HOW SWITCHING COSTS CAN MAKE PREDATORY PRICING RATIONAL: THE ECONOMICS OF WANADOO INTERACTIVE'S PREDATORY STRATEGY

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By setting its prices artificially low, a predatory firm seeks to capture valuable market share, forcing its rivals out of business. Economists have frequently debated the rationality of such a strategy, which aims to recoup the short-term losses by earning supra-normal profits in the long run. John Lavelle analyzes the seminal predation case of 'Wanadoo Interactive' and presents a model seeking to explain their pricing strategy. By emphasizing the role of 'switching costs', specifically in the case of a growing market, he proposes that existing models of predation fail to capture all of the relevant instances in which such behaviour might prove to be rational.

Introduction

Predatory pricing has long been one of the most controversial topics in industrial economics. For decades, many economists disputed the notion that predation – selling at a low cost in order to eliminate rivals from the market – could ever be a rational business strategy. More recently, industrial economists have used game theoretical models to demonstrate that predatory pricing can be rational in certain circumstances, usually when competitors are faced with incomplete information.

This paper argues that modern predatory pricing theory has overlooked an important strategic reason for predation. In the early stages of markets with switching costs, it can be rational for a firm to initially set price below cost in order to attract a large market share at the expense of its competitors. Later, it can raise prices to exploit its large base of 'locked-in' consumers. This strategy is illustrated through a real world instance of predatory pricing, the case of Wanadoo Interactive: the publicly owned French internet provider which was fined € 10.35 million by the European Commission for predatory abuses in 2003.

Part I briefly outlines the economic theory and legal treatment of

predatory pricing. Part II reviews the seminal predation case of Wanadoo Interactive, and argues that conventional theories of predation do not explain why Wanadoo set its prices below cost and incurred large losses between 2001 and 2002. In Part III, there is a discussion of the economics of markets with switching costs. It includes an explanation of how said costs can cause companies to initially set prices low in order to secure a large market share which can be exploited in future. A model of how switching costs induce firms to reduce their prices in order to grow their market share is outlined, and extended to show the conditions under which firms will set price below cost. It is argued that the presence of switching costs is the best explanation of why Wanadoo set its prices at predatory levels. The paper concludes with a brief discussion of the role that economic models of predatory pricing should play in legal proceedings against alleged predators.

I. Predatory Pricing: Economic Theory and Legal Policy

The economic concept of predatory pricing can be broadly defined as a firm foregoing short-run profit with the intention of eliminating a competitor. The firm acts in this manner in order to earn higher profit in the future than it would have earned had the competitor remained in the market.[1] The predatory firm sets prices lower than it would under 'normal' competitive conditions. Its rival cannot afford to compete and leaves the market, allowing the predator to gain market power and set prices above the competitive level. It makes extra long-run profit which compensates it for its short-run losses. Predatory pricing harms the welfare of both consumers, who pay higher prices in the long run, and the firms that are forced out of the market, which lose out on profit.

The spectre of large companies undercutting small enterprises to bankrupt them and monopolise the market has concerned policymakers for over a century. Predatory pricing was outlawed in the United States by the Sherman Antitrust Act of 1890. But, beginning in the 1950s, economic analysis by McGee (1958) and others of the Chicago School cast doubt on the traditional view of predatory pricing. Predation, they claimed, is rarely a rational strategy. Since it is seldom attempted in practice, there is no need for legislation.

More recently, the development of dynamic game theoretical models has allowed economists to identify conditions under which predation may occur (Bolton et al, 2000). Most models of predatory pricing assume some form of

[1] This is loosely based on the definition proposed by Ordover and Willig (1981).

incomplete information. In 'reputation' models, a firm responds to competition by setting low prices in order to establish a reputation as a 'tough' competitor and deter firms from competing with it in other, related markets. In 'cost signalling' models, a predator sets low prices in order to mislead rivals into believing that it has a low cost base and induce their exit from the market. 'Financial market' predation models show how, with imperfect financial markets, firms can respond to competition by setting low prices and making competitors appear unprofitable, preventing them from securing further funding from myopic financers. Finally, in 'test market' predation models, the predator sets artificially low prices to prevent competitors from learning about market conditions and discourage them from remaining in the market. These incomplete information models have somewhat allayed the sceptical attitude to predatory pricing inspired by the Chicago School. There is now, according to Motta (2004), a broad consensus among economists that predation can be a rational strategy.

Due to its negative effect on welfare, predatory pricing is illegal in most jurisdictions. In the European Union[2], predation is forbidden under Article 82 of the Treaty of Rome, which makes it unlawful for a firm to abuse its dominant position by 'directly or indirectly imposing unfair purchase or selling prices'. In order for predatory pricing to be proven, under European case law, it must be established that: first, the alleged predator held a dominant position in the market at the time of the offence; and second, it acted with the intention of eliminating a competitor from the market.

In *AKZO v. Commission* the European courts adopted a cost-based test to establish predatory intent. If a dominant firm sets prices below average variable costs[3] these are presumed to be predatory as: 'there is no conceivable economic purpose other than the elimination of a competitor'. This legal rule of thumb, first proposed by Areeda and Turner (1975), is designed to simplify legal proceedings by providing a clear delineation between normal price competition and 'unnaturally' low prices intended to eliminate rivals.

[2] European Union law is only applicable to cases where predatory pricing 'affects trade between Member States'.

[3] Average variable costs are used as a proxy for marginal costs, which are more difficult to calculate. Prices above average variable cost but below average total cost may be considered predatory if they are found to be part of a plan to eliminate a rival.

II. Case Study: Wanadoo Interactive v. The European Commission

The Wanadoo Interactive case is among the most significant instances of predatory pricing in European case law. On 16 July 2003, the European Commission fined Wanadoo Interactive, a subsidiary of the state-owned France Telecom, for abusing its dominant position in the French high-speed internet market by setting prices at predatory levels (European Commission, 2003). After a series of appeals, on 13 January 2007, the European Court of First Instance upheld the decision to impose a record fine of €10.35 million on the company.

The market in question was the provision of ADSL (a type of high-speed internet access) to the French public. Wanadoo Interactive held a market share of 46% at the beginning of 2002 and was adjudged to have held a dominant position. According to court proceedings, between January 1999 and August 200, Wanadoo set its price for a monthly subscription to its home high-speed internet service below its average variable cost, and between August 2001 and August 2002, below its average total cost. This pricing strategy caused Wanadoo to incur losses until the end of 2002, when the abuse was stopped, and its' expected losses to continue up to 2004. Between January 2001 and September 2002, Wanadoo's market share rose from 46% to 72%, with its competitors' shares shrinking to below 10% each. One rival ADSL provider, Mangoosta, was forced to leave the market. The courts supported the Commission's claim that while holding a dominant position in the market Wanadoo set prices below average variable cost. The legal test for predatory pricing, as established in *AKZO vs. Commission*, was met.

However, while the legal case is relatively straightforward,[4] the economics underlying the Wanadoo Interactive case is less clear cut. Unlike in the United States, European law does not require the competition authority to prove that a company could reasonably expect to recoup losses incurred by pricing below cost. Consequently, in preparing the case the Commission devoted most of its attention to showing that Wanadoo's price was below cost. Significantly less attention was devoted to establishing why it was economically rational for the company to incur such large losses through below cost selling.

On closer examination, none of the standard game theoretical models of predatory pricing can adequately explain Wanadoo's predatory strategy. Most modern theories of predation assume some form of incomplete information but it is debateable whether this is characteristic of the French ADSL market. The

[4] Although France Telecom's appeal disputed both matters of fact and points of law, the Court of First Instance sided with the Commission in virtually all areas of disagreement.

'reputation model' does not seem applicable to the Wanadoo case, as the theory assumes repeated interaction between competitors in a large number of markets – Wanadoo Interactive was not competing with its ADSL competitors in other, more profitable markets, so foregoing profit to establish a reputation as a 'tough' competitor would not have served much purpose. The 'cost signalling' model also seems inappropriate. Wanadoo Interactive was a large, publicly owned company and information about its costs would have been readily available to competitors from published financial accounts. Setting prices low in order to deceive competitors into thinking that it had a cost advantage seems an unlikely strategy. The 'financial market' model of predation is also unlikely to apply. Widespread knowledge about profitability, growth rates and cost levels in the industry would make it difficult for Wanadoo to manipulate market information leading financiers to deny funds to its competitors. Finally, the 'test market' model only attempts to explain predatory abuses in isolated geographical markets, and therefore does not apply in the Wanadoo case.

How then was it profitable for Wanadoo Interactive to pursue a predatory strategy? Based on its analysis of the Wanadoo case and documents recovered from raids on the company's premises, the European Commission (2003) speculated that the below cost pricing strategy was driven by a pursuit of a larger market share:

> 'The abuse on which the Commission has taken action was designed to take the lion's share of a booming market, at the expense of other competitors' (European Commission, 2003).

But can it be a rational strategy to price below cost in order to grow market share at the expense of competitors, as the Commission suggests? If so, how? Textbook theories of predation don't admit such a possibility. The European Commission bases its hypothesis that Wanadoo was attempting to 'pre-empt the market' primarily on documents recovered from raids on the company's premises – not on economic theory.

III. Below Cost Selling in Markets with Switching Cost

Switching costs, market share and pricing strategy

Switching costs are the costs associated with switching consumption from one good to another. Such costs cause two products which are functionally identical to become differentiated after customers have purchased one of them. Klemperer (1995) identifies six types of switching cost:

1. Investment in compatible products: if consumers switch to a new brand of computer, they may also have to invest in new complementary equipment, like a printer or monitor that is compatible with the new brand.

2. Transaction costs: when customers switch their current account to a different bank they must incur costs such as time spent evaluating other banks' products, time spent closing their existing account, the cost of completing documentation necessary to open an account and so on.

3. Learning costs: if a consumer switches to a new brand of computer, he must spend time learning to use the new system.

4. Risk: consumers are uncertain about the quality of untried products and so there is risk attached to switching suppliers.

5. Artificial costs: firms can design products in such a way that customers are penalised financially for switching to another supplier, such as when airlines offer frequent flier programmes.

6. Psychological costs: people's tastes evolve to favour the brand they are using and so there are psychological costs in switching to another, unfamiliar brand.

Switching costs may be borne by producers or consumers – their effect on competition is the same (ibid).

In addition to the six forms of switching costs identified by Klemperer, I

add a seventh: time preference costs. These are due to the empirical observation[5] that people have hyperbolic discount functions – they prefer small gains to larger gains when the small gain is immediate, but when both gains are in the future people prefer the larger of the two. Switching costs, such as the cost of searching for a new supplier, tend to be incurred immediately. In contrast, the benefits of switching to a new product, such as lower prices or improved quality, tend to accrue to the consumer over future periods. If consumers discount hyperbolically, then the impact of switching costs is magnified relative to the benefits of changing supplier.

By making *ex ante* homogeneous products *ex post* differentiated, switching costs make price competition less vigorous and give firms market power over existing customers. Once consumers are 'locked in' to a firm's product by switching costs, the firm can raise prices with reduced fear of losing customers. It follows that the higher a firm's market share, the higher the monopoly profits it can extract from its existing customers. Realising this, firms will set prices low in the early stages of a market's development in order to attain a large share of the market which can subsequently be exploited (Klemperer, 1987a, 1987b, 1995). Under certain conditions, one model predicts that: 'with switching costs, the competition for market share is sufficiently fierce that first-period prices are below firms' costs' (Klemperer, 1987a: 390). In other words, switching costs can make it a rational profit maximising strategy for firms to increase their market share by initially setting price below marginal cost, an *a priori* indication of predatory pricing under European law.

This is an interesting conclusion, with considerable implications for the economic and legal treatment of predatory pricing. It is strange, then, how rarely Klemperer's result is mentioned in industrial organisation literature. In the twenty years since Klemperer's paper, no model has been developed specifically to show the conditions under which switching costs might lead to below cost selling.[6]

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[5] For a summary of empirical work on hyperbolic discounting, see Angeletos et al. 2007

[6] It is important to distinguish here between predatory pricing; lowering prices in order to force a rival's exit, and the related concept of limit pricing; lowering prices in order to prevent a rival's entry. While there is no model which sets out to show how switching costs can rationalise predatory pricing, Klemperer (1989) does show how switching costs can cause firms to engage in limit pricing.

Klemperer's model of a market with switching costs

The following model is adapted from one of Klemperer's later papers (1995)[7] in order to illustrate how high switching costs can lead firms to set prices low in the early stages of the market before raising them once consumers are locked in. The model is extended to show the conditions under which a firm will set first-period prices below marginal cost.

Consider a two period duopoly, where firms A and B maximise profit by setting prices simultaneously and non-cooperatively in each period. There are N consumers, each with a reservation cost, R, for the products of both firms. Initially, we assume that firms A and B have marginal costs of c_1^A and c_1^B, respectively, in the first period and c_2^A and c_2^B, respectively, in the second period. Both firms discount second period profits by δ, and $\delta \leq 1$. Firms cannot price discriminate.

In the first period, both A and B's products are differentiated[8]. This is represented by placing firms A and B at each end of a line segment $[0, 1]$ at 0 and 1 respectively, with the N consumers evenly distributed along the line segment. A consumer at point y on $[0, 1]$ has a transport cost, Ty, [9] of using A's product and $T(1 - y)$ of using B's product.

In the second period, a fraction of consumers, σ^A and σ^B (where $\sigma^B = 1 - \sigma^A$), have already bought from firms A and B, respectively. If these consumers wish to switch suppliers in the second period, they must pay a switching cost, S. We assume that switching costs are high: $S > R - c_2^A > 0$ and $S > R - c_2^B > 0$. The following assumptions about the dimensions of costs are also necessary:

$$R - 2T > c_1^i \; ; \; R > c_2^i \; , \text{for } i = A, B; \; T > \mid c_t^A - c_t^B \mid, \text{for } t = 1,2$$

Firms set first and second period prices to maximise total profit, V^i, given by:

$$V^i = \Pi_1^i + \delta \Pi_2^i(\sigma^i) \qquad \textit{(for } i = A, B\textit{)} \qquad [1]$$

[7] This model from Klemperer (1995) is more or less a hybrid of the Klemperer (1987a) model referred to above and another of his switching cost models published in the same year (1987b). The result that interests us – that switching costs can, under certain conditions, make it rational for firms to sell below cost – holds in all three cases.

[8] By introducing first-period product differentiation into the price setting model, the lack of realism implied by the Bertrand paradox (where P = c) is avoided. This product differentiation might be caused by different consumers having different learning costs for each product.

[9] The 'transport cost' in the model is simply a way of incorporating product differentiation into the model. T can be thought of a measure of product differentiation and not, literally, the cost of transport.

where second period profit, Π_2^i, depends positively on first-period market share, σ^i. A general solution to this equation is attained by solving for the profit maximising second period price, substituting this into the total profit equation, and then solving for first-period price. As Klemperer (1995) shows, the profit maximising second-period price is:

$$P_2^i = R \quad [2]$$

In other words, firms can charge monopoly prices in the second period as high switching costs prevent existing customers from taking advantage of lower prices elsewhere. This presents a firm with two conflicting motivations when selecting first-period price (given second-period profit). On one hand, it wants to charge a high price to increase first-period profit. On the other hand, it wants to charge a low price in order to capture a larger share of the market for the second period to increase second-period profit. It can be shown that each firm resolves this

$$P_1^A = T + [(2c_1^A + c_1^B)/3] - \delta[R - (2c_2^A + c_2^B)/3] \quad [3]$$

first- and second-period profit trade-off by setting a first-period price:

and symmetrically for P_1^B.

Extension: pricing-below-cost in a market with switching costs

At this point, we depart from Klemperer's analysis and explore the conditions under which a firm will set a first period price below marginal cost. A simplifying assumption is made that firms A and B have symmetric costs[10], so $c_1^A = c_1^B = c_1$ and $c_2^A = c_2^B = c^2$. Therefore [3] is reduced to:

$$P_1^A = T + c_1 - \delta(R - c_2) \quad [4]$$

Rearranging:

$$P_1^A - c_1 = T - \delta(R - c_2) \quad [5]$$

[10] We have already assumed that the difference between firms' costs in each period is small (less than T), so this assumption is not a major departure from the original model.

Under what conditions will first-period mark-up be negative, i.e. price below marginal cost? From equation [5]:

$$P_1^A - c_1 < 0$$
$$\text{if:} \qquad T - \delta(R - c_2) < 0 \qquad [6]$$

Or, rearranging:

$$\delta(R - c_2) > T \qquad [7]$$

In other words, when switching costs are sufficiently large, it is rational for a firm to set first-period price below cost when the discounted value of the mark up consumers are willing to pay in the second period is greater than the 'transport cost', a measure of product differentiation.

Admittedly, the value of this model is mitigated by its simplistic assumptions. A limited time horizon, a fixed number of consumers with identical tastes for the product, no price discrimination, two firms with symmetric costs; all of these are uncharacteristic of the real world. But these assumptions are incorporated primarily for mathematical simplicity and if they were relaxed our conclusion – that switching costs can lead firms to price below cost – may well still hold[11].

Wanadoo Interactive, French ADSL and switching costs

In contrast to standard models of predatory pricing, Klemperer's model of a market with switching costs does appear to strongly resemble the Wanadoo case in several important respects. In the early 2000s, the market for high-speed internet access in France was new and growing quickly – in the seventeen months to September 2002 it grew five-fold. Initially, the market resembled the first-period situation in the game above, with a large number of unattached consumers who could be enticed by a low monthly subscription. Firm A's strategy of pricing below cost in the first period in order to attract market share

[11] For example, another of Klemperer's models (1987b) relaxes the assumption that the number of consumers in the market is fixed, by incorporating a fraction of customers to leave the market after the first period and some new customers to enter in the second period. In this model, as in the example discussed, it can be shown that firms will still set price below cost in the first period for certain parameter values.

seems consistent with Wanadoo's actions: it initially set its monthly subscription below its marginal cost, incurring heavy losses, and its market share increased rapidly during the period of predation.

Like in the hypothetical industry described in Klemperer's model, there are significant costs in switching between high-speed internet providers. As Shapiro and Varian (1999) outline, switching costs are especially prevalent in information industries and ADSL is a case in point. A customer wishing to switch provider would have to spend time and money cancelling their existing subscription. He would have to search for another provider, install the new provider's service and learn to operate the new service. In addition, there may be psychological costs to switching, and the customer faces the risk that the new provider may be of lower quality. Unlike a shopper buying his weekly groceries, households purchasing an internet connection are not confronted with a regular choice about who their supplier will be – their subscription continues until they consciously choose to end it. The presence of continuous subscriptions leads to a strong status quo bias in the industry and means that inducing customers to switch providers is extremely difficult.

Because of the presence of high switching costs, subscribers are to a large degree 'locked in' to their existing internet provider, giving companies the power to charge them a higher price in future periods. The second period in the model, where the cost of switching suppliers is prohibitively high, is a reasonable approximation of the French ADSL market as it developed and growth rates levelled off.

Klemperer's model does not, of course, perfectly describe the Wanadoo case. In particular, the model assumes two symmetric firms – in contrast, Wanadoo was significantly larger than its competitors at the time of the abuse. Motta (2004) asserts that it cannot be rational for a firm which already has a larger market share than its rivals to lower price below cost in order to attract more customers. However, Motta's claim may not be true of a small market that is growing rapidly, like the French high-speed internet market. Intuitively, even if a firm already has a large share in a small but booming market, it may still be more profitable for it to set a low price in order to win over the large number of customers who are about to enter the market, rather than setting a high price and exploiting its small number of existing customers.

While standard models of predatory pricing fail to explain Wanadoo's actions, Klemperer's model of a market with switching costs leads us some way towards a convincing account of why predation was a rational strategy for the company. Wanadoo initially kept its price low and suffered large losses in an attempt to secure a larger customer base at the expense of its weaker competitors. The firm intended to recoup these losses in the future by raising its prices above

its competitors', safe in the knowledge that high switching costs in the ADSL market made customers unlikely to change provider. This narrative broadly corroborates the European Commission's beliefs about the motivation for Wanadoo's strategy, and is consistent with documentary evidence recovered by the Commission from Wanadoo's premises.

Conclusion: The Role of Economic Models of Predation in Legal Actions

Bolton et al (2000) echo the views of many industrial economists when they argue that the current legal approach to predatory pricing is overreliant on simplistic legal rules of thumb. They criticise the below average variable cost test for predatory pricing as deficient as it fails to take account of the motivation behind price-below-cost strategies, and ignores legitimate business justifications for selling below price. They say that competition authorities should support their analyses with economic models of predatory pricing when seeking to prove predatory intent in legal actions. The authors believe that the dynamic game theoretical models of predation developed since the 1970s – reputation, cost signalling, financial market and test market models – identify the main circumstances in which predatory pricing is theoretically rational. Furthermore, these models are capable of explaining companies' behaviour in real world cases of predation.

Existing models of predatory pricing are certainly valuable, and are applicable in some real world instances of predation. But this paper's analysis of the Wanadoo Interactive case shows that textbook predation models do not exhaustively describe the circumstances under which predatory pricing occurs in the real world. Wanadoo's predatory strategy was designed to capture share in a new, growing market with switching costs. Yet there has never been a real attempt to construct an economic model of predatory pricing caused by switching costs. Aside from a small number of general purpose papers on the economics of markets with switching costs – which do not attempt to explain predatory pricing strategies – the existing body of economic theory gives little insight into the Wanadoo case, one of the seminal European predation cases.

Calls for economic models to be given a more central role in proving predatory intent in antitrust cases are, therefore, premature. Before this becomes a plausible option, more robust economic models of predation must be developed to more comprehensively describe the circumstances in which predatory pricing is rational. A model of selling below cost to grow market share, with asymmetric competitors in the early stages of a growing market with switching costs, would make an excellent starting point.

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