rejecting such a rule given the concerns among various competition authorities regarding predatory expansions of aircraft capacity by various airlines against low cost competitors. The possibility that an incumbent firm undertakes an

aggressive store expansion in a market in order to drive a rival out also exists.<sup>14</sup>

Posner (1976) was also aware of the multiproduct firm predation problem, but did not offer a solution to it. According to Posner, under his definition of predatory pricing (“pricing at a level calculated to exclude from the market an equally or more efficient competitor”), selling below “long-run marginal cost” with the intent to exclude would be predatory.<sup>15</sup> Long-run marginal costs are defined by Posner as those that must be recovered to stay in business for the more or less indefinite future, and are similar to (if not the same as) avoidable costs.<sup>16</sup> So Posner can be interpreted as suggesting an avoidable cost test for predatory pricing, subject to an intent requirement or no legitimate business justification for the pricing. He goes on to state that it will sometimes be difficult or even impossible to make a nonarbitrary allocation of marginal costs to an individual product or market. He apparently did not recognize that an avoidable cost test does not require arbitrary allocations of costs.

Baumol (1979, p. 9, fn. 26), in a comment on Williamson (1977), also touches on the multiproduct problem, but does not discuss how demand externalities should be dealt with in the context of a predation test. Baumol states that when Williamson requires that the price of a good in the long run exceeds its average total cost, he assumes that Williamson meant the good’s average incremental cost, including any fixed cost outlays required to provide the good.<sup>17</sup> This assumption is based on the fact that most firms are multiproduct

---

<sup>14</sup> See Von Hohenbalken and West (1984).

<sup>15</sup> See Posner (1976) at pp. 188-189.

<sup>16</sup> Williamson (1977, p. 322, fn. 88) discusses some “terminological confusion” that he finds in Posner (1976). In particular, Williamson suggests that average variable cost should be substituted for short-run marginal cost in Posner’s discussion on p. 192, and average total cost should replace long-run marginal cost.

<sup>17</sup> Baumol (1979, p. 9) states: “That is, the average incremental cost of product X is defined as total company cost minus what the total cost of the company would be in the absence of production of X, all divided by the quantity of X being produced. Total costs refer to those that would prevail in the long-run with the output combinations specified.”

firms and average total cost is not well-defined for a multiproduct firm. The same point is made by Joskow and Klevorick (1979, p. 252.).

Ordover and Willig (1981) are perhaps the first economists to suggest a predation test for multiproduct firms when there are demand externalities. Ordover and Willig (p. 9) first define predatory objectives as being present if a practice would be unprofitable without the exit it causes, but profitable with the exit. They then (at page 16) propose an avoidable cost test for predation: for the value of an output cutback that corresponds to elimination of the incumbent's entire output, "the test for predatory sacrifice is whether the incumbent's price is below the average avoidable cost of the product line in question." Under their test, the cost savings from the output contraction (including avoidable advertising costs and capital costs) are compared with the associated revenue reduction.

With respect to multiproduct firms, Ordover and Willig consider the case of a dominant firm responding to the entry of a new rival. The incumbent is a multiproduct firm, and the predatory output is assumed to be cross-elastic with another of the incumbent's products. The test for predatory sacrifice is stated to be the same as in the single product firm case. Predation, then, is said to exist if the conservative estimate of the loss of direct revenues from an output contraction is less than the sum of the direct cost saving from the contraction and the estimate of the net effect on profit from the sales of the cross-elastic product.<sup>18</sup> Where the cross-elastic good is a complement for the predatory good, the adjustment for the demand complementarity lowers the price that the incumbent can charge on the predatory good without violating the cost-based test. Ordover and Willig note that the size of the adjustment to the price floor is greater the larger is the mark-up of price over cost for the cross-elastic good and the more sensitive are the sales of the cross-elastic good to the price and output of the good in question. However, "if

---

<sup>18</sup> The "conservative estimate" of the loss of direct revenues is obtained by multiplying the output reduction by the existing price prior to the output reduction.

there is no significant cross-elastic effect, or if there is no significant mark-up over average incremental costs on the cross-elastic good, the adjustment for cross-elastic effects may be ignored.”<sup>19</sup>

Baumol (1996) provides an extensive discussion of the avoidable cost test for predation, emphasizing the applicability of the test in the multiproduct firm case. Baumol’s Rule 4 (on page 61) states that for a multiproduct firm, the price of each product by itself must equal or exceed that item’s average avoidable cost. In addition, “any combination of the firm’s products must be priced so as to yield an incremental revenue that exceeds the avoidable cost incurred by that combination of products.” Baumol, however, does not deal with the case of demand complementarity for the products of a multiproduct firm.<sup>20</sup>

Cabral and Riordan (1997) modify the Ordoover and Willig (1981) definition of predation in a way that suggests a practical test for predatory behavior in the multiproduct firm case where demand complementarities might exist. Cabral and Riordan (at p. 160) “call an action predatory if (1) a different action would increase the likelihood that rivals remain viable, and (2) the different action would be more profitable under the counterfactual hypothesis that the rival’s viability were unaffected. In other words, a predatory action is unprofitable but for its effect on a rival’s exit decision.” Cabral and Riordan’s test suggests that it is not enough for a firm to argue that below cost pricing on a subset of items is justified by the net revenue gain on complementary goods sold by the firm. Rather, if such pricing causes a rival firm to incur losses, the question would be whether the firm could have realized net revenue gains on complementary goods without engaging in pricing that forces losses on the rival.

A similar approach is advanced by Bolton, Brodley and Riordan (2000, p. 2277). In their discussion of market-expanding price cutting,

---

<sup>19</sup> See Ordoover and Willig (1981, p. 21).

<sup>20</sup> Testing for predatory pricing by a multiproduct firm when demands are related is touched on in Baumol (1986), in the context of a response to a suggestion by Professor Areeda.

they note that such price cutting can be either pro-competitive and output expanding, or anti-competitive by excluding or disciplining rivals without compensating efficiency gains. They go on to write that a market-expanding business justification defense would have three threshold requirements: (1) plausible efficiency gains: synergies or scale economies are examples; (2) no less restrictive alternative: efficiencies cannot be achieved without selling below cost or by shortening the period of below cost pricing; and (3) efficiency-enhancing recoupment: recoupment of the investment in below cost pricing arises from efficiency gains rather than through eliminating or disciplining a rival. Bolton, Brodley and Riordan would have the defendant bear the burden of proving elements (1) and (3), while the plaintiff and defendant would share the burden of establishing or rejecting the feasibility of element (2).

The tests proposed by Cabral and Riordan (1997) and Bolton, Brodley and Riordan (2000) can be interpreted in a way that will provide some guidance in the construction of an algorithm for determining whether supermarkets are engaging in predation against rivals. Craswell and Fratrick (1985-86), who identify the problems in predation analysis that arise from loss-leading and demand complementarities, are skeptical that a test for predation can be constructed for supermarkets that would distinguish predatory conduct without deterring competitive price cuts. They recommend that price wars in the retail grocery industry not give rise to antitrust concerns, regardless of how low prices fall. As will be discussed in the next section, a test for predation can be constructed for supermarkets that is more revealing than Craswell and Fratrick's paper would suggest.

Finally, Areeda and Hovenkamp (2002) also discuss predation in the multiproduct firm case in their *Antitrust Law* treatise (in section 742). They consider the case where two goods are complementary in the sense that a lower price for A increases the sales of product B. (This would seem to cover the case of loss leading by a supermarket.) They acknowledge that it is theoretically correct to say that some revenues from selling B are properly attributable to A or that part of

the costs of producing A are properly attributable to B. However, they reject such a claim by a monopolist seeking to justify a product's apparently predatory price. They offer three reasons for this: (1) reallocating revenues or costs presents administrative difficulties; (2) if A is complementary with B, B is also complementary with A, so that reallocation of revenues and costs will lead to a "wash"; (3) to some extent, the monopolist could achieve the desired increase in revenues by reducing the price of B rather than A.

Areeda and Hovenkamp also consider the case where a firm with a monopoly in product A faces competition on product B. They argue that a below cost price on B cannot be justified by increased revenues on the monopolized product, "for it is the prospect of monopolizing product B that generates our concern over predation there." However, if the rival also produces both A and B, they argue that a firm's selling B below cost cannot harm the rival as long as the combination of A and B remain profitable for both firms.

In the case of multiple products with common costs, Areeda and Hovenkamp recommend that a test for predation in this case requires showing that the firm is pricing below average variable cost across its entire product line. The reasons for this recommendation are that (1) the cost allocation problem in such cases is "well nigh insurmountable", and (2) "when multiple products are produced in the same plant and share this many common variable costs, the chances of creating a monopoly in one of the products are quite small." It is not clear why Areeda and Hovenkamp believe that any allocations of common costs in the multiproduct case are required for the predation test. Their second reason for their recommendation seems to lack a theoretical justification.

Areeda and Hovenkamp also have a brief discussion of loss leading. They do not regard true loss leading as predatory, assuming the reasonably anticipated incremental revenue impact of such pricing is positive. From their discussion, it seems that they would carry out the test for predation at the store level, and not by examining whether the revenue from the sale of the loss leading products covers their costs. While a test for predation can be carried

out at the store level, it can also be carried out for a subset of products, as will be argued in the next section.

### **3.4 Multiproduct firm predation proposals**

There are two types of possible multiproduct firm predation in a retail context that have given rise to complaints to competition authorities. The first type of complaint involves a multiproduct firm, like a supermarket chain, operating a supermarket and a second business, like a gas station, nearby. The second business sets low prices, perhaps to attract customers to the supermarket as well as the gas station, but the low prices produce predatory pricing complaints. The second type of complaint involves loss leading, where a multiproduct firm like a supermarket sells a subset of products at prices below some measure of cost, usually acquisition costs. Both types of possible multiproduct firm predation involve demand complementarities, and thus require some method for handling them. Our earlier review of the policy and case literature suggests that competition authorities are still trying to determine workable rules for handling complaints involving multiproduct firm predation where there are demand complementarities.

There are a number of competitive scenarios to consider in the case of multiproduct retail firm predation when there are demand complementarities. To discuss them, suppose that two stores, A and B, are owned by a supermarket chain, called Firm 1. Store A is a member of a supermarket chain that has a number of dispersed store locations in a city. Call Store A the primary store. Store B can be regarded as a single product store in that it mainly sells one type of product (e.g., gasoline or beverage alcohol). Call Store B the secondary store.

Suppose further that Store B has been located next to Store A because of presumed demand complementarities between Stores A and B. For Scenarios 1 and 2 below, assume that Firm 1 has decided



to have Store B charge a price that is below the acquisition cost of the product sold by B.

*Scenario 1:* In this scenario, another firm, called Firm 2, has a supermarket, C, located across the street from Firm 1's stores. Firm 2 does not own or operate secondary stores that compete directly with B. In this case, below cost pricing by Store B can have two effects: first, some of C's usual customers might be attracted to make a purchase at B and shop at A on the same trip. The loss of business by C could cause it to earn negative profits. Second, below cost pricing by Store B could cause losses for B's direct competitors, depending on where they are located in relation to B. How does one assess a predation complaint in these circumstances?

Assuming no constraints on data availability, one could first compare each of A and B's revenues with their respective avoidable costs, assuming no demand complementarity. One could then compare the combined revenues of A and B with the combined avoidable costs of both stores. If combined revenues are less than combined avoidable costs, then one could conclude that the firm has failed the avoidable cost test, and proceed to examine the other elements that need to be proved in a predation case. If Store A has passed the avoidable cost test, while Store B has failed it, then the question is whether Store B would pass the test if the incremental net revenues to A that are produced by below cost pricing at B are added to Store B's revenues. If the answer is no, then one could conclude that Store B has failed the avoidable cost test. If the answer is yes, then one must consider, based on the Cabral/Riordan test, whether there is a different action by Firm 1 that would leave Store C viable, and whether the different action would be more profitable under the assumption that the rival's viability is unaffected. In other words, the increase in net revenues at A due to B's pricing might be large enough to have B cover its avoidable costs only because B's pricing leads C to fail. There could be an alternative action, such as higher prices at B, that could still produce positive demand externalities for Firm 1 without leading to C's demise.

The assessment of A and B's revenues and costs depends on having access to Firm 1's data. In some jurisdictions, such data will only be made available under a court order once it has been established that there is reason to believe that a competition law has been violated. Prior to this time, one is more likely to have access to the cost and revenue data of the complainant. The competition authority will have to use market structure information in conjunction with the complainant's cost and revenue data and price comparison information in order to determine whether (1) market structure conditions are conducive to predatory conduct, (2) the alleged predator is behaving differently against the complainant than elsewhere that it has stores, (3) the alleged predator has an incentive to engage in predatory conduct, and (4) the complainant and/or competition are potentially being harmed by the alleged predator's conduct. It is an awkward fact, however, that the possibility that a firm's conduct is predatory is extremely difficult to assess in the absence of the alleged predator's cost and revenue data.

*Scenario 2:* In this scenario, Firm 1 still operates Stores A and B, but the store across the street owned by Firm 2 sells the same product as Store B instead of Store A. Store B sells its product below acquisition cost, forcing Firm 2's store, called Store D, to do the same. Is Firm 1's pricing behavior predatory?

The approach to take in assessing predation in Scenario 2 is essentially the same as the approach applied in Scenario 1, although the cases appear different. In Scenario 1, Firm 1's below cost pricing on a good that Firm 2 does not sell is capable of forcing losses on Firm 2. In Scenario 2, Firm 2 does sell the good that is being sold below cost by Firm 1, but it does not also operate a second store that could benefit from below cost pricing. It cannot rely on a demand externality to generate net profits that offset the effects of Firm 1's below cost pricing. Nor might it have sufficient space available at its store location to build a second store.

In this case one can first compare each of A and B's revenues with their respective avoidable costs, assuming no demand complementarity. If there indeed is no demand complementarity,

then each of Store A and Store B should have revenues in excess of avoidable cost in order to comply with the predatory pricing rule. One can also compare the combined revenues of A and B with the combined avoidable costs. If combined revenues are less than combined avoidable costs, then one could conclude that the firm has failed the avoidable cost test. The other elements that need to be proved for a finding of predation could then be examined.

If Store A has passed the avoidable cost test while Store B has failed it, then the net incremental revenue effects of B's pricing would again be assessed, as would the question regarding a more profitable alternative action on the assumption that Firm 2's store remains viable.

From a fairness perspective, one might be concerned that Firm 2's store can be driven from the market, in part because it is site-constrained from taking steps to defend itself. On the other hand, consumers receive a benefit from the lower prices at Stores B and D (as long as D remains in business). There may also be a concern that Firm 1 will raise its price at Store B once Firm 2's store goes out of business. If, however, Store B's low price does generate higher net revenues for Store A, then Store B will not necessarily raise price once Firm 2's store shuts down. It would raise price, however, with the demise of Store D if its price at Store B is lower than the one necessary to generate the demand externality at Store A.

*Scenario 3:* In Scenario 3, Firm 1 operates multiproduct Store A and single product Store B, while Firm 2 operates both multiproduct Store C and single product Store D in competition (in the same product market) with Firm 1's stores. Firm 1 sets prices below acquisition costs for a subset of products sold by Store A. (If it did not, then one would evaluate the alleged predatory conduct by A by examining the store's performance as a whole as set out in Scenarios 1 and 2.) Firm 2 complains that Firm 1's prices are predatory. How does one proceed to evaluate the complaint in this case?

First, it should be noted that Store A's below cost prices could attract customers away from both Stores C and D, depending on the nature of Firm 2's response. Customers of Store C would be attracted

by A's low prices, while some of C's customers that would have also patronized Store D will now patronize Store B instead. Depending on the extent of Firm 1's discounting and Firm 2's response, Firm 2 could incur losses as a result of Firm 1's pricing strategy. But is the pricing strategy predatory?

Firm 1's pricing could be analyzed using the same approach as outlined in Scenarios 1 and 2. That is, one could evaluate whether Stores A and B have revenues above avoidable cost separately and/or jointly, and one could ask whether some alternative pricing strategy for Firm 1 would be more profitable, assuming Firm 2 remains in the market. The latter question takes on added significance for Scenario 3 because of the likelihood that Firm 1's pricing of a subset of products below acquisition cost will not in fact lead it to have revenues below avoidable cost on a store basis.

It is here that a consideration of loss leading by Firm 1 becomes relevant. Loss leading pricing strategies are widely used among multiproduct retailers in certain industries like the supermarket industry. The strategy typically involves a retailer selecting a small subset of products to advertise with prices that are below avoidable cost. The products are not chosen randomly. Rather, some of the products are selected because they are frequently purchased items for which many consumers are price sensitive. Low prices for these products might then be capable of inducing consumers to abandon the store that they would normally patronize in favor of the store with the lower prices. To the extent that happens, the retailer expects consumers to purchase the products with negative margins, but also other products for which the retailer receives positive margins. Net revenues from the latter can exceed the losses from the former, and then the loss leading strategy would be profitable.

It is not difficult to imagine a case where loss leading by both Firms 1 and 2 results in higher sales and profits for both firms. This could happen if consumers that are attracted to Firms 1 and 2 by their low pricing, both their usual customers as well as customers that normally patronize other stores, actually increase their total expenditures on the goods sold by Firms 1 and 2.

Still, what appears to be loss leading can pass a certain threshold where it is no longer part of an innocent profit-maximizing strategy. Rather, it could be predatory by design. The set of products chosen for below cost pricing by Firm 1 may or may not result in Firm 1 incurring losses at the store level, even as they force losses on Firm 2. While Firm 2 might match Firm 1's below cost prices, it might not offer the same set of other goods as Firm 1 that are priced with positive margins. In this case, testing for predation by simply looking at Firm 1's revenues and avoidable costs at the store level would permit Firm 1 to engage in predation while at the same time passing the predation test. What is required, then, is a test that would distinguish sales increasing loss leading behavior from predation.

Once again, Cabral and Riordan provide the conceptual approach. One would ask whether the set of products being priced below acquisition cost could be priced higher in a way that results in higher profits for Firm 1, while at the same time allowing Firm 2 to cover its costs. While the conceptual approach seems clear, the difficulty arises in having a competition authority implement the approach.

Part of the difficulty is that in the initial stage of an investigation into a predation complaint, the competition authority may not have access to the alleged predator's revenue and cost data. It will have to assess the depth of the alleged predator's discounting using information provided by the complainant. In the case where Firms 1 and 2 are operating supermarkets as Stores A and C, the complainant Firm 2 likely has price surveys taken from Store A. The complainant should also be able to provide data on its own acquisition costs for the products on the price survey. These costs could be similar to Firm 1's costs if both firms are members of large buying groups having access to the best supplier prices.

The next step would be to determine what "normal" loss leading prices would be for the products. The complainant could provide information in this regard. Alternatively, one could calculate the average percentage by which price is below cost for loss leading items in a supermarket where predation is not alleged. This could be

compared to the percentage price reduction at the alleged predatory store.

Having established the relative magnitude of Firm 1's price reduction relative to costs, one would then want to estimate the possible net revenue gain to Firm 2 if prices were raised to their "normal" loss leading levels. One could get an estimate of the possible net revenue gain by examining store sales before and after the start of the alleged predation period (assuming that the store was not confronted by predatory prices from the day it opened).

Finally, one would wish to compare Firm 1's prices for loss leading products at Store A with the prices that it charges at other of its stores in the same market where predation is not alleged. Alternatively, one could compare the percentage reductions below cost of loss leading items at Firm 1's predatory store and a non-predatory store (assuming that the sets of loss leading items could differ), to assess the extent of the differential reduction.

Having followed the steps outlined above, one should be able to establish that (1) Firm 1 is pricing a set of items at Store A lower than at other of its stores in the same market, lower than one would expect with normal loss leading, and likely below its acquisition cost as well, (2) Firm 2 is suffering a loss of net revenues by charging the same prices as Firm 1, and could have higher net revenues if normal loss leading prices were charged. Showing (1) and (2) should be sufficient to permit the competition authority to meet the requirements for obtaining a court order to retrieve Firm 1's cost and revenue data. One could then examine whether Firm 1 is operating with revenues below cost on a store basis. One could also attempt to estimate the net revenue increase that Firm 1 could achieve by raising prices on its deeply discounted loss leading items.

With respect to the implementation of the predation test for Scenarios 1 and 2, the difficulty is in estimating the value of the demand externality that A experiences from the below cost pricing by Store B. One would also wish to estimate the value of this externality at higher prices charged by Store B. To help obtain these estimates, one might be able to examine sales of Store A before and

after below cost pricing by Store B. Assuming that Store A is a member of a chain, one might be able to examine the sales and profits of other stores in the chain, particularly those that do not have another store like B generating demand externalities for them. In doing this, one would have to control for other factors that could affect the sales of these stores, such as trade area populations, local competition, store size and product mix. One might also be able to undertake some demand analysis in order to estimate cross price elasticities between Stores A and B.

It is not known to what extent the type of analysis discussed here has been undertaken in investigations of predation complaints involving multiproduct firms. While most firms are multiproduct, our literature and case review did not uncover any discussion of applied procedures for analyzing the multiproduct firm predation problem in a retail context when products are complements or substitutes. Competition authorities would clearly benefit from the development of such procedures, as they would expedite the evaluation of predation complaints. The development of such procedures in real market settings would also permit economists to assess the sensitivity of the outcomes of the price/cost test to alternative treatments of costs and revenues by the test.

### **3.5 Conclusion**

Statements of predatory pricing policy for most countries that have one ignore many of the problems that arise from attempting to determine whether a multiproduct retailer has engaged in predation. They therefore provide little guidance regarding how such a case would be handled. In particular, government policy and case law leave the question of how to deal with demand complementarities in retailing largely unanswered.

In this paper, we have argued that although government policy has not addressed this issue, economic literature does suggest an overall approach that can be applied. The approach entails

determining whether an alleged predator can earn higher profits by raising price on the goods being priced below cost, on the assumption that the rival firm remains viable. If so, then one of the required elements of a predation case is met. This approach is then illustrated in several scenarios involving two types of possible multiproduct firm predation. In the first two scenarios, the alleged predator operates two adjacent stores (at least one of which is multiproduct), and lowers the price below cost at one, which can affect the sales and profits of the other. In the third, the alleged predator lowers a subset of prices at its multiproduct store, which can also affect the sales and profits of both stores. Some general applied approaches to carrying out this type of analysis are also briefly discussed.

This article does not set out a complete applied algorithm for assessing the possibility of multiproduct firm predation since the appropriate algorithm would likely depend upon the particular case. We do suggest that if a multiproduct retailer is found to be pricing below avoidable costs on a product or certain combination of products, further analysis may be required to determine whether such below cost pricing was necessary to take full advantage of demand complementarities. Since this likely cannot be determined from an analysis of a single store's costs and revenues, consideration may have to be given to the prices and sales of other stores operated by the alleged predator in the same and different markets (depending on whether predatory pricing is confined to one part of the market), or estimation of cross elasticities. Since these are costly and time consuming tasks, a competition agency may be best served by reserving such analysis for cases involving large national chains operating in many markets.

This paper has focused on testing for predation when multiproduct retailers face demand complementarities. However, testing for predatory pricing in retailing may be complicated for other reasons as well. One important factor is the location of the retailers in geographic space. If the alleged predator, prey, and other retailers in the market are spread out across an urban area, several



elements of a case may be affected. The distribution of retailers over space will determine how low a firm must price in order to achieve predatory aims and which outlets must lower price the most. As well, the spatial distribution of outlets will affect the ability of the alleged predator to harm the prey and the possibility that subsequent price increases will be constrained by competitors. The literature on tests for predatory pricing has tended to examine firms competing in a spaceless world.<sup>21</sup> The appropriate test for predation in a spatial market is a subject of future research.

---

<sup>21</sup> One exception is the recent article by Lindsey and West (2003).

## References

- Areeda, P. and D. Turner (1975), "Predatory Pricing and Related Practices Under Section 2 of the Sherman Act," *Harvard Law Review*, 88 (1), 697-733.
- Areeda, P. and H. Hovenkamp (2002), *Antitrust Law: An Analysis of Antitrust Principles and Their Application, Volume III*, 2<sup>nd</sup> Ed., Aspen Law and Business, New York.
- Baumol, W. (1979), "Quasi-Permanence of Price Reductions: A Policy for Prevention of Predatory Pricing," *Yale Law Journal*, 89(1), 1-26.
- Baumol, W. (1986), *Superfairness: Applications and Theory*, MIT Press, Cambridge, Mass.
- Baumol, W. (1996), "Predation and the Logic of the Average Variable Cost Test," *The Journal of Law and Economics*, 39(1), 39-72.
- Bolton, P., Brodley, J., and M. Riordan (2000), "Predatory Pricing: Strategic Theory and Legal Policy," *The Georgetown Law Journal*, 88(8), 2239-2330.
- Boudreaux, D. (1996), "Predatory Pricing in the Retail Trade: The Wal-Mart Case," in Coate, M. and Kleit, A., (eds.), *The Economics of the Antitrust Process*. Topics in Regulatory Economics and Policy Series. Kluwer Academic, Boston, 192-215.
- Cabral, L. and M. Riordan (1997), "The Learning Curve, Predation, Antitrust, and Welfare," *The Journal of Industrial Economics*, 45(2), 155-169.

- Calvani, T. (1999), "Predatory Pricing and Below-cost Sales Laws in the United States: An Analysis," a report prepared for the Competition Bureau of Canada. Available online at <http://strategis.ic.gc.ca/SSG/1/ct01491e.html>.
- Competition Bureau (2001a), "Enforcement Guidelines on the Abuse of Dominance Provisions," Industry Canada, Ottawa.
- Competition Bureau (2001b), "Enforcement Guidelines: The Abuse of Dominance Provisions (Sections 78 and 79 of the Competition Act) as Applied to the Retail Grocery Industry," Industry Canada, Ottawa.
- Competition Bureau (2002), "Enforcement Guidelines for Illegal Trade Practices: Unreasonably Low Pricing Policies under Paragraphs 50(1)(b) and 50(1)(c) of the *Competition Act*," draft, Industry Canada, Ottawa.
- Competition Commission (2000), "Supermarkets: A report on the Supply of Groceries from Multiple Stores in the United Kingdom," Cm 4842.
- Craswell, R. and M.R. Fratrik (1985-86), "Predatory Pricing Theory Applied: The Case of Supermarkets vs. Warehouse Stores," *Case Western Reserve Law Review*, 36(1), 1-49.
- Denger, M. and J. Herfort (1994), "Predatory Pricing Claims After *Brook Group*," *Antitrust Law Journal*, 62(3), 541-558.
- Director of Investigation and Research (1992), "Predatory Pricing Enforcement Guidelines," Minister of Supply and Services Canada, Ottawa.

- Irish Competition Authority (2000), "Response to the Competition and Merger Review Group Report on the 1987 Groceries Order," Discussion Paper No. 10, Dublin.
- Joskow, P. and A. Klevorick (1979), "A Framework for Analyzing Predatory Pricing Policy," *Yale Law Journal*, 89(2), 213-270.
- Lindsey, R. and D.S. West (2003), "Predatory Pricing in Differentiated Products Retail Markets," *International Journal of Industrial Organization*, 21(4), 551-592.
- Niels, G. and Ten Kate, A. (2000), "Predatory Pricing Standards: Is there a Growing International Consensus?" *The Antitrust Bulletin*, 45(3), 787-809.
- Office of Fair Trading (1997), "Competition in Retailing," Research Paper 13.
- Office of Fair Trading (1999), "The Chapter II Prohibition," OFT 402.
- Office of Fair Trading (2000), "The Application of the Competition Act in the Telecommunications Sector," OFT 417.
- Ordover, J. and R. Willig (1981), "An Economic Definition of Predation: Pricing and Product Innovation," *Yale Law Journal*, 91(1), 8-53.
- Posner, R. (1976), *Antitrust Law: An Economic Perspective*, University of Chicago Press, Chicago, Illinois.
- Von Hohenbalken, B. and D.S. West (1984), "Predation among Supermarkets: An Algorithmic Locational Analysis", *Journal of Urban Economics*, 15, 244-257.

Walsh, P. and C. Whelan (1999), "A Rationale for Repealing the 1987 Groceries Order," *The Economic and Social Review*, 30(1), 71-90.

Williamson, O. (1977), "Predatory Pricing: A Strategic and Welfare Analysis," *Yale Law Journal*, 87(1), 284-340.



## **4. Defining a price squeeze in competition law**

*Paul A. Grout*

### **4.1 Introduction**

A price squeeze describes a situation where a vertically integrated company sets a high price for its upstream supply to downstream competitors while setting its own retail price so low as to exclude or significantly chill the downstream competition. While the prevention of this activity has been a core component of competition law in the US for decades it has only recently become a common theme in European competition policy. This paper provides a brief introduction to US and EC policy, then explores some of the inherent conflicts that arise between a price squeeze test and efficiency, and draws conclusions as to the appropriate definition of a price squeeze for competition law purposes.

The rough definition of a price squeeze given above may appear straightforward but very rapidly runs into complexities when confronted with real evidence, and although this paper is concerned with appropriate definitions of a price squeeze test it will make no attempt to be definitive in resolving the many areas of dispute that exist. Instead the paper sets itself the more modest objective of giving insight into and providing suggestions for the appropriate definition with regard to four important areas of disagreement. One is whether exclusion ought to be part of the test or whether it ought to be a test that simply defines unlawful relationships between upstream and downstream prices regardless of whether this relationship has or has not excluded competitors. A second closely related question is

whether failure of the test can be demonstrated using the vertically integrated company's downstream costs or those of competitors (or either, as the European Commission has suggested). A third area of concern is whether persistence is necessary. Finally, we discuss how to deal with common costs at the downstream level.

## 4.2 Background

### *Application of article 82 of the EC Treaty*

Article 82 of the EC Treaty states that 'an abuse by one or more undertakings of a dominant position within the common market or in a substantial part of it shall be prohibited as incompatible with the common market in so far as it may affect trade between Member States'. A central tenet of European competition law is that it is the abuse of, not the holding of, a dominant position that is illegal. There are three steps to establishing such an abuse. First the specific market has to be identified. Second, given that definition, the entity must be shown to be dominant on that market. Finally, if the firm is dominant on the market then the issue of whether there has been an abuse or not can be addressed.

An entity is dominant if it is in 'a position of economic strength...giving it power to behave to an appreciable extent independently of its competitors, customers and ultimately of consumers'.<sup>1</sup> Interestingly, one of the immediate definitional issues arises with regard to the position of upstream companies. One could argue that it does not make much sense to apply a price squeeze test to all vertically integrated firms that are dominant in the upstream market. For example, it is possible that a company that has 45% of the upstream market may be found dominant but it would be difficult to suggest that the downstream competitors have little

---

<sup>1</sup> This is the basic 'legal test' used by the Commission since *United Brands v Commission*, Case 27/76 (1978) ECR 207.



choice of upstream supply. On the other hand one could take the view that the appropriate test should only apply where the vertically integrated company's input is essential (or at least there is no economically feasible alternative). An in between case could be to adopt the idea that the company should have a position of 'super dominance' in the upstream market.<sup>2</sup> We will return to this issue in Section 4 since it ties in with the relevance of exclusion.

### ***The background of price squeeze in the US***

The initial application of the notion of a price squeeze in antitrust law arose in the United States v Alcoa case in the 1930s and 1940s. Judge Hand found against Alcoa in the Court of Appeals in 1945, suggesting that amongst other things they were guilty of raising the price of competitors' essential inputs - ingot - so that they could not compete with Alcoa in sheet rolling, i.e., the downstream market. Judge Hand stated:

'The plaintiff describes as the 'Price Squeeze' a practice by which, it says, Alcoa intended to put out of business the manufacturers of aluminium sheet who were its competitors'. ..... 'To establish this the plaintiff asks us to take Alcoa's costs of rolling as a fair measure of its competitors' costs, and to assume that they had to meet Alcoa's price for all grades of sheet and could not buy ingot elsewhere.' ..... 'That it was unlawful to set the price of sheet so low and hold the price of ingot so high seems to us unquestionable, providing as we have held, that on this record the price of ingot must be regarded as higher than a "fair price".'

This case has received considerable attention over the years. The Hand decision has been cited and discussed approvingly in many subsequent cases before the Supreme Court (see, for example, Posner and Easterbrook (1980). However, within the economic literature the

---

<sup>2</sup> See Whish (2001) for a discussion of the emergence of super dominance.

reception has been mixed. For example, Lopatka and Godek (1992) claim: 'For many years now, Judge Hand's standard of antitrust liability has stood condemned. The consensus has been that Alcoa committed no wrong doing'.

Since Alcoa there have been many attempts to establish price squeezes in electricity markets in the US but the history has not been one of success in proving violation of Section 2 of the Sherman Act. Joskow suggests that this is in part due to the need to establish intent to monopolise these markets (see Joskow (1985)). More recently discussion of the price squeezes test has started to appear frequently in specific antitrust reports and cases in the context of telecommunications. Although, there is no mention of price squeeze in the Telecommunications Act of 1996, there is discussion in the FCC's First Report and Order on Implementation of the Local Competition Provisions.<sup>3</sup> The debate relates to the role of imputation rules. An imputation rule 'requires that the sum of prices charged for a basket of unbundled network elements not exceed the retail price for a service offered using the same basket elements'. In paragraphs 848 to 850 the FCC recognise that an imputation rule could help to detect and prevent price squeezes but they decline to impose an imputation requirement. However, despite the decision not to employ imputation rules, price squeeze considerations are significant in FCC analysis. For example, in the investigation of new access offerings filed by several ILECs (incumbent local exchange companies) the FCC found 'that the ADSL service offerings at issue here are interstate services, are properly tariffed at the federal level, and need not be transferred to the states in order to ensure proper consideration of price squeeze issues.'<sup>4</sup> Similarly, in *US v Sprint and Joint Venture Co.*, the US Competitive Impact Statement suggested:

---

<sup>3</sup> First Report and Order on the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act (FCC 96-325, Adopted August 1st 1996).

<sup>4</sup> Bell Atlantic Telephone Cos, BellSouth Telecommunications Inc, GTE System Telephone Cos and Pacific Bell Telephone Co. Memorandum and Order November 30 1998.

..... DT and FT will have an increased incentive and ability to cross subsidize Joint Venture Co. and Sprint by providing revenues from the monopoly services or by shifting costs of Joint Venture Co. and Sprint to the monopoly services. In both France and Germany, over three quarters of the revenues of FT and DT are derived from services and facilities that are legally protected against competition. These monopoly activities can be used to cross-subsidize competitive services. Such cross-subsidization would facilitate a strategy of placing competitors of Joint Venture Co. and Sprint in a "price squeeze" by keeping prices for the monopoly inputs they need well above true economic costs, while simultaneously undercutting them on price in the competitive markets through Joint Venture Co. and Sprint, whose costs will have been artificially reduced. The result could be a substantial lessening of competition in both international telecommunications services and seamless international telecommunications services in the U.S.<sup>5</sup>

### ***Price squeeze in Europe***

The notion of a price squeeze in European Community competition policy has a more limited history. It arose in *National Carbonising Company and Napier Brown/British Sugar*.<sup>6</sup> In *National Carbonising* the EC Commission observed that:

‘an undertaking which is dominant as regards production of a raw material .. and is therefore able to control its price to independent manufacturers of derivatives .. and which is itself producing the same derivatives in competition with these manufacturers, may abuse its dominant position if it acts in such a way as to eliminate the competition from these manufacturers in the market for these derivatives. From this general principle the .. Commission deduced that the (dominant undertaking) may have an obligation to arrange its prices so as to allow a reasonably efficient manufacturer of the derivatives a margin sufficient to enable it to survive in the long term.’

---

<sup>5</sup> *US v Sprint and Joint Venture Co* (Civil Action No 95 CV 1304).

<sup>6</sup> See Commission Decision 76/185/ECSC of 29 October 1975, *National Carbonising Company* and Commission Decision 88/518/EEC of 18 July 1988, *Napier Brown/British*.

The Commission has also used the possibility of a price squeeze, along with other potential 'abuses' to intervene against Deutsche Telekom.

'In a provisional assessment of the proposed tariff scheme the Commission concluded that the new tariffs were incompatible with the competition rules of the Treaty. It was clear in particular that they would discriminate in favour of business customers vis-à-vis residential customers, that they would have price squeezing effects on competitors and that they represented bundling, i.e. the undue linking of the provision of the monopoly and competitive services. The Commission required a number of conditions to be fulfilled including the granting of infrastructure licences before the tariff scheme came into operation and the prevention of the tariff scheme being applied retroactively. This is an excellent example of how the competition rules can be used to encourage competition to lower interconnection rates.<sup>7</sup>

More recently, in 2000, the Court of First Instance (*Industrie des Poudres Spheriques*) defined a squeeze price as follows:

'Price squeezing may be said to take place when an undertaking which is in a dominant position on the market for an unprocessed product and itself uses part of its production for the manufacture of a more processed product, while at the same time selling off surplus unprocessed product on the market, sets a price at which it sells the unprocessed product at such a level that those who purchase it do not have sufficient profit margin on the processing to remain competitive on the market for the processed product.'<sup>8</sup>

This definition focuses on the profit margin of competitors, which by definition will depend on the competitor's downstream costs. However, the Commission has also taken wider views as to the demonstration of a price squeeze. Notably, in the notice on application of competition rules to access agreements in the

---

<sup>7</sup> Pons (1998).

<sup>8</sup> Case T-5/97 *Industrie des Poudres Spheriques SA v European Commission* (2000).

telecommunications sector the Commission considered what may constitute a price squeeze.<sup>9</sup> In the Notice the Commission provides two ways that a price squeeze could be demonstrated. These are:

‘a price squeeze could be demonstrated by showing that the dominant company’s own downstream operations could not trade profitably on the basis of the upstream price charged to its competitors by the operating arm of the dominant company’

and

‘the margin between price charged to competitors on the downstream market for access and the price which the network operator charges in the downstream market is sufficient to allow a reasonably efficient service provider .. to obtain a normal profit’.

‘Could’ in this context suggests that there are several events that can constitute a price squeeze but that a price squeeze certainly arises if either of the two suggested occur, i.e., these are sufficient but not necessary for a price squeeze to exist. Indeed, the Commission seems to indicate that this is exactly what it has in mind. This implies that either of these is sufficient to define a price squeeze but is not necessary. The primary difference between the two approaches adopted above is that one is based on the relationship between the vertically integrated company’s prices and the downstream competitor’s cost while the other is based on the relationship between the vertically integrated company’s prices and its own cost. In this sense the Commission’s test appears to be very strict since a company will have been deemed to fail a price squeeze test if either of the events occur.

---

<sup>9</sup> ‘Notice on the application of competition rules to access agreements in the telecommunications sector: Framework, Relevant Markets and Principles (98/C 265/02)’.

### **4.3 Conflict between a price squeeze test and efficiency and its implications.**

The standard justification for a price squeeze test tends to be based on the assumption that entrants sell almost identical products and that both entrants and vertically integrated incumbents have simple cost structures. A vertically integrated company producing an upstream input that is essential for downstream competitors can exclude more efficient downstream competitors by raising upstream prices to a level such that they cannot compete in the downstream market, and in such a simple world a price squeeze test will protect efficient competitors and is likely to do no real harm.<sup>10</sup> However, as soon as one moves away from this specific case then a conflict can arise between prices that achieve efficient allocation of resources and prices that satisfy such a test. That is, where products have some degree of differentiation and there are fixed or common costs the consequences of blocking all combinations of prices that constitute a price squeeze may be far from benign. In this section we provide simple examples of this conflict and use these to throw some light on how one might design a price squeeze test. In particular we address three issues. First, we throw some light on the role of exclusion and the appropriate downstream costs that should be used to signal an abuse. Second, we consider the appropriate time period over which the abuse is to be calculated, i.e., is persistence important. Finally, we consider the effect of downstream fixed and common costs.

---

<sup>10</sup> In part because, in many cases, the vertically integrated company will have no wish to exclude a more efficient downstream competitor providing it can extract more upstream profit by using the more efficient competitor rather than its own channels.

### ***Exclusion and the appropriate downstream cost***

It is useful to start off with an extremely simple example of how a price squeeze test can impose such restrictions on a market that efficient pricing and allocation is blocked. Take a market where there are two products, A and B. Both are produced using a single upstream input and a downstream retail component. There are two consumers, each of which is willing to buy one unit of either A or B but not both. One consumer is indifferent between A and B and will choose whichever is the cheapest but will only purchase if the price is equal to or below 4. The other customer prefers product A to B and will purchase A unless it has a price above 7 in which case the consumer will purchase B provided it has a price of 3 or below.

The cost structure is as follows. The retail cost of each unit of product is one and the upstream marginal/incremental cost of each unit of product is 2. There is also an upstream fixed cost of 4.

It is easy to see that there can only be one upstream company since the fixed cost is too large to sustain two separate companies simultaneously supplying a unit each to the market. However, if for simplicity we assume that the vertically integrated company is not earning an abnormal return, then a single vertically integrated company can sell, for example, product A at 6.5 and product B at 3.5 and cover all its costs. These prices will not satisfy a price squeeze test since there is no price for the upstream input that covers all upstream costs and enables product B to cover the company's downstream cost of retailing B. Note that the company's choice of a price for B that fails to meet a price squeeze test is in no way related to a decision to exclude competitors from the market. It is simply an innocent by-product of an efficient pricing structure. This is the core problem.

Now imagine that there are potential entrants at the retail level wishing to purchase the upstream input and replicate the vertically integrated company's retail arm. There is only one price for the upstream element that will satisfy a price squeeze test. This is a price

of six. This sustains a retail price of seven for products A and B but, of course, a price of seven squeezes product B out of the market.

To see this, note that given the current retail price of 3.5 for product B an upstream price of 2.5 is required to sustain retail competition at the current retail price. Clearly, an entrant will be able to purchase the upstream input at 2.5 and undercut the vertically integrated firm for sales of product B. The vertically integrated firm is then restricted to upstream provision with sales of two units, each at a price of 2.5. Total upstream costs are eight so this position is not sustainable.

For anyone to be able to sell a unit of B profitably into the retail market then the price for a unit of upstream product must be no greater than 3 since any upstream price higher than this results in a final retail price of more than 4 (which is too high to solicit any sale). However an upstream price of 3 produces upstream revenue of 6, which is still less than total upstream cost. So the upstream price must rise to a level that excludes product B from the market. An upstream cost of 6 will just cover all upstream costs and will allow either the vertically integrated company or a retail competitor to survive with a retail price of 7. Seven is the maximum that any consumer will pay and the retailer or vertically integrated company is able to solicit a sale at this price.

The net effect of applying the price squeeze test has been to raise the price of all retail products, indeed to a point where one is priced out of the market. The reason is clear to see. In the extreme example given here the more expensive product has to cover all of the common cost. In fact the example could be made more extreme by setting the maximum price that a consumer will pay for product A at 6.9. In this case the effect of an anti price squeeze restriction would be to destroy the market for A and B. Note, that the problems highlighted in this example do not arise simply because the two products use identical amounts of the same upstream input. An appendix to this paper provides an example where the market for



products is closed by the imposition of a price squeeze test even when no two products use the same mix of upstream inputs.<sup>11</sup>

This is an example of the general conflict that can arise between policies that focus on efficiency and policies that focus on the protection of 'equally efficient' competitors. The example is designed to provide a simple and stark explanation of the conflict but the main point is extremely general and can be loosely explained as follows. The presence of fixed costs in the upstream market and different consumer preferences (i.e., elasticities) over the final products can lead to different (yet efficient) prices in the retail market for products even though they have similar end to end costs. However, a requirement that competitors should be able to purchase the input at a price that allows them to compete in the retail market (i.e., a price squeeze test) in conjunction with similar retail costs does not allow the products to have different prices. This raises the price for the cheaper product and hence reduces its demand. As a result this product contributes less to the common cost, which implies that the other product has to contribute more, raising prices even further. That is, the application of a price squeeze test has had pernicious effects on the market. Short of abandoning any form of price squeeze test as a potential abuse there is no simple perfect solution to avoid these types of problems while protecting competitors. However, the conflict does provide some insight as to how one would devise a price squeeze test.

The conflict outlined above is less likely to be a problem if the products are sold in separate markets. That is, if the same input is used in products that are sold into different markets then it may be perfectly possible to ensure that a vertically integrated firm is not using any upstream monopoly to exclude competitors while sidestepping the negative consequences. It would make sense to suggest that different upstream prices for the same product do not

---

<sup>11</sup> Both these examples are special cases of end-use pricing. The conflict between anti-discrimination policy and end-use pricing has been more frequently discussed in telecommunications (see for example, Grout (1996)).

constitute a price squeeze providing the input prices that the vertically integrated company charges to those wishing to compete in any specific retail market are such that an efficient competitor can survive in that market given the retail price and the input price. Input prices could then vary between different downstream markets (allowing a degree of discrimination) but within any single retail market all competitors would be 'fairly placed'. That is, input prices that are market-based and differ across markets would be acceptable.<sup>12</sup> Indeed, although not normally presented in this way, this is probably the most natural interpretation of the current price squeeze definitions since they are concerned with exclusion in particular markets.

While market-based input-prices sidestep some of the difficulties it is not obvious that this will help very much. Identification of separate market with common upstream inputs is difficult for several reasons. One is that supply side competition is clearly very strong where there are common inputs across separate markets and this will tend to bring the products into the same market.<sup>13</sup> Another is that the identification of the competitive price is a problem when one tries to separate out products that use the same input. In the example there is not a competitive price for product A that is independent of the competitive price of B since between them they have to meet the fixed upstream costs. Therefore, although market based input prices seem to be a natural interpretation of how to implement a price squeeze test, it is not obvious that this will sidestep many problems.

As we have seen a price squeeze test can have the effect of restricting the demand for some of a vertically integrated company's range of products. Where every downstream product for every firm is absolutely identical then all suppliers are in a similar position.

---

<sup>12</sup> As with any form of discrimination this requires the vertically integrated company to effectively police resale.

<sup>13</sup> Although this is only possible if there is some type of upstream alternative even though the upstream supplier has an extremely strong position.

However, what if this is not the case? Where the nature of a competitor's product differs from that of the vertically integrated company, say in terms of elasticities or intensity of upstream input relative to retail input in the product, then an inefficient competitor can benefit from the imposition of a price squeeze test. That is, a competitor at the retail level could use a price squeeze test to chill the ability of the vertically integrated company to compete even when the latter is not earning an excess return nor using its pricing structure to squeeze competitors.<sup>14</sup> Given this possibility and the fact that a price squeeze can be an innocent by-product of an efficient pricing structure it seems natural that exclusion or considerable chilling of competition should be an essential component of any price squeeze test. That is, failure to pass a test should not be deemed an abuse unless exclusion or extreme chilling will arise in the absence of the imposition of a test.

Note that there is a relationship between the role of exclusion within a test and the relevant definition of upstream market power. If one adopts the notion that a vertically integrated company need only be dominant on the upstream market then it makes sense to adopt a strong approach to exclusion, i.e., require exclusion, since firms that are barely dominant upstream will find it difficult to exclude competitors. In contrast, if the test only applies to those companies where their upstream input is essential then exclusion is far more likely to arise if they engage in price squeezing, and so a softer view can be taken on the role of exclusion.

If we find the possibility of exclusion in a market then the issue arises as to whether the test should be based on the vertically integrated firm's downstream cost or the downstream competitor's cost. Clearly, as indicated in the previous section, the Commission takes the view that either can be used to demonstrate a price squeeze. This is an extremely strong test since the Commission seems

---

<sup>14</sup> Indeed the next subsection provides an example which shows that the imposition of a price squeeze test can sustain an 'inefficient' downstream firm even when consumer preferences for the retail product are identical.

to be indicating that a company can pass one and still be deemed to be abusive if it fails the other. If one has to be chosen then each has its merit.

In practical terms there is a real problem if a company is found to have acted illegally because of the relationship between its prices and the costs of a competitor. This places the vertically integrated company in a very difficult position since it is unlikely to know its competitor's costs sufficiently well to use this as a test of whether it is acting within the law or not. This is particularly a problem since the competitor is likely to have an incentive to prevent this information entering the market or indeed to provide misinformation to raise the difference between the vertically integrated company's upstream and downstream prices. The legal certainty argument favours the adoption of the vertically integrated company's costs since the company cannot then claim that it was unaware that its price structure failed to meet the test.

On the other hand, since a price squeeze test prevents the vertically integrated company from offering an efficient array of prices, the vertically integrated company is constrained in a manner that can protect an inefficient entrant. Therefore, it does not make sense to simply outlaw any array of prices that significantly chill downstream competition and fail to pass a price squeeze test based on the vertically integrated company's downstream costs. If an act is deemed illegal then one ought to ensure as a minimum that the excluded parties are not inefficient companies that are being protected by the narrow price squeeze test. That is, it is hard to see how a judgement can be made purely on the vertically integrated company's retail costs. A broader assessment needs to be made. In particular the efficiency of the downstream competitor is an important element of the equation. Using an economic efficiency criterion one could argue that there could be benefit in terms of lower retail prices to offset the protection of inefficient competitors. This depends on the nature of the upstream and downstream markets but as always in price squeeze issues the bulk of the 'monopoly power' is upstream and the competition that is

fostered/protected is downstream hence the final impact on retail prices is limited. EU competition law is not based on such trade-offs, but while the law may protect an efficient downstream company even if there are overall efficiency losses it is not consistent with competition law to protect an inefficient entrant. Hence, the test should address the costs of the downstream competitor.

Therefore, I would conclude that, far from accepting that a price squeeze test has been demonstrated if prices fail the test for either set of costs, I would suggest that in principle it makes more sense to require the test to fail against both the vertically integrated company's downstream cost and the downstream competitor's cost before one deems such prices as abusive. Things may be more complex in practice and so there may have to be some leeway in some cases. For example, a problem with bringing all retail costs into the picture is that the simplicity of price squeeze test is lost. A core attraction of a price squeeze test is that it does not require the analysis of upstream costs since it is essentially a price and downstream cost relationship. This enables a significant problem to be sidestepped, say compared to consideration of excessive pricing of upstream sales, since retail costs are often easier to identify than upstream costs (in part because they tend not to have such a long time frame). Focussing solely on the vertically integrated company's downstream costs simplifies the process even more since the vertically integrated company is likely to be more established in the market. In some cases it may not be possible to accurately establish the competitor's costs (e.g., if entry is being prevented by the current price structure) and then it may be that the vertically integrated company's downstream costs are all that are available. It is then a judgement whether this is sufficient, but this should be seen as a proxy for the appropriate information set.

### ***Persistence of abuse***

Again, opening discussion of this issue with a simple example is a useful approach. In this case the explicit purpose is to show how a price squeeze test can help sustain an inefficient mix of products. This example relates directly to the issue of what is an appropriate time frame to apply to a price squeeze test. Here an incumbent sells a single product that is made up of three inputs and a retail element. The incumbent sells 10 units of the product and the upstream and retail cost structure is as shown in Table 1.

**Table 1**

	<b>Total FC</b>	<b>FC/unit</b>	<b>MC/unit</b>
<b>Inputs:</b>			
1	10	1	1
2	0	0	1
3	10	1	1
<b>Retail:</b>	0	0	2

The incumbent can price each unit of the product at 7 and this will cover all costs.

Now suppose that an entrant wishes to sell a small quantity (2 units) of an almost identical competing product, which it can do at the same price as the incumbent, leaving the incumbent with sales of 8. The entrant does this by using a unified activity that replaces input 3 and the retail element but only at a common cost of 4.25 per unit. The entrant therefore needs to purchase inputs 1 and 2 from the incumbent. It is easiest to think of this as a single input 1+2.

Suppose that the entrant is deemed efficient for its current size and therefore consider a price squeeze test for the sale of input 1+2. For the entrant to be profitable meeting the incumbent's price of 7 per unit, the price for 1+2 must be no more than 2.75 ( $= 7 - 4.25$ ). The entrant is then profitable selling 2 units. The incumbent will lose market share (now selling 8 rather than 10) and will be loss making as it will not be recovering its own fixed costs.

To restore profitability the incumbent needs to raise price to 7.25.<sup>15</sup> At a price of 7.25 there is a full equilibrium. The price squeeze test is satisfied (at 3 per unit for input 1 + 2) and both the entrant and the incumbent exactly cover their costs.

However, the price is higher than it need be since an efficient use of the incumbent's network would allow a price of 7 instead of 7.25. But neither company has a strategy available to move the market to its efficient point. If the entrant sets its price below 7.25 it loses money. The incumbent similarly loses money if it cuts price below 7.25 if one assumes that it will be forced to reduce the imputed price for 1+2.

The main point of the example is to show that the price squeeze test sustains a set of prices that are higher than they need be. In the economic jargon a price squeeze test can sustain multiple equilibria. Note that unlike the example in the previous subsection this is not a result of differences in preferences but is simply due to the 'instantaneous' application of the price squeeze test. Furthermore, in the more realistic scenario where the relative retail price rise caused by the application of the price squeeze occurs through a retail price fall that is slightly less than the fall in other costs it is easy to see how the evidence can be misinterpreted. In this situation it is difficult to know exactly what has caused a cost reduction and it would be perfectly possible that some element of cost reduction could be attributed to the presence of the competitors drawn into the market

---

<sup>15</sup> Note that in practice the way this is likely to come about is through a reduction in retail price over time that is somewhat less than the fall in upstream costs rather than through a price rise. This matters for the interpretation of the evidence (see later).

through the price squeeze restriction on the incumbent. An incorrect interpretation of the evidence could be that the price squeeze protected entrants, their entry has driven down costs and the market is now in a better and sustainable competitive equilibrium. There is no process by which this false interpretation of the evidence could be exposed unless the price squeeze is dropped at least for a period and the incumbent is given pricing flexibility. This ties in directly to the problem of deciding how we should treat the time frame over which the abuse is said to take place.

Clearly any test involving cost price comparisons is prone to the problem that the relationship will fluctuate over time as costs change and market conditions change. The best prices that the market can bear may fail to cover total cost. For example, by definition, set-up costs, launch and re-launch costs, etc., are not smooth and have to be recuperated over time, causing profits to fluctuate. Similarly, cost shocks can hit a company and so a price squeeze test may fail for a period where there is no intent to abuse. All these indicate that one needs to be cautious of adopting a short time frame to assess a price squeeze. These arguments apply to any price cost test but the above example indicates that there may be particular arguments in the price squeeze context that suggest a long time frame is required. In the example the application of a price squeeze test over a short period will prevent a vertically integrated company from making full use of its economies of scope. The vertically integrated company may appear to fail a price squeeze test if it reduced the price of its retail product but will eventually pass such a test once it captures market share. Of course, the test is designed to prevent the vertically integrated company squeezing out the competitor but in this case the competitor is squeezed out because it is comparatively inefficient. Because of this comparative inefficiency the price squeeze test can also be passed at the new prices once the market has settled down.

The main point is that if a price squeeze test is deemed to have failed only when companies have persistently failed to deliver prices that satisfy the test then the possibility of a price squeeze test propping up an inefficient entrant is reduced. That is, persistence



should be a central part of any price squeeze test. Long time frames can of course create scope for a vertically integrated company to selectively squeeze entrants by adopting volatile prices and so some discretion is required when assessing a case. Furthermore, there is a considerable problem of assessing whether there is real abuse here since whenever a vertically integrated company is hoping to move from one equilibrium to another where both meet a price squeeze test then there is clear intent to exclude or chill the inefficient competitor. Despite these difficulties persistence should be a central part of a test and only be set aside when there is good objective evidence of intent to exclude through variability of pricing.

### ***Downstream fixed and common costs***

The paper has focussed on upstream common costs but common costs can arise at the retail level as well. The issue then arises as to what is the appropriate cost. If the test is defined purely on the downstream costs of the vertically integrated company then economic sense suggests that retail incremental cost is the appropriate measure. That is, the company can trade profitably given the price it charges for its upstream inputs as long as the downstream retail price minus the upstream price is at least equal to the retail incremental cost. Such an approach would be consistent with the European Commission's views on predatory pricing (although the time frame that is used is also an issue since it is not obvious that this should be the very long run even though the Commission has recommended this in telecoms and post, see Grout (2000)). The use of incremental cost seems the natural downstream cost approach in a price squeeze test but does not automatically allow all downstream competitors to make a profit. This is clear if we turn to the definition that requires a competitor to make a profit. If the downstream competitor has fewer retail products than the vertically integrated company then the company will not be able to take advantage of the economies of scope at the retail level. That is,

at a given set of retail and upstream prices the vertically integrated company may be able to cover its own incremental cost but the competitor may not be able to make a profit when purchasing upstream input at the market price. A similar conflict can arise in reverse if the competitor at the retail level has more retail services than the vertically integrated company. In essence the decision as to the appropriate downstream cost is a decision as to what constitutes an efficient competitor. A company may be efficient given its product range but still not be able to compete because another firm has economies of scope across a wider product range.

There is no way that the two definitions given by the Commission can be reconciled in this context unless the range of products is part of the definition of efficiency. This would be a natural interpretation for an economist. That is, the company with the lowest cost (or put another way the maximum range of retail products) would define the price squeeze. The intuition is that if one company finds it efficient to spread costs over several products then this should also be true for the other companies. The consequence is that a single product retail entrant will find it difficult to compete against a vertically integrated company with many retail products. The picture is somewhat muddled, of course, if the range of products is legally restricted, e.g., by patents on products other than those in question.

There are alternative approaches. For example, one could adopt a combinatorial test of some sort or allocate common costs to services in some way and use this as the price squeeze definition. However, these two have significant problems offering no obvious resolution. Therefore, a price squeeze test makes most sense if applied to the company that has the most ability to spread common costs although at times this may confer significant 'power' to large companies relative to small.

## 4.4 Conclusions

This paper has addressed four areas of difficulty in defining a price squeeze test. These are the choice of downstream cost, the role of exclusion, the relevance of persistence and the role of downstream common costs. With regard to the first, although it is common to focus on how a price squeeze can exclude competitors or chill competition in a downstream market, the paper provides a simple example of the less well recognised point that the imposition of a price squeeze test can itself have the effect of restricting the demand for some of the vertically integrated company's range of products. This latter problem arises because there is a conflict between efficient pricing strategies and pricing structures that satisfy the test. A vertically integrated company's failure to meet a price squeeze test can be an innocent by-product of an efficient pricing structure where there is no intent to exclude competitors from the market. Unless all companies produce absolutely identical products then the imposition of a price squeeze test can provide scope for protection of 'inefficient' competitors. The paper argues that this inherent protection suggests that a price squeeze definition ought to focus on competitor's cost to ensure that inefficient companies are not protected but that legal certainty favours the adoption of the vertically integrated company's costs as the base for a test (since a company ought not to be found to have acted unlawfully if it cannot have known that its prices failed to meet the required test). Given the tension between approaches it is suggested that the Commission's view that a price squeeze can be demonstrated either by the competitor's or the vertically integrated firm's downstream costs is misplaced and that a more sensible test should require joint failure. Furthermore, we argue that exclusion or at least extreme chilling should be a component of any test and, since a price squeeze test can sustain multiple equilibria, that persistence should be required unless there is strong evidence of deliberate variability in pricing with intent to exclude. Finally we address the issue of common costs and suggest that incremental cost should be the appropriate benchmark for downstream cost.

## References

- Grout, P.A. (1996), 'Promoting the Superhighway: Telecommunications Regulation in Europe', *Economic Policy*, 22.
- Grout, P.A., (2000), 'Recent developments in the definition of abusive pricing in European competition policy', *Leverhulme Centre for Market and Public Organisation Working Paper 00/023*.
- Joskow (1985), 'Mixing Regulatory and Antitrust Policies in the Electricity Power Industry: The Price Squeeze and Retail Market Competition', in *Antitrust and Regulation: Essays in Honour of John J. McGowan*, Edited by F. Fisher (MIT Press).
- Lopatka and Godek (1992), 'Another Look at Alcoa: Raising Rivals Costs Does Not Improve the View' *Journal of Law and Economics*, 35, 311-329.
- Pons, J-F (1998), 'The application of competition and anti-trust policy in media and telecommunications in the European Union', speech delivered at *International Bar Association*
- Posner and Easterbrook, (1980), *Antitrust Cases, Economic Notes and other Materials*, 2nd Edition, (West Wadsworth)
- Whish, R. (2001), *Competition Law*, 4<sup>th</sup> Edition, (Butterworths).

## Appendix

The above example has the feature that both products use exactly the same upstream input. However, the problem can arise even if there are several upstream elements and no two products use the same combination or indeed the same mix of upstream elements.

Here a company has four upstream products ('inputs') and produces four retail products. The relationship between the products and inputs is given in Table 1. That is, product A consists of inputs 1 and 2 and a retail element, product B consists of inputs 2 and 3 with a retail element, etc.

**Table 1**

	Upstream inputs				Retail
	1	2	3	4	
<b>Product</b>					
A	x	x			x
B		x	x		x
C	x		x		x
D			x	x	x

For simplicity, assume that there are equal numbers of each product sold and each unit of input has a marginal cost of unity, as does retail. In addition, there are fixed costs of 12 units that are common across inputs and have to be spread across the products. Let the maximum price that consumers will pay be 9 for each of B and C and 4 for each of A and D. In the absence of a price squeeze test, if the

company charges 4 each for A and D, and 8 each for B and C then it will cover costs.<sup>16</sup> This is shown in Table 2.

**Table 2**  
**Costs and Revenues with no restriction**

Service	Total marginal cost of inputs	Retail cost	Total	Price
A	2	1	3	4
B	2	1	3	8
C	2	1	3	8
D	2	1	3	4
Total	8	4	12	24

Total costs = MC + FC = 12+12 = 24

In contrast to Table 2, the pricing structure with a price squeeze test in place is as follows. If the company wishes to continue to sell any of Product A, then it cannot charge a price greater than 4. To satisfy the price squeeze test rule it follows that the sum of the common cost that can be carried by a unit of input 1 and a unit of input 2 must be less than or equal to 1. This is simply calculated as retail price minus attributable costs,  $4-3=1$ . Any more than 1 will push the retail price of A above 4. Similarly, if the company wishes to continue to sell product D then the sum of the common cost that is carried by input 3 and the common cost that is carried by input 4 must also be less than or equal to 1. This indicates that the maximum common cost that can be

<sup>16</sup> The marginal cost for each service is 3. In addition there is a common cost to cover. The total price of all four services  $8+8+4+4 = 24$  just meets the aggregate cost.

allocated to each unit of a component is, on average, 0.5. This holds for all four components.

This implies that if product A and product D are to remain in the market then the maximum common cost that can be collected is 4, leaving 8 as loss to the company.<sup>17</sup> To recover costs the company is forced to change its pricing policy. It must either raise the price of A and/or D to recover a higher level of common costs (which can be extracted from customers taking services B and C).

Suppose as an illustration, that it continues to price product A at 4. To achieve this, inputs 1 and 2 each carry a mark up of 0.5 per unit above MC. That is, inputs 1 and 2 cost 1.5 per unit (i.e. MC of 1 per unit of component plus 0.5 per unit contribution to common costs). The rest of the common cost must be allocated to inputs 3 and 4, which implies that the company will be forced to set a price of product D at a level so high that no one purchases it.<sup>18</sup>

If no one purchases product D then input 4 cannot contribute to the common cost and it all has to be covered by input 3. Inputs 1 and 2 contribute 0.5 per unit to common cost and hence contribute 2 in total. This leaves 10 to be collected by input 3 which sells at a price of 6 per unit (i.e., MC of 1 per unit and contribution to common cost of 5 per unit from product B and C each using one unit of 3). The retail price of product B is now 8.5 (1.5 for input 2, 6 for input 3 and 1 from retail). Similarly, the retail price of product C is 8.5. Product D is priced at 8 (6 for input 3, the minimum MC price of 1 for input 4 and 1 from retail) and finds no market.

To summarise, the company's prices in the absence of a price squeeze restriction are  $P_A = 4$ ,  $P_B = 8$ ,  $P_C = 8$ ,  $P_D = 4$  and in the

---

<sup>17</sup> The company uses one unit of input 1 for product A and one unit for product C, thus input 1 recovers one unit of common cost. Similar arguments for the other three components show that 4 of the 12 units of common cost are recovered in total, leaving 8 unrecovered.

<sup>18</sup> Product D can only be purchased if input 4 carries a very large negative price. While theoretically feasible in this simple example it is not a practical solution, e.g., if input 4 had an alternative use then the incumbent could face infinite losses if it is forced to provide it at a large negative price.

presence of a price squeeze restriction are  $P_A = 4$ ,  $P_B = 8.5$ ,  $P_C = 8.5$ ,  $P_D = 8$ .

Applying a price squeeze test to the company, even if as a result of these prices the vertically integrated company retains the market, raises almost every price and reduces none. Furthermore, again the company has no choice but to price D out of the market. The interesting feature about this rather more convoluted example is that the problems arise through complicated cross restrictions on the upstream inputs. That is, the inability to price a particular product as highly as the others does not directly force the vertically integrated company to reduce the upstream price for other products since they do not use the same inputs. Instead it forces the company to cover its upstream common costs through other upstream activities which then spills over into other retail prices. In this particular example retaining a low price for product A forces D out of the market even though D does not have any common upstream inputs with product A.



## 5. Below cost pricing in the presence of network externalities

*Adriaan ten Kate and Gunnar Niels*

### 5.1 Introduction

The treatment of predation and other low-pricing practices in competition policy has always been subject to debate and controversy, and that is still the case today. The economic literature and case law have developed a range of tests for predation, but little consensus exists as to which of these is the most appropriate. EC case law has established the average variable cost test under the abuse of dominance provisions of Article 82.<sup>1</sup> Yet, in a recent case the European Commission applied an incremental cost test instead,<sup>2</sup> while in another it held (and was later supported by the European Court) that even prices above average total costs could be considered abusive in certain circumstances.<sup>3</sup> Both the average variable and the incremental cost floors follow the logic of the famous paper by Areeda and Turner (1975). Competition authorities in the UK have developed a number of other predation standards to complement those established in EC law, in particular the avoidable cost test, the net revenue test and the discounted cashflow (DCF) test.<sup>4</sup> Antitrust

---

<sup>1</sup> Case C62/86, *AKZO Chemie v. Commission*, [1991], ECR I-3359 [1993] 5 CMLR 215.

<sup>2</sup> Case COMP 35/141, *United Parcel Service/Deutsche Post AG* (2001/354/EC), March 20th 2001.

<sup>3</sup> Case C-395/96, *Compagnie Maritime Belge Transports v. Commission*, March 16th 2000. It should be noted that the price-cost test applied here was highly specific to the case at hand – involving a dominant shipping conference with a 90% market share using so-called “fighting ships” – and may be less relevant to other types of industries.

<sup>4</sup> The avoidable cost and net revenue tests are explained in Office of Fair Trading (1999), the DCF test in Oftel (2000).

law in the US has established “recoupment” as the primary standard for predatory pricing cases.<sup>5</sup> This means that the assessment focuses on structural factors such as market shares and exit and entry barriers, rather than on price-cost comparisons or the intent of the alleged predator. This standard is similar to the two-stage approach proposed by Joskow and Klevorick (1979), under which market structure would also be assessed in the first instance.

If testing for predation is difficult enough in “normal” markets, it is even more complicated in dynamic markets, in particular those characterised by network effects. That applying competition law to commercial practices in such markets is far from straightforward has been widely recognised,<sup>6</sup> and predation is no exception. Markets with strong network externalities (perhaps better described as positive demand-side externalities) tend to be “tippy”—a network (or product standard) that gains an advantage over rival networks may at some point become so much more attractive to users that a “winner takes all” situation arises. In relatively new network markets, where various competitors battle for critical mass, aggressive pricing tactics are commonly employed, and the competitors who lose out in the battle may complain about such tactics before competition authorities.

The famous *Microsoft* case in the USA is a clear example of such a situation. Giving away its product for free was one of the tactics used by Microsoft (and later followed by rival Netscape) in the battle to become the preferred Internet browser in the second half of the 1990s. The *Talking Pages* case in the UK is another example. In June 1999, Oftel, the UK telecommunications regulator, accused British Telecom (BT) of predatory pricing in the market for classified directory advertising (CDA) services.<sup>7</sup> BT had introduced its

---

<sup>5</sup> *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209 (1993). For an overview of the treatment of predation in the US, the EU and other jurisdictions, see Niels and Ten Kate (2000).

<sup>6</sup> See, for example, Shapiro (1999) and Evans and Schmalensee (2001).

<sup>7</sup> See Oftel (1999a). This case was addressed as a breach of BT’s Public Telecommunications Operator Licence. Since March 2000, Oftel also has powers to apply the UK Competition Act

operator-assisted CDA service, called Talking Pages, just two weeks after a competing firm, Scoot.Com, had launched the first such service available throughout the UK. The service allows end-users to be connected, through an operator, to a business subscriber who provides the classified service requested in the end user's local area. Scoot's service operates through a 0800 number, so is free of charge to end-users. Business subscribers are charged a registration fee, a monthly listing fee, a connection fee per call, and a call charge per minute. The network character of CDA services derives from the two-sidedness of demand. The more business subscribers there are, the more attractive it is for end users to consult the "pages", and the more end users the more attractive it becomes for businesses to subscribe. BT's Talking Pages is a similar service to that of Scoot, but business subscriptions to Talking Pages were offered for free during a one-year trial period. BT already had a market share in excess of 80% in printed CDA services in the UK through its Yellow Pages service. Oftel found that the Talking Pages offer amounted to predatory pricing. Subsequently, BT raised the price of Talking Pages so as to cover incremental cost and make the service 'overall profitable', whereupon Oftel closed the case.<sup>8</sup>

This article shows that below cost pricing, particularly, but not only, in the initial stages of network development, can be perfectly rational in many circumstances—both for monopolistic networks and for networks that are in competition with each other (as in the *Microsoft* and *Talking Pages* cases)—and that such practices are often welfare-enhancing rather than anti-competitive. This implies that the various price-cost tests for predation established in competition policy, and applied in cases such as *Talking Pages*, may not be appropriate for markets characterised by strong network

---

1998 in the telecommunications industry, and a more recent predatory pricing case against BT, involving dial-up Internet services, was addressed under this Act. See Oftel (2001).

<sup>8</sup> Thus, OFTEL applied both an incremental cost test and a DCF test in this case. See OFTEL (1999b). Some of the economic aspects of the *Talking Pages* case are also discussed in Niels and Jenkins (2000).

externalities. These tests are unable to draw a distinction between predation and legitimate (welfare-enhancing) pricing practices, and may even reduce welfare if they hinder network growth or the full exploitation of positive network externalities. The problem is that in network industries low pricing serves a double purpose. On the one hand, the low pricing may be an instrument to quickly establish critical mass for the network, which is unambiguously welfare enhancing. On the other, there is the traditional motivation of displacing competitors from the market, which may or may not be anti-competitive. However, particularly in network industries, but more generally in any “winner takes all” situation, displacing competitors may be the only way of not being displaced oneself.

We discuss these issues in the context of a comparative-static demand model with network externalities. This model is explained in detail in the Appendix, and is a generalisation of the network models developed by others such as Katz and Shapiro (1985) and Economides and Himmelberg (1995). Section 2 of this article describes the main characteristics of the demand model, and explains the concepts of *fulfilled-expectations equilibrium* and *critical mass*. Section 3 then explores a number of alternative supply-side scenarios in which the challenge for network providers is to set prices such that critical mass is indeed obtained. These scenarios are, respectively, a monopoly, a network good provided by various competitors, and monopolistic competition between incompatible networks. In each of these scenarios below cost pricing is a possible and often welfare-enhancing outcome. Section 4 discusses the implications for competition policy, in particular addressing the question whether the established tests for predation are appropriate in network markets.<sup>9</sup>

---

<sup>9</sup> Farrell and Katz (2001) address a similar question in a different type of setting. Using a two-stage game with two competing networks, these authors argue that it is particularly difficult to intervene against predation in network markets in ways that improve welfare.

## 5.2 A fulfilled-expectations equilibrium demand system

To explore the specific problems faced by network providers in determining their pricing strategies further, we develop a demand system featuring network externalities for a homogeneous good in a comparative-static setting. Following the literature we assume that there is a universe of potential consumers, each with a specific willingness to pay for joining the network depending on the size they expect the network will have.<sup>10</sup> The higher the network size a consumer expects, the higher his willingness to pay. Consumers are classified according to a one-dimensional type, and a density function of consumers over that type delivers a demand function for the network good which not only depends on price but also on the expected network size. Again, the higher the size, the higher demand. For a formal description of such a demand system the reader is referred to the Appendix.

However, consumers may be mistaken in their expectations of what the size of the network will be. Some of them may have joined the network expecting a huge network size, only to find out afterwards that they were too optimistic. If they had known in advance what the real network size would be, they would never have entered at the price they paid. Likewise, there may be over-cautious consumers regretting their decision of not having joined the network once it became clear how successful it was. In a *fulfilled-expectations equilibrium* no such frictions exist. All consumers expected *ex ante* the network size that is obtained *ex post*, and are therefore satisfied with their decisions.<sup>11</sup>

It is easy to demonstrate that for each feasible network size (given the consumer universe) there is a price at which equilibrium is reached. This leads to a fulfilled-expectations equilibrium demand

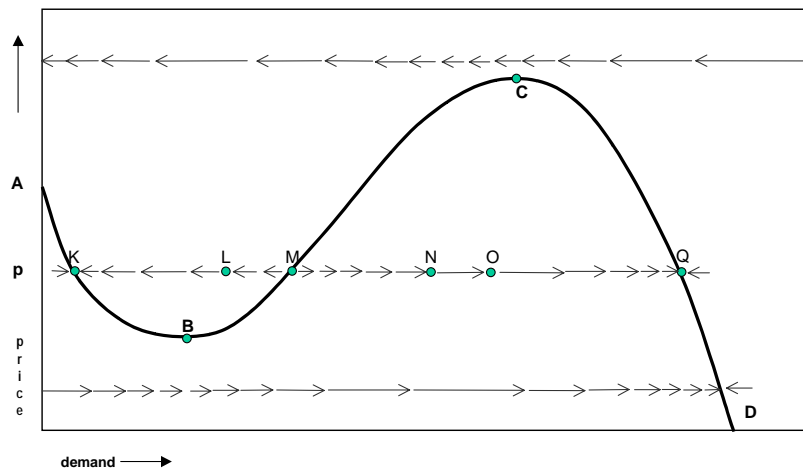
---

<sup>10</sup> See, for example, Economides and Himmelberg (1995) and Economides (1996).

<sup>11</sup> In the Appendix it is demonstrated that this situation represents a Nash equilibrium of a game among all consumers in the universe.

(FEED) curve, the inverse of which is depicted in Figure 1.<sup>12</sup> From the figure it becomes clear that the inverse FEED curve is not negatively sloped throughout—as would be the case with a “normal” demand function—but instead may have one or several waves. As a consequence, the demand function itself is no longer single-valued. In our representation of the FEED curve, for instance, there are three equilibrium points ( $K$ ,  $M$  and  $Q$ ) at price  $p$ .

**Figure 1: Fulfilled-expectation equilibrium demand curve**



It should be noted that the FEED curve in Figure 1 is slightly different from the inverse-U-shaped curves familiar from the

<sup>12</sup> It should be reminded that in a demand function quantity depends on price whereas in the inverse demand function price depends on quantity.

literature.<sup>13</sup> In the Appendix we show that our specification is more general and that the inverse-U-shaped curve represents the special case in which point  $B$  coincides with the origin. The latter situation is obtained when no consumer is willing to pay any positive amount of money for the network good if he expects network size zero. Although there are certain networks for which this is definitely the case, there are many others—particularly those where network effects are indirect (or two-sided), such as for example computer software—for which consumers are willing to pay a positive amount even if they expect to be the only buyer. Therefore, we stick to our more general interpretation.<sup>14</sup>

To gain a proper understanding of the fulfilled-expectations equilibrium demand curve we consider a point in the  $(p, q)$  space that is not on the equilibrium curve—say, point  $N$  just to the right of equilibrium point  $M$ . It can easily be verified that, at that point, there are a number of consumers who did not join the network but who, given price  $p$ , would have joined if they had correctly anticipated the resulting network size. If these consumers were given a second chance they would enter, and we would jump from point  $N$  to, say, point  $O$ . However, at this new point  $O$  there are still other consumers who were not yet willing to pay price  $p$  at network size  $N$  but who are willing to do so at the new size  $O$ . Hence, the network tends to expand even further. This process continues until it becomes exhausted at the equilibrium point  $Q$ . Beyond point  $Q$  the tendencies are reversed (as shown by the direction of the arrows in Figure 1), which is why  $Q$  is an equilibrium.

Similarly, if at price  $p$  demand happens to be at point  $L$  to the left of  $M$ , there are consumers who joined the network but with a willingness to pay below  $p$  given the network size  $L$ ; i.e., they regret their decision of having joined. If they were given a second chance

---

<sup>13</sup> See Economides (1996) for a survey of this literature.

<sup>14</sup> Becker (1991) discusses an equilibrium demand function essentially the same as the one presented in Figure 1, albeit with a slightly different interpretation. **[to be specified]**

they would abandon the network.<sup>15</sup> Hence, the network size would decrease. However, this would cause still other consumers to regret their decision of having joined. This tendency to contract persists until it becomes exhausted at equilibrium point  $K$ . To the left of  $K$  the tendencies are reversed again.

The above reasoning makes it clear that the equilibrium point  $M$  at the increasing part of the FEED curve is not stable. Small disturbances cause the network size to float further away from the equilibrium value. A push to the right causes the network to explode all the way up to  $Q$  and a push to the left causes it to implode all the way down to  $K$ . The network is said to have reached *critical mass* if it arrives at the point at which it expands further on its own force. That is, for price  $p$ , the network in Figure 1 achieves critical mass at point  $M$ . Notice that the concept of critical mass defined in this way depends on the price. The higher the price, the higher the critical mass. Thus, there is a critical mass curve, which is the increasing part of the FEED curve where equilibria are unstable.

The expansionary and contractionary forces we just described are represented by the arrows in figure 1. At prices below  $B$  all forces are expansionary until demand settles at the right side of the FEED curve. For those prices the concept of critical mass is irrelevant; forces are expansionary from network size zero onwards. At prices above  $C$  all forces are contractionary and demand settles at zero (or on the left part of the FEED curve if  $A$  happens to be above  $C$ ). For those prices critical mass has no meaning either. For prices between  $B$  and  $C$  forces are first expansionary until the left part of the FEED curve, then contractionary between the left and middle part, expansionary between the middle and right part and contractionary again beyond the right part. Notice also that forces tend to become small when they get close to an equilibrium, as indicated by the length of the arrows in Figure 1.

---

<sup>15</sup> If the network good is durable, a second chance means giving these consumers their money back; if it is non-durable, it simply means not renewing the subscription in the following period.



A few observations are in order about the distinction between durable and non-durable network goods. A network good is durable if it is bought once and serves a lifetime. Examples are computer software and fax machines. Examples of non-durable network goods are memberships or subscriptions to a telephony network that have to be renewed every period. Many network goods have both durable and non-durable elements. Since the fulfilled-expectations equilibrium demand system is a model of the comparative-static type, it does not make such a distinction. It is applicable to both durable and non-durable network goods because only one period is considered. However, when one wants to give a dynamic interpretation to the field of expansionary and contractionary forces underlying the demand system, as we do in the next section, it becomes important to make the distinction explicit. This came already to the surface in the discussion above where consumers of durable goods regretting their decision of *not having* bought can still buy, but consumers regretting their decision of *having* bought cannot undo that decision (unless they are offered their money back); they are locked in. For non-durable network goods there is no such problem.

### **5.3 Effects on the supply side**

It is important to realise that all characteristics discussed so far have nothing to do with the way in which the network good is supplied. Fulfilled-expectations equilibria, critical mass and expansionary and contractionary forces are properties of the demand system only. The purpose of the present section is to explore the implications of these properties for the pricing strategies that network providers may adopt under different conditions of supply. We consider three scenarios. First, we explore the case of a monopolistic network provider. Next, we analyse the scenario in which one and the same network good is offered by several competing suppliers. Finally, we

make a few observations about the situation in which there is monopolistic competition between networks, i.e., several incompatible but competing networks are each provided by a single monopolist. In the first scenario the increases in the network value resulting from expansion are fully appropriable by the monopolist; in the second, such increases are not fully appropriable—i.e., they must be shared with competitors—and in the last one, they are appropriable again but eroded by the expansion of competing networks.

In what follows we deviate from the strictly comparative-static approach in which the demand system was formulated. Instead, we consider a scenario in which demand does not instantaneously explode (or implode) to the corresponding equilibrium, as is supposed to be the case under comparative-statics, but where it takes time to convince consumers to join the network. More precisely, we consider a time path, at each point of which consumers decide to join or abandon the network considering *actual* price and network size. In our reasoning we closely follow the field of expansionary and contractionary forces described in the previous section, as represented in Figure 1. As anticipated above, it will be important to make the explicit distinction between durable and non-durable network goods.

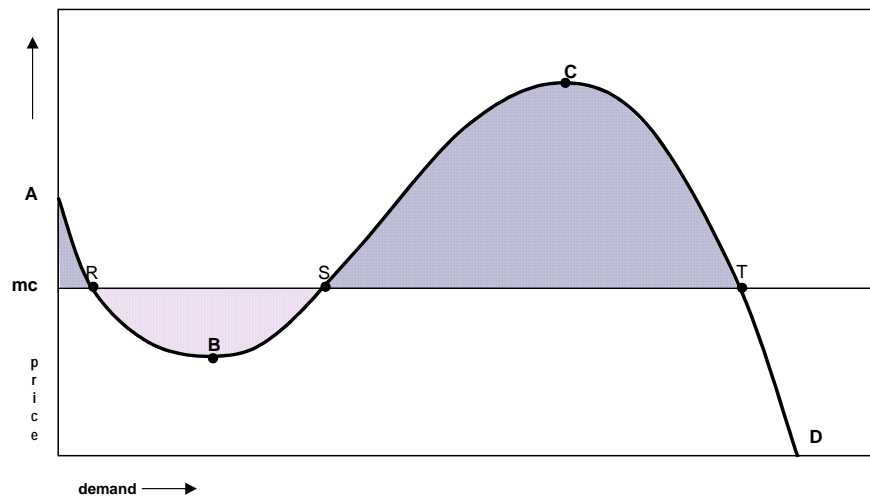
### ***A single network under monopoly***

#### *Durable network good*

Let us consider a monopolistic network provider without competition from other networks facing a demand for his durable network good as depicted in Figure 1. Assuming that his marginal costs are constant and somewhere in between  $B$  and  $C$ , the question is: starting from network size zero, how should he price his good over time (or over network size) in order to extract a maximum amount of profits from his sales?

If the monopolist is completely patient—i.e., there is no time-discounting on his profits—the answer is simple. His price path should be just below, but as close as possible to, the FEED curve. See Figure 2. The monopolist starts setting his price at  $A$  and gradually lowers it to  $R$ , thus skimming consumer surplus. Then he “dives” with the price below his marginal cost, first moving to  $B$ , where the network reaches critical mass, and continuing to  $S$ , where he can “breathe” again above marginal cost. Next, he moves up to  $C$  and finally he skims consumer surplus down to  $T$ , now at the full-network-size part of the FEED curve. His total profits amount to the sum of the shaded areas in Figure 2, counting the “under-water” part between  $R$  and  $S$  as negative.

**Figure 2: Pricing strategies for network development—completely patient monopolist with durable good**



The above pricing pattern corresponds to first-degree price discrimination. The durable nature of the good allows the monopolist to wait at any point of the curve for the next marginal consumer to join, before lowering (or raising) his price further. As is

well known, this first-degree price discrimination over time only works when consumers are short-sighted; i.e., they do not anticipate the price movements of the monopolist. If they are forward-looking, they may postpone their decision to enter when they expect price to fall, or advance it when they expect price to go up. This would limit the possibilities of the monopolist to perfectly discriminate and his profits would be lower accordingly. Under our assumption that consumers base their decision to enter on the actual price and network size, they are indeed short-sighted.

It should be realised, however, that a pricing path of perfect discrimination may be a long walk. Remember that close to the equilibrium curve forces are small, i.e., the closer to the FEED curve, the slower the consumer reactions. Thus, if the monopolist becomes somewhat impatient—i.e., time discounting becomes positive—he will prefer a pricing path that is below the FEED curve. The deeper he dives below the curve, the stronger the under-water currents driving him towards critical mass, as these forces are stronger further away from the curve. Hence, there is a trade-off between the size of the initial losses and the time necessary to get to full network size and reap the benefits.

In principle, it is possible to calculate the optimal pricing path with techniques of variation calculus once the field of forces, the marginal cost curve, the discounting rate and consumer resistance (i.e., how quick they react to those forces) are given. However, in any event price will have to be below marginal cost during some period in order to build up critical mass. Otherwise, demand remains trapped below the critical mass level and the network will never take off.

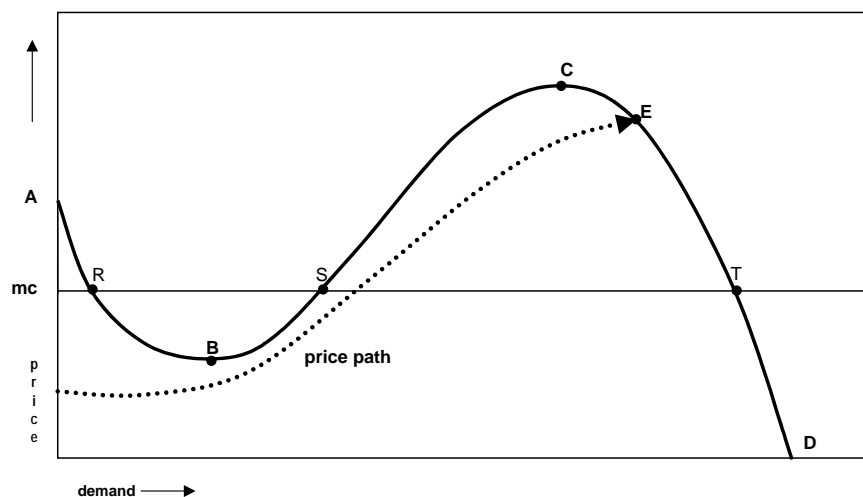
### *Non-durable network good*

The picture is different for non-durable network goods. There, it becomes even more important to keep the time of diving as short as possible, because during the dive, losses are not only incurred over

new subscribers but also over subscribers that have joined the network before (at least when the monopolist is not able to discriminate between new and existing subscribers). Hence, the device is: *dive deep to make it short*.

Another difference with the durable-goods case is that after emerging it does not pay any longer to follow the FEED curve all the way down to T. Instead, there is a monopoly point E on the full-network-size demand line somewhere between C and D where marginal revenue equals marginal cost. See Figure 3. Any optimal pricing path for a non-discriminating monopolist leads to that point.

**Figure 3: Pricing strategies for network development—monopolist with non-durable goods**



In Figure 3 we drew what is likely to be an optimal price path for a monopolistic provider of a non-durable network good. He is not all too interested in obtaining a positive profit from the part above marginal cost at the beginning of the FEED curve but prefers to set an introductory price far below marginal cost in order to achieve critical mass as soon as possible. Then he will swim upwards close to the FEED curve towards the “marginal-cost” surface, take a breath,

and fly on to the point  $E$  where he will reap monopoly rents for as long as it lasts.

### *Imperfect knowledge*

In real life there is no perfect knowledge, and the monopolist has only a speculative perception of where the FEED curve should be drawn and what the field of forces looks like. In such a foggy landscape he takes a great risk by diving below cost, and can only hope to recoup initial losses in the future if circumstances will let him so. Whether that succeeds depends to a great extent on the size the network will obtain at the end of the road, a variable which is usually unknown at the time of diving. However, whenever marginal cost is above  $B$ , diving below marginal cost at some point in time will be necessary to reach critical mass, and any government-imposed regulation prohibiting such below cost pricing may inhibit network development and hence disbenefit consumers.

If network development involves relatively high fixed costs and low marginal costs—say below  $B$ , as is often the case with networks<sup>16</sup>—the monopolist takes on the risk the moment he decides to invest in the network good, and not so much during subsequent stages when setting prices. Again, the success of this investment greatly depends on the size of the network at saturation point, because the fixed costs must be recovered from sales volumes. In such a situation, pricing below marginal cost is not strictly necessary because there are prices at or above marginal cost that are sufficiently low to achieve critical mass. However, even here below-marginal-cost pricing may be an attractive strategy, particularly when the monopolist is eager to recoup losses soon (or only to find out whether recoupment will be possible). From the monopolist's perspective, the majority of the losses were incurred when the fixed

---

<sup>16</sup> See, for example, Shapiro and Varian (1998) who argue that in many information networks marginal costs are virtually zero.

(up-front) investment in the network was made, and losing a bit more money through below cost introductory pricing is relatively less painful.

### *Below cost pricing*

From the above it is clear that, irrespective of whether the network good is durable or non-durable, if the monopolist sets price at or above marginal costs at all points in time he will never get away from the left part of the FEED curve. He will stay somewhere in between  $A$  and  $R$  and will not reach critical mass at any price. Thus, the only way to get away from this deadlock is to dive with his price not only below marginal cost but even below  $B$  in order to get to the right of the critical mass curve and recoup his initial losses there.

This reasoning depends on our assumption that at any point in time consumers base their decision to join or not to join the network on *actual* price and network size. If consumers were forward-looking and based their decision on the *expected* value of those variables, as in the comparative-static model, no below cost pricing would be needed and the monopolist could set his monopoly price ( $E$ ) right from the start. However, given the usual uncertainty under which networks are developed, consumers, who are even less informed than the network provider himself about the true prospects of the network, are more likely to have an attitude of *first-see-then-buy*, and if they were willing to join “blindly”, they would have to be compensated in some way for the risks they incur. Even then, low—although perhaps not below cost—pricing would be necessary to make the network take off.

Notice the similarity of the above pricing patterns to predatory pricing: the price is initially set below marginal cost, and initial losses are recouped later with a price at the monopoly level. However, for networks the motivation is entirely different. Where with predatory pricing under normal demand conditions the purpose is to drive competitors out of the market, here the prime

purpose is to achieve critical mass; there are not even any competitors in the market to begin with.

### ***One network good supplied by several competitors***

Let us now turn to a network industry with several competitors supplying a network good, the demand for which is as described in section 2. It is important to notice that in this case, when one of the competitors sells a unit of the network good, this makes the network as a whole more attractive for consumers; hence, the other competitors also benefit. We assume that the alternative suppliers have similar marginal costs which are above point *B* of Figure 1. If all competitors starting from zero network size charge a price at, or above, their marginal cost, the network will never take off. This situation is basically the same as where the network is provided by a monopolist which sets prices above marginal cost. Demand remains trapped on the left side of the FEED curve (although perhaps at a somewhat lower price due to oligopolistic interaction).

Thus, to get away from that part of the demand curve someone must adopt a below cost pricing strategy. The question then becomes: who is willing to do so? If one of the competitors began to sell at a loss, critical mass would be reached, but as soon as that provider tried to raise price his rivals would enter again and share the fruits of his sacrifices. Recoupment is therefore problematic. This is a typical free-rider problem in which no one takes the lead because the benefits of the costly initial move are not appropriable. Thus, under competition the network is less likely to be developed than under monopoly.

From a competition point of view this is an extraordinary situation. Usually, competition is good for social welfare while monopoly is bad. Here the roles are inverted. A monopolist would have incentives to break away to critical mass by pricing below cost because future benefits are appropriable, but competitors would not because the benefits of any below cost pricing effort by one of them



would accrue to his fellow competitors. Network externalities thus turn the conventional economic logic upside down. In normal markets, demand curves slope downwards; in the presence of network externalities they may slope upwards. In normal markets, monopoly is bad for social welfare; in the presence of network externalities, monopoly may be preferable to competition in certain circumstances.

To extend this line of reasoning further, let us imagine that in the previous situation the competitors reach a collusive agreement to set price below cost collectively, in order to break the deadlock derived from the free-rider situation. In that case they behave as if they were a monopolist—or almost a monopolist—to collectively break through to reach critical mass. From that point onwards, it would be preferable if they ceased to collude and started competing again. However, even if they continued to collude once critical mass is reached this would probably be more optimal from the point of view of consumer welfare than a situation in which such collusion were prohibited from the start. This is one of the rare examples in which price collusion, albeit not about high but about low prices, may be welfare enhancing.

### ***Monopolistic competition between networks***

Let us now turn to monopolistic competition between networks which are mutually incompatible, but to a high degree substitutable from a customer's point of view. The classical examples are Beta and VHS for video recorders and the subsequent DVD technology threatening to overtake them both. The CDA services of Scoot and BT Talking Pages, mentioned in the introduction, provide another example. As explained below, such industries are often characterised by a winner-takes-all race.

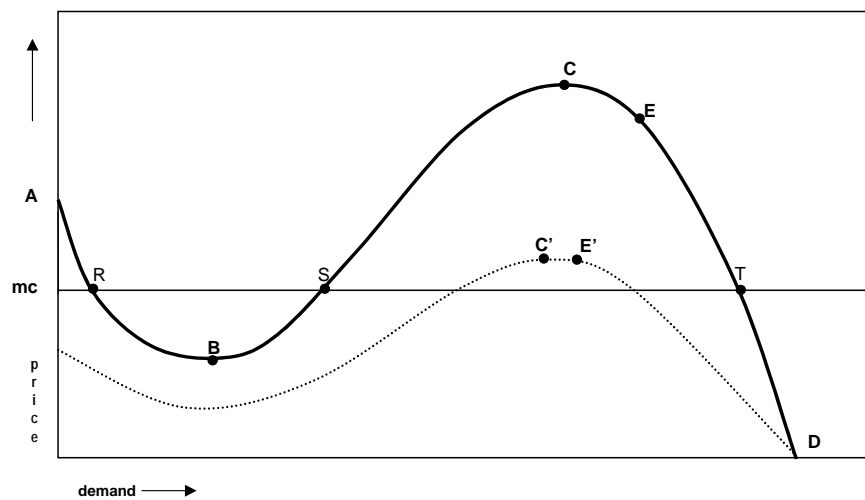
To model situations of that kind adequately more complex demand systems are needed than the system considered in this article. Such systems should explicitly account for the degree of

substitution between the alternative networks. However, in order not to make things more complex than they already are, let us see what our one-network-good demand system has to say about the case.

The main question to be addressed is: how does the presence of a competing network on the horizon affect our FEED curve? The answer is that the greater the network size of the competing network and the better its prospects to expand further, the lower our FEED curve. Conversely, the greater our network size and the prospects to develop it further, the lower the FEED curve of the competing network.

The way in which the presence (or the expansion) of a competing network affects the FEED curve of the original network is illustrated in Figure 4. The whole FEED curve is moved downwards. If at the time the competing network emerges the original network is beyond critical mass, say at the monopoly point  $E$ , the new monopoly point  $E'$  will move ever closer to  $C'$ . Price and network size decline and profits are squeezed. If this process continues, the network collapses when  $E'$  hits  $C'$ . At that point, subscribers start abandoning the sinking ship.

**Figure 4: Effects from the entry of a competing network**



There is an additional feature, however, that does not follow from Figure 4 nor from our single-network model but deserves attention. There is a strong resemblance between competition among networks with externalities on the demand side, on the one hand, and competition between firms with economies of scale on the supply side, on the other. The similarities are threefold. First, there is no stable equilibrium in which several competitors coexist. A small advantage for one of them is self-reinforcing and will translate into a disadvantage for the others which also tends to increase by its own force. Thus, there is only room for one winner. Second, in both cases trying to keep several firms (networks) in the market for the sake of competition may not be to the benefit of the consumers. In the supply-side case it does not allow firms to take full advantage of the economies of scale; in the demand-side case it leaves the positive externalities of the networks partly unexploited. Third, it is not always the most efficient firm who turns out to be the winner. There is first-mover advantage, and even if the first mover is not the most efficient supplier he has a positive chance to win, which is not in the interest of the consumers. Altogether, competition makes network

development much more risky and does not necessarily lead to optimal welfare.

Alternatively, if none of the networks has reached critical mass at the time they enter into competition, the undertaking becomes even more adventurous. Diving with price must be deeper and recoupment is less certain. In such a situation everything becomes a matter of being quick. Whereas in the case of a single network with several suppliers, dealt with in the previous sub-section, there was a second-mover advantage due to the free-rider problem, in the competing-network case dealt with here it is the first move that counts.

The implications for optimal pricing strategies are unequivocal. Patience becomes an unaffordable luxury. Critical mass must be reached as soon as possible and the only way to achieve that is to dive deep. Pricing below cost, and possibly even giving the network good away for free, during the introduction period is not only an instrument to derail the competing network but also nothing less than a strategy to survive. It is the most extreme expression of what competition is about.

#### **5.4 Implications for competition policy**

From the above analysis it follows that the motivations network providers have to set prices below cost may be different from the traditional predation incentive. Even if the prime purpose of such below cost pricing is that of driving competitors out of the market in order to recoup initial losses once monopoly is established, there is a different dimension to it which may render competition policy action inappropriate.

First, network providers may set price below cost to push the network towards critical mass. Such below cost pricing has little to do with driving competitors out of the market, and network providers may have incentives to do so even if there are no competitors at all. Competition policy action against such practices

could frustrate network development and thus harm both producers and consumers.

It might be argued that it is unlikely that competition authorities would intervene in such cases, because if there are no competitors no one would file a complaint in the first place. The same holds true when there are competitors who share the network with the low-price setter. These competitors would in the long run benefit from the greater network size resulting from the low-pricing efforts of the first mover, and are therefore more likely to wait and reap the benefits rather than to complain before the competition authority.

The situation becomes more complex when there is a competing network on the horizon. If the competing network is already established while the aggressive price-setter is only fighting to obtain critical mass, it is unlikely that a complaint against such pricing would prosper, due to the simple fact that the plaintiff would be the dominant firm, not the defendant. However, what if both competitors are at the stage of network development? And even more tricky, what if one of the network developers is a large company with a strong presence in other, related markets, as in the case of Microsoft or of BT Talking Pages, mentioned in section 1?

In these cases complaints may be frequent, but distinguishing predatory pricing from legitimate (welfare-enhancing) below cost pricing is extremely difficult. The established tests for predation, discussed in section 1, are arguably not up to the task. Take the incremental (or marginal or variable) cost test. The scenarios in section 3 make clear that such a standard could well have the effect of inhibiting network development, leaving a very small network size at point  $R$  (or even more to the left) in Figure 2 where consumers are worse off. In fact, the whole discussion about price-cost tests is of much less relevance than in "normal" markets. In particular at the early stages of network development, price is a poor measure of actual revenues because it does not capture the effects of network value increases from expansion. Furthermore, in many network industries the bulk of costs are either sunk or fixed, so that an

incremental (or marginal or variable) cost test would set an almost meaningless low price floor.

The DCF test—which was also applied in the *Talking Pages* case—suffers from the logical flaw that showing profits throughout the lifetime of a product does not guarantee that there is no predation. After all, true predatory pricing is also an investment in long-run profits, financed by losses in the short-run.<sup>17</sup> The recoupment standard does not do much better. The winning network provider would probably pass the test, since its initial losses can be recouped through subsequent gains once the market has tipped in its favour. However, this does not mean that competition policy intervention is required. In markets with strong network externalities a competitive market structure may simply not be feasible, and attempting to preserve competition in such a setting is likely to harm rather than benefit consumers. Moreover, in the winner takes all environment of many network battles, driving competitors out of the market is not only an offensive strategy but also a defensive one. It is like “kill or be killed”.

An alternative policy would be simply to “do nothing” during the introductory stages of the network, which means that any below cost pricing practices would be allowed. Trying to intervene in markets with strong network externalities—for example by prohibiting prices below marginal cost—is unlikely to be successful because at the end of the day there will probably be only one winning network anyway (or, alternatively, if the policy succeeds in keeping several rival networks alive, it is doubtful whether this would be in the interest of consumers). In terms of the example of the *Talking Pages* case, the idea of Scoot to launch an operator-

---

<sup>17</sup> The DCF test is in fact the same as the recoupment standard but draws exactly the opposite conclusion: if current losses can be recouped through future gains, predation is considered feasible under the latter, but the practice would be allowed under the former. This flaw in the DCF test has been recognised by the UK Competition Appeals Tribunal in *NAPP Pharmaceuticals Holding Ltd and subsidiaries v the Director General of Fair Trading* (Case 1000/1/1/01, final judgment, January 15th 2002, paragraph 260) and also (as observed by Baumol, 1996, p. 96) by a number of US courts.

assisted CDA service was probably a good and innovative idea, and one might consider Talking Pages' counterattack unfair given BT's size and other advantages. However, what ultimately counts is who serves the interests of consumers best. In the early stages of network development, no one can tell. There is no guarantee that the most efficient network will win, but to tell the efficient from the less efficient is a difficult, if not impossible, task for a competition authority. From our analysis above the only conclusion seems to be: why not let the competing networks struggle it out by themselves? False positives may be very costly; false negatives at least do not inhibit network development.

While a "do nothing" approach may sound extreme, competition authorities should get some consolation from the fact that network markets are dynamic by nature, and that a market tipping is not always the end of competition as we know it. Network effects sometimes become exhausted at a point below total market demand, thus leaving room for various competing networks. Networks may also co-exist (and compete) if they each offer slightly differentiated services. Moreover, from a dynamic perspective, and as discussed in section 3 of this article, there could still be competition "for the market", meaning that the dominant position obtained by one network may be overtaken by a completely new network in a relatively short time period.

## Appendix: A comparative-static demand system with network externalities

### A1. Willingness to pay

The demand for the network good is supposed to be derived from a willingness to pay  $w(y,n)$  depending on a one-dimensional consumer type  $y$  and the expected size  $n$  of the network. If price is lower than or equal to his willingness to pay the consumer buys; otherwise he does not. If he buys, he buys only one unit. We assume that  $w(y,n)$  is differentiable with positive partial derivatives to  $y$  and  $n$ :

$$(1a,b) \quad \frac{\partial w}{\partial y} > 0 \quad \text{and} \quad \frac{\partial w}{\partial n} > 0$$

The positive partial derivative to  $y$  indicates that the typification of consumers is chosen such that the higher the type, the higher the willingness to pay. In that, there is no loss of generality. The only assumption implicit in the fact that  $\partial w/\partial y$  is positive is that a consumer who is willing to pay more than another at one expected network size is also willing to pay more at any other size; i.e., consumer ordering is network-size insensitive. The positive partial derivative to  $n$  reflects the consumer's increasing willingness to pay as the expected network size increases.

Another assumption implicit in this specification is that the willingness to pay of a consumer depends only on the size of the network and not on which specific consumers subscribe. Evidently, any particular subscriber to a telephony network would rather have a few close relatives than many unknown users joining the network. However, taking into account such personal consumer preferences would complicate the demand system further. Most authors on the subject make the same or equivalent assumptions.

Without loss of generality consumers may be classified according to their willingness to pay at expected network size zero. This is so



because any other typification can be transformed to the former without affecting conditions (1a and 1b). By doing so, a consumer of type  $y$  is willing to pay a price  $y$  at zero network size ( $w(y,0) = y$ ). In the following we call this network size zero the *bottom line* of the network.

We assume consumers to be continuously distributed on the interval  $(y_{min} \geq 0, y_{max})$  with a positive density  $v(y)$ . If the marginal consumer is of type  $y$ , the corresponding demand is

$D(y) = \int_y^{y_{max}} v(y') dy'$ . Under this definition the size of the consumer universe is  $V = D(y_{min})$ .

The *entry price* is defined as the price at which consumers begin to buy at the bottom line:  $p_{ent} = y_{max}$ . At prices below the entry price there is a positive demand at the bottom line. If the entry price is zero ( $y_{max} = y_{min} = 0$ ) no consumer is willing to pay a positive price when he expects to be the only buyer. This corresponds to the inverse-U-shaped demand curves familiar from the literature on network externalities. However, in that case condition (1a) is not strictly satisfied at the bottom line.

Our specification of the network externalities is fairly general. It is more general than the additive network externality used by Katz and Shapiro (1985), which does not depend on a consumer type. It is also more general than the multiplicative externality used by Economides and Himmelberg (1995). One limitation of our specification is that it does not allow for consumers of the same type to have different externality perceptions. Thereto it would be necessary to have a multi-dimensional typification of consumers.

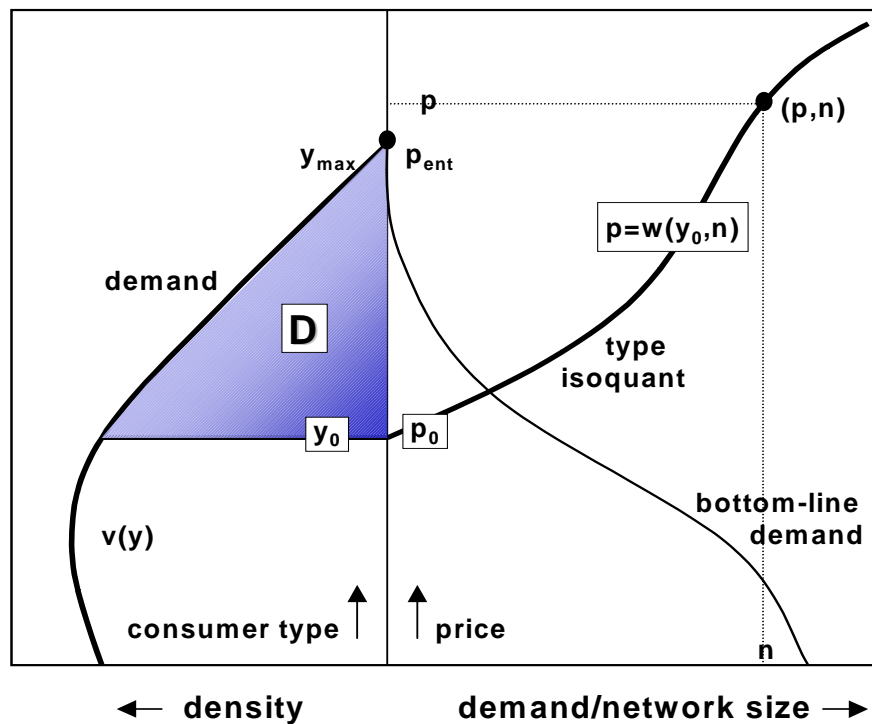
The willingness to pay  $w(p,n)$  leads to the following demand function:

$$(2) \quad D(p,n) = \int_{y_0(p,n)}^{y^{\max}} v(y) dy$$

where  $y_0(p,n)$  is the value of  $y$  that solves the equation  $w(y,n) = p$ . It can easily be demonstrated that  $\partial y_0 / \partial p > 0$  and  $\partial y_0 / \partial n < 0$ , so that  $\partial D / \partial p < 0$  and  $\partial D / \partial n > 0$ . Bottom line demand is represented by  $D_b(p) = D(p,0)$ . Inverting the demand function  $D(p,n)$  in its first argument leads to an inverse demand function  $D^{-1}(d,n)$  which maps a demand  $d$  to a price  $p$  with the mapping depending on  $n$ . The inverse bottom line demand function is  $D_b^{-1}(p)$ .

The main characteristics of this demand system are illustrated in Figure A1. The horizontal axis represents network size  $n$  and the vertical axis price  $p$ , which has the same dimension as the consumer type  $y$ . To obtain the demand for the network good at price  $p$  and expected network size  $n$ , first go to point  $(p,n)$ , then slide downwards along the type isoquant  $p = w(y_0,n)$ , to arrive at the vertical axis at point  $y_0$ . Left of the vertical axis one finds the consumer type density function and the demand is represented by the shaded area. The inverse bottom line demand function is drawn to the right of the axis.

Figure A1: The demand system



In Figure A1 we chose a price  $p$  above the entry price  $y_{max}$ . At that price no consumer would be willing to join the network at the bottom line, but expecting a positive network size  $n$  all shaded-area consumers enter. Thus, even at prices above the entry price demand may be positive, provided that the expected network size is positive.

## A2. Fulfilled-expectations equilibrium

Suppose all consumers expect a network size  $n$ . Faced with a price  $p$  they decide whether to buy or not to buy according to their willingness to pay at that network size. Aggregating all consumers that buy gives a demand, and if that demand happens to coincide

with the expected network size, expectations are said to be fulfilled. Fulfilled expectations give rise to a fulfilled-expectations equilibrium curve which satisfies the following equation:

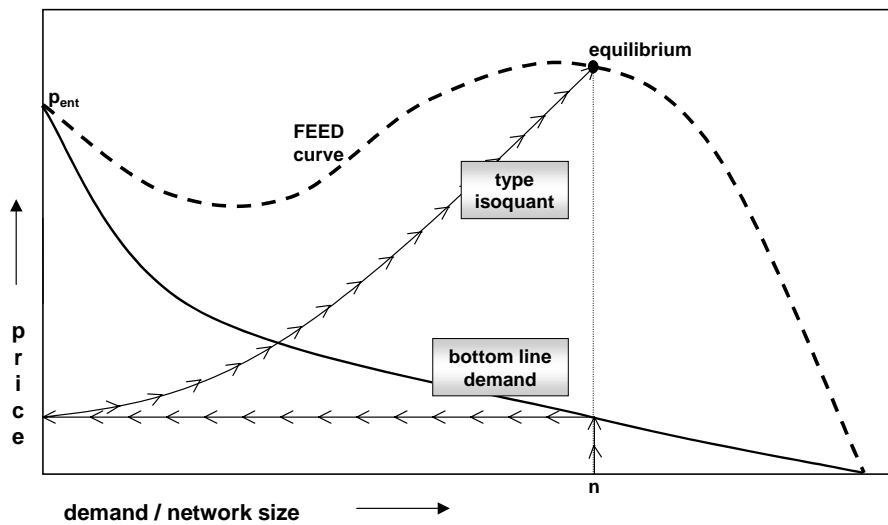
$$(3) \quad D(p,n) = n$$

It can easily be demonstrated that for each network size  $n$  that does not exceed the consumer universe, there is one and only one positive price satisfying equation (3). For a specific  $p$ , however, there may be several network sizes satisfying (3). Therefore, it is more convenient to describe the fulfilled-expectations equilibrium curve not as a demand function depending on price but as a price function depending on demand (or network size). The inverse fulfilled-expectations equilibrium demand curve can be written as:

$$(4) \quad p^e(n) = D^{-1}(n,n)$$

An example of an inverse fulfilled-expectations equilibrium demand (FEED) curve is presented in Figure 1 in the main text. The way in which the inverse FEED curve can be constructed is illustrated in Figure A2.

Figure A2: Fulfilled-expectations equilibrium



To obtain the fulfilled expectations equilibrium price  $p$  for network size  $n$ , first move vertically upwards to intersect with the inverse bottom line demand curve; next, move horizontally to the left to intersect with the vertical axis; and finally climb the corresponding network type isoquant to the right until arriving again at network size  $n$ . That gives the level of the corresponding equilibrium price  $p^{fe}(n)$ .

### A3. A game-theoretical interpretation of the demand system

Consider a non-cooperative one-stage game in which the players are the consumers, the moves are to buy or not to buy, and the payoffs are the consumers' willingness to pay minus price if they buy, or zero if they don't buy. Thus, for every price there is a well-defined game. The network externality is what makes this game interactive, i.e., it causes the payoff to each consumer to depend on the moves of all the other consumers. In the absence of externalities—i.e., when

the willingness to pay does not depend on network size—the game falls apart into a number of independent decision problems for the individual consumers.

It can be demonstrated that a necessary condition for a strategy profile to be a Nash equilibrium to this game is that the profile must be of the type-separating kind. A strategy profile is type-separating if there exists a type  $y_0$  such that all consumers with a higher (or equal) type buy, and all consumers with a lower type don't. If  $y_0 = y_{max}$  or  $y_0 = y_{min}$  the profile is extreme, i.e., all consumers buy or no consumer buys.

To prove the above proposition, one should first recognise that in any other strategy profile there must be at least one pair of consumers with unequal types in which the higher type does not buy while the lower type does. If for the lower type of the pair buying is better than not buying, then it is also better for the higher type, and if for the higher type buying is worse then it is also worse for the lower type. Thus, one of the consumers would be not playing optimally, and the profile cannot be a Nash equilibrium. Consequently, any Nash equilibrium profile must be of the type-separating kind.

A precondition for a type-separating strategy profile  $y_0$  to be a Nash equilibrium of the game with price  $p$  is that  $w(y_0, D(y_0)) - p = 0$ . To see that, note that the left-hand side of the equation is exactly the payoff from buying for consumers with type  $y_0$ . The fact that it is zero means that type  $y_0$  consumers are indifferent about buying or not buying. From the fact that  $w(y, n)$  is a strictly increasing function in  $y$  it follows that the payoffs at network size  $D(y_0)$  for consumers of type  $y$  is positive if  $y > y_0$  and negative if  $y < y_0$ . Thus, all consumer choices are optimal given the choices of the other consumers, which proves our proposition that each fulfilled-expectations equilibrium, including the unstable ones, is a Nash equilibrium of the game among the consumers.

Finally, it is interesting to mention that these Nash equilibria do not (locally) maximise consumer surplus. From the point of view of consumer surplus it would be preferable if some infra-marginal consumers bought at a loss, thus expanding the network and

enhancing the payoffs of the supra-marginal consumers by more than their own losses. However, to reach a consumer surplus maximum, some form of cooperation between consumers would be necessary.

## References

- Areeda, Philip E., and Turner, Donald F. (1975), "Predatory Pricing and Related Practices under Section 2 of the Sherman Act", *Harvard Law Review*, Vol. 88, pp. 697–733.
- Baumol, William J. (1996), "Predation and the Logic of the Average Variable Cost Test", *Journal of Law and Economics*, Vol. 39, April, pp. 49–72.
- Becker, Gary S. (1991), "A Note on Restaurant Pricing and Other Examples of Social Influences on Price", *Journal of Political Economy*, Vol. 99, No. 5, pp. 1109–1116.
- Economides, Nicholas (1996), "The Economics of Networks", *International Journal of Industrial Organization*, Vol. 14, No. 6.
- Economides, Nicholas, and Himmelberg, C. (1995), "Critical Mass and Network Size with Application to the US Fax Market", Discussion Paper EC–95–11, New York: Stern School of Business.
- Evans, David and Schmalensee, Richard (2001), "Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries", NBER Working Paper 8268, May.
- Farrell, Joseph, and Katz, Michael L. (2001), "Competition or Predation? Schumpeterian Rivalry in Network Markets", University of California, Berkeley, Economics Department Working Paper No. E01–306.
- Joskow, Paul and Klevorick, Alvin (1979), "A Framework for Analyzing Predatory Pricing Policy", *Yale Law Journal*, Vol. 89, pp. 213–270.



- Katz, Michael, and Shapiro, Carl (1985), "Network Externalities, Competition and Compatibility", *American Economic Review*, Vol. 75, No. 3, pp. 424–440.
- Niels, Gunnar and Jenkins, Helen (2000), "Predation or Innovation? How Competition Authorities Deter Dominant Firms from Entering New Markets", *European Competition Law Review*, Vol. 21, No. 6, pp. 287–290.
- Niels, Gunnar and Kate, Adriaan ten (2000), "Predatory Pricing Standards: Is There a Growing International Consensus?", *Antitrust Bulletin*, Vol. 45, No. 3, pp. 787–809.
- Office of Fair Trading (1999), "The Competition Act 1998: Assessment of Individual Agreements and Conduct", OFT 414, September.
- Oftel (1999a), "Telecommunications Act 1984 Provisional Order under Section 16", June 15th.
- Oftel (1999b), "Competition Bulletin; Issue 14", November.
- Oftel (2000), "The Competition Act 1998; The Application in the Telecommunications Sector", March.
- Oftel (2001), "Investigation by the Director General of Telecommunications into the BT Surf Together and BT Talk & Surf Together Pricing Packages", May 4th.
- Shapiro, Carl (1999), "Competition Policy in the Information Economy", mimeo, University of California, Berkeley.
- Shapiro, Carl and Varian, Hal S. (1998), *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business School Press.

## Other books in the same series

### **2000: Fighting Cartels – Why and How?**

The book takes up legal as well as economic aspects on why we should be concerned with cartels, how to detect and find sufficient evidence of cartel behaviour, and how to accomplish an effective prevention of cartel behaviour.

The theme reflects the growing concern in Sweden as well as internationally for the detrimental effects of cartels on society. The book takes up various aspects of anti-cartel enforcement, and in particular, how competition authorities of today could be successful in the prevention of cartels.

### **2002: The Pros and Cons of Merger Control**

The book is intended to serve as a contribution to the debate on merger control and consists of four individual contributions from independent scholars and professionals with an expertise in economics. Naturally, the opinions expressed are those of the authors alone.

The pros and cons of merger control are high on the agenda of policy makers, competition authorities, academics, representatives of industry and labour organizations, and others. The need for merger control is widely supported – but the specific principles and tools by which it should be exercised are subject to discussion and debate, and also revision. The review of the Merger Regulation in the Green Paper by the European Commission has raised several fundamental questions.

The pros and cons of changing the "substantive test" from the dominance standard to the SLC-test ("Substantial Lessening of Competition") is an issue that needs careful scrutiny. The concept of

collective dominance and other issues such as jurisdiction, efficiencies, and procedures are also of great importance.

The books can be ordered from our website  
[www.konkurrensverket.se](http://www.konkurrensverket.se)