Market Power and Competition Law in the Software Industry

Yu, Q.

CHAPTER 3.

DISCRIMINATORY PRICING IN SOFTWARE SALES AND COMPETITION LAW: MORE EFFICIENCY THAN HARM?[243]

ABSTRACT

The software market is a new market that differs from traditional markets in many respects. Yet although these differences provide an environment that is conducive to the proliferation of discriminatory pricing, they also remove the eliminative and exploitative aspects of discriminatory pricing. Software discriminatory pricing in essence is a commonly used marketing strategy; traditional regulation is not well suited to regulating it. This chapter analyses the possibility of abusive discriminatory pricing in the software market, concludes that it is efficient, and suggests a test for assessing abusive discriminatory pricing.

I. INTRODUCTION

Price discrimination occurs when a firm receives different rates of return from sales of the same product. When this practise is used, product suppliers can maximise their profits, but consumers will turn to competing suppliers for competitive prices. Only market players who control most of the market share on the production and supply sides can sell their products to different customers at different prices without taking into account the prices offered by their competitors.

The pricing leverage enjoyed by dominant market players is likely to both exclude competitors from the market and decrease the overall competitiveness of the market. However, price discrimination may also improve allocative efficiency, satisfying more consumers on different parts of the demand curve. In certain sectors, price discrimination also facilitates innovations in efficiency. Thus, price discrimination has both negative and positive effects. Competition laws were designed to kerb the anticompetitive effects of price discrimination while still encouraging efficiency.

Price discrimination laws were developed and enforced during the twentieth century in the EU. In *ECS/AKZO*,[244] it was revealed that the monopolist AKZO used a selective below-cost pricing strategy against ECS in the organic peroxides market in order to exclude the latter. The

[243] This Chapter was published in European.Competition.Law.Review in 2012. *Discriminatory Pricing in Software Sales and Competition Law: More Efficiency than Harm?* 33 E.C.L.R. 22 (2012). This chapter examines discriminatory pricing in software sales, a topic that is similar with that of Chapter Two because it is prima facie violation of competition law but in fact procompetitive. It is an integral part of Part III and parallel to Chapter Four, which investigates software resale price maintenance.

[244] European Commission Decision 85/609 of 14 December 1985, ECS/AKZO, OJ December 1985.

court held that selective below-cost pricing against competitors is anticompetitive and has no positive effect on efficiency. In *British Airways*,[245] it was revealed that British Airways favoured certain travel agents with low prices; this practise decreased competition in the air ticket retail market and also did not improve efficiency.

The above cases occurred in traditional industries that are characterised by the "production and distribution of traditional physical goods, multiform production, stable markets, heavy capital investment, modest rates of innovation, and slow and infrequent entry and exit".[246] At the beginning of the twenty-first century new product markets started to emerge that were confronted with a problem: the price discrimination doctrines had been developed for the traditional industries. The new product markets exhibited "falling average incremental cost, modest capital investment high rates of innovation, quick and frequent entry and exit, [and] network externality, which is called [the] new economy".[247] The price discrimination doctrines were developed in traditional industries, and so price discrimination was different and more complex in the markets of the New Economy. Price discrimination doctrines in the New Economy, thus, must be different.

The software industry is a New Economy industry. The product in this market, software, is highly innovative. Large-scale software markets have high barriers to entry, and large sums of capital must be invested in developing software. However, because the cost of manufacturing an extra copy of software is low, the software created has a low marginal cost. When increasing numbers of consumers use the software, a network develops. This network is valuable and attractive to buyers. These features of the industry have greatly changed the competition process in the software market.

An examining of the price discrimination that has occurred in the software market reveals that software firms often ensure discriminatory sales by creating different versions of software. This marketing strategy is adopted by most software suppliers and can be used to help firms recover costs and ensure further investment and innovation. This chapter introduces the LAIC test as a means of evaluating possible pricing abuse. LAIC makes it possible to determine the actual unit cost of software. A cost floor that includes all of the expenses required to create one unit, LAIC is different from the cost floor based on the marginal cost (as used in traditional markets) because it includes both software development costs and marginal costs.

Part II of this chapter studies price discrimination and its application in traditional markets. It identifies the characteristics of traditional markets and indicates how to assess discriminatory

[245] Case T-219/99 British Airways Plc v Commission of the European Communities.

[246] Richard A. Posner, A*ntitrust Law*, p 245 (University Of Chicago Press 2nd edn, 2001).

[247] Richard A. Posner, A*ntitrust Law*, pp 245, 246 (University Of Chicago Press 2nd edn, 2001).

pricing in those markets. Part III examines those characteristics of the software market that distinguish it from traditional markets. Part IV examines the consequences of software price discrimination for competition. Part V introduces the LAIC price test as a means to assess the relationship between cost and price and analyses the possible negative effects of software price discrimination on competition based on this analysis. Part VI summarises the implications of these findings for an analysis of price discrimination in the software market, and part VII draws conclusions.

II. DISCRIMINATORY PRICING THEORY PRACTISED IN TRADITIONAL MARKETS

This section will examine price discrimination theory and how it applies to traditional industries. Price discrimination theory was developed in traditional industries; however, its implications and applicability extend far beyond them. Identifying the basic methods of assessing competition in traditional industries makes it possible to further apply price discrimination theory.

A. PRICE DISCRIMINATION AND COMPETITION IN RELEVANT MARKET

"Price discrimination may be defined as the sale or purchase of different units of a good or service at prices not directly corresponding to differences in the cost of supplying them".[248] A supplier, then, can choose to sell its products at a price higher than those of its competitors. Pricing competition is the main mechanism of competition. As a result of reduced costs, suppliers of goods or services that provide the same product at lower prices will attain competitive advantage in the market and hence will survive. It would be irrational for a supplier to offer the same product at a price much higher or lower than that of its competitors in a competitive market. Thus, price discrimination often occurs in a concentrated market. In such a market, a monopolist can possess a decisive market share. The dominant firm can survive by selling the product at a competitive or marginal price. Even if the firm sets a higher price than its competitors do, there will be few substitute products from which consumers can chose, and the competing firms may not have the ability to quickly produce the products that would meet the customer need created by the dominant firm's high prices.

Dominant firms often engage in price discrimination because this tactic is a practical way of maximizing profits. According to perfect price discrimination theory,[249] if a dominant firm sells its product at each customer's preferred price, the firm can maximise its profits. However, the monopolist is not likely to offer the prices desired by all customers; instead, the monopolist will attempt to offer the highest acceptable prices. Price discrimination can also serve to threaten or

[248] Richard Whish, C*ompetition law,* p 748 (Oxford University Press, 6th edn, 2008).

[249] Pigou, A. C, *The Economics of Welfare*, p 244 (Macmillan and Co. Pub, 1st edn, 1920); Walter Nicholson, I*ntermediate Microeconomics: And Its Applications p* 452 (Dryden Press, 6th edn. 1994). William S. Brown, *Principles of economics,* p 301 (West Publishing Co., 1995).

exclude equally efficient competitors and can stop competing buyers from improving their market position. A monopolist can offer a selectively low price to the customer of an equally efficient firm. Because offering this price will cause the firms in question not to make a profit, both will collapse sooner or later, but the monopolist can wait until its competitor exits the market and then increase its prices again. In buyers' markets, if buyers receive different prices for reasons other than price efficiency, the favoured buyer will have a cost advantage over other buyers. This will change the competitive relationship among the buyers.

B. PRICE DISCRIMINATION AND COMPETITION LAW

Price discrimination greatly affects the market. Because price discrimination sets affordable prices for customers with different demands, "it is important to appreciate that price discrimination can be positively beneficial in terms of allocative efficiency, since it may result in an increase in output".[250] However, more output by a monopolist means reduced output by its competitors, and therefore price discrimination may pose a threat to a firm's competitors. Two laws address the anticompetitive effect of price discrimination. EU Article 102TFEU[251] provides that any abuse by one or more undertakings of a dominant position … shall be prohibited …, in particular, consist in: …(c) Applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage. In the United States, the Robinson-Patman Act[252] prohibits selling or contracting to sell goods at unreasonably low prices for the purpose of eliminating competition or a competitor.

The two provisions differ greatly. Article 102TFEU (c) protects market competitors, whereas the Robinson-Patman Act emphasises the effects of price discrimination on market structure. However, the laws are similar on two points. First, both stress price competition and base their analyses on the relationship between price and cost. Price is presented as the principal justification for competition infringement. Second, both provisions do a poor job of stressing the relationship between efficiency and the alleged abusive practises. However, this ambiguity has recently been clarified by changes to the EC guidelines and developments in US case law.[253]

---

[250] Richard Whish, *Competition law*, 749 (Oxford University Press, 6th edn, 2008). Also, Richard Schmalensee, *Output and welfare implications of third degree price discrimination*, 71 Am. Econ. Rev. 242 (1981). (many subsequent authors seem to equate the efficiency effects of discrimination with its impact on total output.).

[251] Treaty on the Functioning of the European Union (TFEU). http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:12008E102:EN:HTML.

[252] 15 U.S. Code § 13 - Discrimination in price, services, or facilities.

[253] Neelie Kroes, *Tackling Exclusionary Practices to Avoid Exploitation of Market Power: Some Preliminary Thoughts on the Policy Review of Article 82*, 29 Fordham Int'l L.J 598 (2005). (Article 82 does not expressly foresee the possibility of "exempting" abusive behavior because of efficiencies. However, we must find a way to include efficiencies in our analysis*)*; D.D.C., *U.S. v. Microsoft Corp*. 1995-2 Trade Cases P 71,096, August 21, 1995 (NO. CIV. A. 94-1564 at IV H. (volume discount was allowed. It is not a violation of this Final Judgment for Microsoft to use royalty rates, including rates embodying volume discounts, agreed upon in advance with respect to each individual OEM, each specific version or language of a Covered Product, and each designated Personal Computer System model subject to the License Agreement).

C. ANALYSING NEGATIVE COMPETITIVE EFFECTS IN TRADITIONAL MARKETS IN THE EUROPEAN UNION

Price discrimination can affect the competition between a monopolist and its competitors, competing buyers and even downstream markets. These two anticompetitive effects are called primary line and secondary line injury, and both are illustrated by the relevant case law.

1. PRIMARY LINE CASE

The two types of price discrimination strategies adopted by dominant firms can greatly distort the market order in terms of cost-price competition. The use of selectively low prices as a way to outdo one's competitors is one type of primary discriminatory pricing, but this an irrational choice intended to maximise profits in a short period. These low prices are instituted not because costs are low but rather because it is believed that offering such prices will eliminate the firm's competitors. It can be deduced that the monopolist intends to harm or eliminate its competitors using this strategic pricing. In addition, the allocative efficiency that these changes create for consumers will not last in the long term. Regulators expect the monopolist to compete without abusing its dominant position and to adhere to the cost-price competition mechanism.

Price discrimination can directly exclude a firm's competitors from the market. This has been witnessed in the EU case - *ECS/AKZO*,[254] the disputing market players were ECS[255] and AKZO. "ECS is a small producer of the organic peroxide benzoyl peroxide in the United Kingdom".[256] AKZO Chemie BV is part of the large multinational group AKZO, which holds the dominant position in the EEC organic peroxides market. In this case, ECS alleged that AKZO Chemie BV "implemented a policy of selective and below-cost price-cutting designed to damage the business of ECS and exclude it as a competitor".[257] "AKZO Chemie and AKZO UK vigorously denied in affidavit evidence that any such threats had been made as ECS alleged",[258] arguing that "their prices are above variable cost, only less efficient firms will be harmed if a dominant firm sells below its total cost but above variable cost".[259] The European Commission noted that AKZO generated losses and did not recover its total costs. It also noted that "[i]f prices are taken to a level where a business does not cover its total costs, smaller but possibly more efficient firms will eventually be eliminated and the larger firm with the greater economic resources—including the possibility of cross-subsidisation—will survive".[260] In addition to

[254] European Commission Decision 85/609 of 14 December 1985, ECS/AKZO, OJ December 1985.

[255] Engineering and Chemical Supplies (Epsom and Gloucester) Ltd (ECS).

[256] European Commission Decision 85/609 of 14 December 1985, ECS/AKZO, OJ December 1985.

[257] European Commission Decision 85/609 of 14 December 1985, ECS/AKZO, OJ December 1985.

[258] European Commission Decision 85/609 of 14 December 1985, ECS/AKZO, OJ December 1985, 27.

[259] European Commission Decision 85/609 of 14 December 1985, ECS/AKZO, OJ December 1985, 75.

[260] European Commission Decision 85/609 of 14 December 1985, ECS/AKZO, OJ December 1985, 77.

finding that AKZO intended to exclude its competitor from the market,[261] the Commission investigated ECS and AKZO's costs and held that

> discrimination between similarly-placed customers is expressly prohibited by Article [82](c) when it places certain firms at a competitive disadvantage. In the present case however the anticompetitive effect of AKZO's differential pricing involved not so much direct injury to customers but rather a serious impact on the structure of competition at the level of supply by reason of its exclusionary effect.[262]

The Fifth Chamber held that

> that the Commission had made clear in the statement of objections all the behaviour it classified as abusive,… that the charging of prices below average variable cost, or even below total variable cost but above average variable cost, where it formed part of a plan to eliminate a competitor, was abusive, that the company had offered customers supplies at such unreasonably low prices with the aim of eliminating the competitor, that its policy of selectively quoting low prices to customers of the competitor while maintaining higher prices for its own existing, and comparable, purchasers was likewise abusive."[263]

This conduct was classified as an instance of abuse of a firm's dominant position; the firm had charged predatory prices. However, AKZO's pricing was not considered to be discriminatory. This ruling suggests that there is no clear distinction between predatory prices and selectively low prices, which are categorised as indicating primary line discriminatory pricing. First, neither predatory pricing nor discriminatory pricing harms consumers or changes market structures during the injury period. Second, when a dominant player adopts selectively low prices as a means of combating equally efficient competitors, only a below-cost strategy (using prices that are either below the average variable cost or above the average variable cost but below the total variable cost) can achieve the desired effect of exclusion. A price–cost analysis, therefore, is both an effective tool for examining predatory pricing and a meaningful component of any analysis of primary line discriminatory pricing.

2. SECONDARY LINE CASE

In addition to having a dramatic exclusionary effect on a firm's competitors, price discrimination can also distort the competitive relationship between buyers.

[261] European Commission Decision 85/609 of 14 December 1985, ECS/AKZO, OJ December 1985, 26.

[262] European Commission Decision 85/609 of 14 December 1985, ECS/AKZO, OJ December 1985, 83.

[263] Case [1993] 5 C.M.L.R. 215, *AKZO Chemie BV v. E.C. Commission.*

In *British Airways,*[264] British Airways plc (BA), 'the largest British airline',[265] established three systems of incentives (marketing agreements) in addition to the normal commissions given to certain travel agents according to the numbers of tickets they sold. BA provided commissions to agents who met the following three conditions: the ticket agents exceeded a minimum number of sales per year, BA's share of the agents' worldwide sales increased, and the current ticket sales exceeded those obtained during the same time period in the previous year. The Commission analysed BA's incentive systems and described the systems as follows: "two travel agents handling the same number of BA tickets and providing exactly the same level of service to BA will receive a different commission rate, that is a different price for their air travel agency services if their sales of BA tickets were different in the previous year. Conversely, two travel agents selling different volumes of BA tickets and providing a different level of service to BA could earn the same commission rate, that is, they would be paid the same price by BA for their air travel agency services, if their sales of BA tickets have increased by the same percentage over the previous year".[266] It also commented that "[t]he effect of these discriminatory commissions will be to place certain travel agents at a competitive disadvantage relative to each other".[267] Finally, the court held that "[b]eing dependent on the financial resources of each agent, that ability of agents to compete in supplying air travel agency services to travellers and to stimulate the demand of airlines for such services was naturally affected by the discriminatory conditions of remuneration inherent in BA's performance reward schemes".[268]

In this case, the three systems of incentive rewards discriminated against some competing travel agents and placed ticket agents in unequal starting positions: "BA's performance reward schemes cannot be regarded as constituting the consideration for efficiency gains or cost savings resulting from the sale of BA tickets after attainment of the said objectives".[269] Such examples indicate that cost-price competition is a standard way to ensure competition process and that it is crucial to consider cost rationality in determining secondary line discriminatory pricing practises.

III. THE SOFTWARE MARKET

The characteristics of software production and the software market differ extensively from those found within traditional industries.

[264] Case [2003] T-219/99 *British Airways Plc v Commission of the European Communities.*

[265] Case [2003] T-219/99 *British Airways Plc v Commission of the European Communities*, at 1. (In 1997, BA ranked first in the world in terms of international scheduled passenger-kilometres flown, and ninth for combined international and domestic scheduled passenger-kilometres flown).

[266] European Commission Decision 2000/74 of 14 July 1999. 109.

[267] European Commission Decision 2000/74 of 14 July 1999, 111.

[268] European Court of Justice, 17 December 2003, Case T-219/99. *British Airways Plc v Commission of the European Communities*, at 238.

[269] European Court of Justice, 17 December 2003, Case T-219/99. *British Airways Plc v Commission of the European Communities*, at 284.

A. SOFTWARE PRODUCTION IS HIGH IN FIXED COSTS AND LOW IN MARGINAL COSTS

Software is an innovative product. Large-scale software is expensive to create. Investing in developing large-scale software is risky. It is uncertain that the software engineers will succeed in developing the expected software, and if the engineering process fails, most of the code cannot be used elsewhere, so the project investors will probably receive limited or no returns. It is also costly to invest in software development. Although investors are generally adventurous, their investments must meet a high capital threshold. For instance, "IBM has been estimated to spend over 2 billion developing OS/2".[270] The risks of these fixed investments deter most investors, permitting only those with abundant capital to invest. Hence, there are high barriers to entry in the software market.

It is not uncommon for an industry to require significant fixed costs as a condition of entry. However, software has another feature that makes it different from other products: it requires negligible marginal costs. Extra copies of software are easy and nearly costless to produce; indeed, now that software is sold on CD-ROMs or as Internet downloads, the cost is close to zero. This low marginal cost strips software suppliers of the ability to control market supply even when they have a distinct market share, because low marginal cost enables software suppliers to respond quickly and powerfully to dynamic demand. If a supplier implements an exploitative price, its competitors can easily satisfy that supplier's customers. These negligible marginal costs also render many cost benchmarks useless in detecting pricing abuses, including average variable cost (AVC). AVC offers a broad assessment of the cost per unit but does not reflect the cost of creating an extra copy of a piece of software. In addition, because of the software cost structure, there is little cost variability, which decreases the efficacy of the AVC approach in this context.

B. THE SOFTWARE MARKET HAS NETWORK EFFECTS

Network effects arise when "the utility that a user derives from consumption of the good increases with the number of other agents consuming the good".[271] Network effects are user-driven and affects other users, in other words, they have 'network externalities'. Network effects are created by the demand side (consumers) but have significant effects on the competition process. There are two types of network effects. One type is caused by the internal compatibility between products. Consumers will purchase one of the products after they have bought the other because the two are internally compatible. Michael A. Jacobs comments that "the System/370 environment is a good example of what are referred to as 'network externalities.' The 'network'

[270] Kenneth C. Baseman, Frederick R. Warren-Boulton, Glenn A. Woroch , *Microsoft Plays Hardball: The Use of Exclusionary Pricing and Technical Incompatibility to Maintain Monopoly Power in Markets for Operating System Software* XL:2 Antitrust Bull 5 (1995).

[271] Michaell. Katz and Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 Am. Econ. Rev. 424 (June 1985).

here is the set of customers for hardware of a similar architecture, providing similar interfaces".[272] This phenomenon is more apparent in economies of scale. Network effects can occur in the software industry. For instance, some software requires certain platforms to work, and the standards of compatibility differ. For example, regarding the LOTUS software, it has been commented that "[t]he dominant word processing programs available for the DOS operating system and the major word processing systems available for the WINDOWS operating system provide one common file compatibility standard for transferring data: the LOTUS standard. As the LOTUS file compatibility standard is the dominant standard for transferring data among personal computer software applications. Software that is compatible with LOTUS standard will be preferred by consumers".[273] These characteristics of networks are called complementary network externalities.

In the other type of network effects, a network can form because consumers value a product more when more individuals are using it. Growing numbers of consumers that buy a particular software will coalesce into a network. If the particular type of software offers advantages in terms of its operation or applications, more people will purchase and use that software product. This increase, in turn, will lead to more people understanding how the software operates and what its applications are, and this will help to spread the use of the software. Other consumers who wish to use software products are more inclined to purchase this software. For instance, regarding the Bluetooth software,[274] it is clear that if one wishes to share information with people who have Bluetooth or to join a network that includes many such people, one should also have Bluetooth oneself. Such considerations encourage more consumers to join the group and use the software technology. Hence, they form a network. As the scale of the network increases, so network effects will come into play. A very large network has many advantages in attracting new members. These advantages reduce costs or increase value for new entrants. The software market is extremely susceptible to this type of network effect because most large-scale

---

[272] Michael A. Jacobs, *Copyright and compatibility* 30 Jurimetrics Journal 93 (1989). (Consider now the other end of the computer spectrum, the IBM System/ 370 mainframe architecture. The System/370 architecture defines the computer's functionality and the computer's interfaces, but it doesn't define the computer's implementation. From this arises the familiar black box metaphor.

The task of a compatible vendor is to conform to the System/370 architecture as defined by IBM. If it conforms, then the compatible vendor will be able to plug in his piece of hardware-to run existing software and attach it to existing hardware unchanged….In this case, because literally billions of dollars of software already exists for the System/370 environment, that positive consumption externality is quite significant.)

[273] Neil Gandal, *Competing Compatibility Standards and Network Externalities in the PC Software Market,* 77 Manag. Sci. 600 (1995).

[274] Theodoros Salonidis, Pravin Bhagwat, Leandros Tassiulas1, and Richard LaMaire, *Distributed Topology Construction of Bluetooth Personal Area Networks*. (Bluetooth is a promising new wireless technology, which enables portable devices to form short-range wireless ad hoc networks and is based on a frequency hopping physical layer.) (This paper appears in: INFOCOM 2001. Twentieth Annual Joint Conference of the IEEE Computer and Communications Societies. Proceedings. IEEE) (visited 27 April 2012); Jaap Haartsen A Mahmoud Naghshineh B Jon Inouye, *Bluetooth: Vision, Goals, and Architecture*. 2 Mobile computing and communications review 38 (1998). (Formed in February 1998 by mobile telephony and computing leaders Ericsson, IBM, Intel, Nokia, and Toshiba, the Bluetooth special interest group (SIG) is designing a royalty-free, technology specification where each of the founding companies has a significant stake in enabling this vision. All the main market operator use this software hence formed a big network).

software is developed using significant capital and technical investments and is owned by few market suppliers. The first-mover advantage is also a factor: the first mover can easily acquire a majority of the market share. Large-scale software markets are often understood as concentrated markets formed by large groups of consumers. When more people use software products, new consumers value the products in question more highly and then tend to gravitate to these large software networks. Nintendo's dominance in the 1980s and early 1990s illustrates this claim: "yet by Christmas 1986, the Nintendo Entertainment System (NES) was the hottest toy on the market. The very popularity of NES fuelled more demand and enticed more game developers to write games to the NES, making the system yet more attractive".[275]

C. A SOFTWARE PRODUCT IS A DURABLE GOOD

Software is a durable good rather than a perishable good. A perishable good will be used up or expire after a period of time. Software never expires and can be used indefinitely without replacement as long as it is still compatible with the other technologies required to use it.[276] This feature creates a different form of competition in the durable goods market to that which exists in the perishable goods market.

Product durability introduces many concerns regarding competition, two of which are especially important in the software market. First, as time passes, some consumers may want to switch to new products. They then sell their current products and buy new ones with the money earned from the resold products. This practise creates a second-hand product market in which products are not controlled by product suppliers.[277] This is not the case in the software market; however, since here the unique characteristics of the software market mean different effects on software sales. Software resale remains impossible.[278] If a current user of a software product buys

[275] Carl Shapiro, Hal R. Varian, *Information rules: a strategic guide to the network economy*, p 178 (Harvard Business Press, 1999).

[276] Michael L. Katz and Carl Shapiro, *Antitrust in software markets* in Jeffrey August Eisenach, Thomas M. Lenard, C*ompetition, Innovation, and the Microsoft Monopoly,* p36 (1998), (Software "wears out" only due to technological change or planned obsolescence, not based on normal wear and tear such as applies for durable equipment. Page 7, 8).

[277] Jeremy 1. Bulow, *Durable-Goods Monopolists,* 90, J. Polit. Econ. 314 (1982); Daniel K. Benjamin and Roger Kormendi, *The Interrelationship between Markets for New and Used Durable Goods* 17 J Law & Econ 381 (1974); H. Laurence Miller, *On Killing Off the Market for Used Textbooks and the Relationship between Markets for New and Secondhand Goods* 82 J Pol Econ 612 (1974); S.J. Liebowitz, *Durability, Market Structure, and New-Used Goods Models* 72 Am Econ Rev 816 (1982); Daniel A. Levinthal and Devavrat Purohit, *Durable Goods and Product Obsolescence* 8 Marketing Sci. 35 (1989).

[278] Tjeerd Overdijk, Polo van der Putt, Eva de Vries, Thomas Schafft, *Exhaustion and Software Resale Rights A comparison between the European exhaustion doctrine and the U.S. first sale doctrine in the light of recent case law*, CRi 34 (2011). (The previous year saw some interesting developments with regard to the resale of (used) software licenses. In the U.S. the position of software vendors to control distribution seems to be strengthened. In Europe, on the other hand, the position of software vendors might be weakened. A Dutch court found that a purchaser of used software does not need a license from the software vendor. In Germany, the highest civil court referred questions to the CJEU with respect to resale of downloaded software. Market players will have to cope with diverging approaches in their markets and ongoing legal uncertainty); Chukwuyere Ebere Izuogu, *Exhaustion of Rights and the Resale of Used Software Licenses: The State of Play in Germany and the United Kingdom*, available at: http://papers.ssrn.com/soL3/papers.cfm?abstract_id=1597637. (Both statutory and judicial authorities indicate that the distribution rights of software owners will be exhausted once the original software is distributed in a tangible media while the right of communication and making

a substitute, they will experience a monetary loss because they will not be able to sell their old product to pay for the new one. This restriction has made rational current users reluctant to acquire substitute software products unless they are free. Two concerns arise. First, there are significant switching costs for existing customers, which creates high barriers to entry. Second, the price competition mechanism only affects those customers who have not yet made a purchase.

The second concern associated with product durability is, according to Professor R. H. Coase, that a dominant supplier of a durable good tends to lower its prices towards the marginal cost in the long run. This theory is known as the Coase Conjecture.[279] Coase used an extremely durable good – land – to conduct his analysis.[280] In real estate sales, consumers anticipate that the prices of dominant suppliers will fall because they believe that the demand for land will decrease with time and decrease prices accordingly. Based on this thinking, low-elastic buyers tend to make purchases later for lower prices. To induce these consumers to buy, suppliers are forced to lower prices. In the long run, it is possible that the price will even be close to the marginal cost. Although software is less durable than land, this theory helps to explain some software pricing practises. In the software market, suppliers face high demand elasticity, which forces them to attract as many consumers as possible to maintain solvency and continue innovating. Discriminatory pricing became an important method of achieving these objectives. The low prices introduced using this procedure should be carefully considered in analyses of competition because most of these low pricing strategies are not intended to exclude competitors and have no relevant effects.

D. INNOVATION, PRICE AND COMPETITION

As a typical innovation market, the software market features different methods in the competition process. In traditional markets, the main competitive weapon is price. Market players gain buyers by lowering their product or service costs. Because products in traditional markets are homogenous (i.e., they are generally similar in terms of grade and quality), their costs are also similar. Thus, the cost-price relationship became the main index for both suppliers and consumers looking to supply and purchase products, respectively.

The software market is quite different. Software is created to improve efficiency, as in computing. Software can complete operations within seconds that would take people several years to perform. A software product with superior efficiency will be favoured by consumers and

available to the public works against the exhaustion of rights doctrine once the original software package is distributed in an intangible form or deployed as a service).

[279] R. H. Coase, *Durability and Monopoly,* 15 J. L. & Econ. 144 (1972).

[280] R. H. Coase, *Durability and Monopoly,* 15 J. L. & Econ. 144 (1972).

thus will succeed in the market. Hence, the rise of an innovative product can lead to the exit of an older product from the market. The replacement of the DOS computer operating system[281] by the Windows computer operating system provides an excellent example of this phenomenon.[282] In competing within software markets, software suppliers tend to invest more in developing new, more efficient products that can compete with current products. In contrast, investing in homogenous software will both create investment risks and make market survival uncertain.

The prevalence of innovation competition limits the scope of price competition in the software market. Because costs differ in the development stage, most competing software programmes have different costs and are profitable. It is difficult for a competitor to set a price by guessing the profitability of the competitor's product. Besides, when network effects are a factor, even if the competing software has the same efficiency level, a price advantage may not attract a significant number of new customers.

E. SUMMARY OF SECTION III

The following four unique characteristics of the software market are important for analysing discriminatory pricing in the market:

1) The production of software involves high fixed costs, but its sales and distribution are characterised by low marginal cost. These facts invalidate the use of traditional cost criteria in analysing abusive software pricing.

2) The consumer-side economies of scale in software products result in high switching costs for existing consumers. Even if competing software is offered for free, it is not likely to attract enough consumers.

3) Software is a durable product, which on the one hand discourages existing users from switching, due to switching costs. On the other hand, lowering the price of software to attract more low-profile consumers is useful for profit recovery. Low prices are prima facie discriminatory, but in actual fact may not be.

4) Because software products compete mainly through innovation, price competition is secondary. As a result, pricing abuse, for example anti-competitive discriminatory pricing, is not a preferred strategy in the software market.

IV. COMPETITION IMPACT OF DISCRIMINATORY PRICING OF SOFTWARE

[281] The IBM Personal Computer Disk Operating System. http://www-01.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/9/897/ENUS286-129/index.html&lang=en&request_locale=en.

[282] *A history of Windows*. http://windows.microsoft.com/en-us/windows/history#T1=era0.

Discriminatory pricing practises and their effects on the software industry will now be investigated.

A. DISCRIMINATORY PRICING PRACTISES

Price discrimination has become an accepted tactic within software sales. It takes different forms. Microsoft has set different retail prices for software for countries outside the United States;[283] it creates different versions of the software and sells them at different prices. DivX, llc, offers complementary use of a preliminary version of its software but charges for the advanced version.[284] The main method of software price discrimination involves creating different versions of software and selling them in different countries at different prices (as Microsoft does). This method is the most significant form of software price discrimination.

1. DISCRIMINATORY PRICING OF SOFTWARE IN US COURT DECISIONS

In 1996, the discriminatory sale of software was described in the case *ProCD v. Zeidenberg*.[285] The plaintiff ProCD operated an information database and paid over $10 million to compile it and keep it current. The information database can be used for different purposes, and "*it is much more valuable to some users than to others*". Thus, ProCD engaged in discriminatory sales practises. The court indicated that in addition to charging manufacturers and retailers higher prices mailing lists than it charged specialised information intermediaries, the company also engaged in the following practises:

> ProCD decided to engage in price discrimination, selling its database to the general public for personal use at a low price (approximately $150 for the set of five discs) while selling information to the trade for a higher price. It has adopted some intermediate strategies too: access to the SelectPhone (trademark) database is available via the America Online service for the price America Online charges to its clients (approximately $3 per hour), but this service has been tailored to be useful only to the general public.[286]

The court also discussed the legality of the discriminatory selling of software:

> if ProCD had to recover all of its costs and make a profit by charging a single price-that is, if it could not charge more to commercial users than to the general public-it would have to raise the price substantially over $150. The ensuing reduction in sales would harm consumers who value

[283] http://www7.buyoffice.microsoft.com/emea1/default.aspx?culture=en-GB&torb=4&cou. (Visited 25Sep 2011)

(Microsoft® Office Home and Student 2010 Price: 139.00€ (about￥886)).

http://office.microsoft.com/zh-cn/buy/HA101810737.aspx. (visited 25Sep 2011)

(Microsoft® Office Home and Student 2010 Price: ￥398-299).

[284] A video play-related instrument software. www.divx.com/en/software.

[285] *ProCD, Incorporated, v. Matthew Zeidenberg and Silken Mountain Web Services, Inc.* 86 F.3d 1447. 7th Circuit (1996)

[286] Court of Appeals,: *ProCD, Incorporated, v. Matthew Zeidenberg and Silken Mountain Web Services, Inc.* 86 F.3d 1447. 7th Circuit (1996).

> the information at, say, $200. They get consumer surplus of $50 under the current arrangement but would cease to buy if the price rose substantially. If because of high elasticity of demand in the consumer segment of the market the only way to make a profit turned out to be a price attractive to commercial users alone, then all consumers would lose out-and so would the commercial clients, who would have to pay more for the listings because ProCD could not obtain any contribution toward costs from the consumer market.[287]

Although the focus of the case was not discriminatory selling,[288] the judgement essentially legalised the form of discrimination practised by ProCD.

2. DISCRIMINATORY PRICING OF SOFTWARE IN MODERN COMMERCE

At the start of the twenty-first century discriminatory practises were still employed in software sales but were being used in a different manner, as is evidenced by the sale of the operation system Windows 7. There are three versions of Windows 7: Windows 7 Ultimate, Windows 7 Professional, and Windows 7 Home Premium. The main functions of the three versions are the same. Windows 7 Ultimate has 73 functions, Windows 7 Professional has fewer functions than Windows 7 Ultimate, and Windows 7 Home Premium has fewer functions than Windows 7 Professional (as shown in Table 1 below). The number of customers who use Windows 7 Ultimate is limited. To recoup costs and expand its sales, Windows 7 Ultimate must attract more customers by lowering its price. However, few people use all of the functions contained in Windows 7 Ultimate, and there are many users who cannot afford it. Nevertheless, users with less elasticity than Windows 7 Ultimate users can afford Windows 7 Professional, and users with the lowest elasticity will buy Windows 7 Home Premium. If users with low elasticity are given a low price and cannot use all of the features of Windows 7 Ultimate, these users will parallel trade it with highly elastic users. In contrast, the downgrading strategy used with Windows 7 Ultimate, in which some of the features of Windows 7 Ultimate were removed and new versions of Windows 7 Professional and Windows 7 Home Premium were created, prevented this from occurring and raised the number of purchases by other users. All users are buying the same product, Windows 7 Ultimate (Windows 7 Professional and Windows 7 Home Premium are downgraded versions of Windows 7 Ultimate); the only difference is the version. From the table below, we can see that the product downgrading strategy can effectively separate users into groups. If different versions of software are developed for different groups of consumers, then some versions must have extra functions and cost more. The point of

[287] *ProCD, Incorporated, v. Matthew Zeidenberg and Silken Mountain Web Services, Inc.* 86 F.3d 1447. 7th Circuit (1996)

[288] The focus is caused by it, however the limiting method (shrinkwrap licence) was not adopted in accordance to law and this fault lead buyers to arbitrate its product.

versioning[289] the software is to allow different users to share in the total cost. Low-elasticity buyers use fewer functions and pay less, whereas high-value buyers use more functions and pay more to cover the cost. Versioning can also be viewed as a means of simply allowing highly elastic buyers to recover their investments and of permitting low-elasticity buyers to obtain a product that meets their needs at an affordable price.

Table 1: Compare Windows 7 editions[290]

Features	Windows 7 Home premium	Windows 7 Professional	Windows 7 Ultimate
Make the things you do every day easier with improved desktop navigation.	√	√	√
Start programs faster and more easily, and quickly find the documents you use most often.	√	√	√
Make your web experience faster, easier and safer than ever with Internet Explorer 8.	√	√	√
Easily create a home network and connect your PCs to a printer with HomeGroup.	√	√	√
Run many Windows XP business programs in Windows XP Mode (separate download).		√	√
Connect to company networks easily and more securely with Domain Join.		√	√
In addition to full-system Backup and Restore found in all editions, you can back up to a home or		√	√

[289] Versioning is a strategy offering the same information goods in different versions so as to appeal to different types of customers. Customers in effect are segmented. Carl Shapiro and Hal R. Varian provide more examples in their article: "The version they choose reveals the value they place on the information and the price they're willing to pay for it."; "traditional information providers have always used versioning, in one form or another, as a way to structure their product lines. Publishers release a book first in hardback and later in paperback, selling the same text at a high price to readers who must have the book right away and at a lower price to people who don't mind waiting. In a similar way, movie houses charge $7 or more for a ticket to a film that can be rented six months later for $3 a household." Carl Shapiro and Hal R. Varian, Versioning: *The Smart Way to Sell Information*, 76 Harvard Bus Rev 106 (1998).

[290] http://windows.microsoft.com/en-CA/windows7/products/compare. (Visited 27 April 2012).

business network.			
Help protect data on your PC and portable storage devices against loss or theft with BitLocker.			√
Work in the language of your choice and switch between any of 35 languages.			√

3. DISCRIMINATORY PRICING OF SOFTWARE IN GEOGRAPHY MARKETS

Price discrimination for different countries is one method of discriminatory software sales in the twenty-first century. In China, for example, Microsoft Office 2010's Home and Student Edition costs ￥398-299, which is less than it costs in the United States, where the price is ￥886. However, the software sold in China is the Chinese version, which makes the brokerage from China to the U.S. profitless. It is no accident that the price of the Microsoft software in China is lower than its price in the U.S. From the point of view of Microsoft, if a pricing strategy can be used to sell more products, extend market share and make more money, it makes sense to employ that strategy. The low prices offered in China can improve sales, expand market share, recover costs and create profits. Also, due to lower social development levels, exchange rates and other factors, consumers in eastern Europe and Asia generally have low incomes and low purchasing power; consequently, piracy rates are higher there than in western countries. For instance, "in most regions and cities in China, the average salary for a nurse with 3–10 years working experience is only around US$200 per month. With more than 15 years of experience, the average is about US$300 per month. In the coastal areas, Shanghai for instance, salaries can be slightly better, but come with a higher cost of living".[291] In contrast, in the US, the "[a]verage starting salary (fall of 2004) for a new FT faculty person with a master's degree in nursing was US$34,628 for all schools reporting: salaries within the nursing department varied from US$27,000 to US$77,536".[292] Consumers in low-income areas in eastern Europe and Asia cannot consume at the U.S. level. Thus, consumers in these regions cannot afford expensive software, and this reality encourages piracy.

Due to concerns about low productivity in these areas, some consumers and governments favour the use of open source software.[293] (e.g., the Linux software is used in some Chinese

[291] Zhiwu Zack Fang, *Potential of China in Global Nurse* 42 Migration Health Services Research 1421 (2007).

[292] Donna Jones, Barbara Caton, Joyce DeWitt, Nancy Stubbs, Esther Conner, *Student-to-faculty ratios, Teaching loads, and salaries in associate degree nursing programs in the central United States* 2 Teaching and Learning in Nursing 17 (2007).

[293] Eric von Hippel and Geor g von Krogh, *Open Source Software and the "Private-Collective" Innovation Model: Issues for Organization Science*, 14 Organization Science 209 (2003). (Open source software is software that is made freely available to all).

government offices).[294] Lowering software prices to levels that are consistent with consumer income can significantly increase sales, increase the firm's market share and make it possible to recover more costs in these areas, which have large numbers of consumers. In addition, expanding sales through low prices will significantly curb piracy. Although pirated software can increase the market share of software companies to some extent, it also dampens the enthusiasm for developing and investing in genuine software. Because piracy reduces the profits of genuine software companies, every piece of pirated software will decrease the degree to which the company can compensate for its fixed costs. Price discrimination can solve this problem to some extent in that at least it can allow the software provider to recover a portion of its costs.

B. COMPETITION IMPACT

When price discrimination occurred in traditional markets, in most cases it may have had harmful effects on competitors and competing buyers. This section will examine the effects of price discrimination in this innovation- and investment-intensive industry.

1. PRIMARY LINE EFFECTS

At the primary level, discriminatory pricing in software, as described above, has no negative effects on competition. According to price discrimination theory, selective pricing should be used to put competitors at a disadvantage, the low prices offered may not create profits or may even be below cost, and the low prices are subsidised by the high prices that the company charges other buyers.

The price discrimination in software sales that was described in the previous section has none of the above characteristics. Firstly, selective pricing is not used to disadvantage certain competitors. Selling downgraded versions is a common strategy among both dominant firms and their competitors. Because all software suppliers implement this selling strategy, there are no targeted competitors, and thus, competition is not negatively affected. Furthermore, the downgraded versions are available to all buyers rather than to a certain group. There is competition among all the versions of the software in the marketplace, which in a way improves competition in the market.

Secondly, low and unprofitable prices are not used. Firms can and should offer downgraded versions of software at lower prices because of consumer elasticity. This elasticity is different from the phenomenon described in the Coase Conjecture, which addresses the question of later purchases. The elasticity in software derives from the use of different versions for customers with different means and needs. Consumers who place a low value on the software will want to pay a

[294] The China Knowledge Resource Integrated Database. (Available at http://dlib.cnki.net/kns50/detail.aspx?QueryID=294&CurRec=1. (visited 27 April 2012).

low price, whereas consumers who rely heavily on the software are willing to pay more. It is rational to recover costs using a versioning strategy that takes this distinction into account and appropriately serves all of the customers at different points on the demand curve. Each unit of software will be sold, regardless of which version; and there will be more buyers to help to recoup the total costs and contribute to company profits. After a certain period of cost recovery, the low-cost versions will generate a profit surplus.

2. SECONDARY LINE EFFECTS

If one considers the possible secondary-line effects of discriminatory software pricing, it becomes evident that there are no negative effects of this type on competition because the consumers are not competing with each other. For this type of harm to exist, a competitive relationship must exist between the buyers. If there are no competing buyers, then there will be no negative effect on competition. In the software markets described in the previous section, the consumers who buy different versions of a piece of software are not in a competitive relationship. Because the different versions of the software have different functions, they cannot be substitutes for each other; likewise, their users are not in competition and are all end-users. Therefore, there can be no negative effect on competition. Different versions of a particular type of software can exhibit differing degrees of versioning depending on the type of consumer for which they are made. This versioning strategy, in turn, greatly frustrates parallel trading, which can be an obstacle to the type of price discrimination that was used in the ProCD case.

V. POSSIBLE COMPETITIVE INJURY OF DISCRIMINATORY PRICING AND COST FLOORS IN THE SOFTWARE MARKET

A. COMPETITIVE INJURY FROM DISCRIMINATORY PRICING OF SOFTWARE IDENTIFIED IN THE US

Although innovation competition has made price competition less influential, price should not be underestimated as a weapon in the competition process. A dominant player that wishes to leverage price competition to exclude its competitors from the market or to disadvantage them can still do so. This phenomenon is particularly important in secondary line price discrimination. In *United States v. Microsoft Corp.*,[295] Microsoft was held to have discriminated against IBM in terms of price and via other practises in trading its software products. Microsoft was found to have used its monopoly within the market for Intel-compatible PC operating systems to punish IBM

[295] *United States v. Microsoft Corp.*, 84F. Supp. 2d9. (1999)

for its refusal to cooperate.[296] Microsoft was ultimately required to pay IBM $775 million for its discriminatory pricing and overcharges.[297]

In the case, it was commented that "*Microsoft is the leading supplier of operating systems for PCs*"[298] and held a market share of 95%. "*IBM is both a hardware and a software company, the IBM PC Company relies heavily on Microsoft's cooperation to make a profit, while IBM's software division competes directly with Microsoft in other respects*".[299] IBM was also a major supplier of PCs. In the operating computer software product market, "*Microsoft tried to convince IBM to move its business away from products that themselves competed directly with Windows and Office*".[300] After being denied, "*Microsoft punished the IBM PC Company with higher prices, a late license for Windows 95, and the withholding of technical and marketing support*" [301] and charged IBM a high price for its operating system while offering IBM's competitors lower prices.[302] "*In the latter half of the 1990s, IBM (along with Gateway) paid significantly more for Windows than other major OEMs (e.g., Compaq, Dell, and Hewlett-Packard) that were more compliant with Microsoft's wishes*".[303]

From this case, we learn that there are two related product markets. One is the market for Intel-compatible personal computer (PC) operating systems and office productivity applications. In this market, IBM's OS/2 competes with Microsoft's Windows 95. The other market is the market for PC whose operating systems are pre-installed. IBM, Compaq, Dell, Hewlett-Packard and other market players compete in this market. According to the District Court of Columbia, there was no price competition between OS/2 and Windows 95. Instead, Microsoft sells Windows 95 to IBM at a selectively high price to force it to abandon OS/2. Although IBM has software and hardware business, the high prices that it is obliged to pay to Microsoft lessens its profits and hence frustrates its efforts with regards to OS/2. The selectively high price of Microsoft's operating system was not considered exploitative but exhibited intent to exclude on the part of Microsoft. Because IBM is a major supplier of PCs, supplying it with operating systems at high prices is not an economically rational choice intended to maximise profits. The only possible reason why Microsoft would have employed this strategy would have been to decrease the profits of IBM.

---

[296] *United States v. Microsoft Corp*., 84F. Supp. 2d9, 132. (1999)

[297] http://www.microsoft.com/presspass/press/2005/jul05/07-01msibmsettlepr.mspx. (...Microsoft will pay IBM $775 million ... In addition to addressing all discriminatory pricing and overcharge claims based on the findings in the U.S. antitrust case, the settlement resolves all antitrust claims, including claims related to the IBM OS/2 operating system and SmartSuite products, with the exception of claims for harm to IBM's server hardware and server software businesses.)

[298] *United States v. Microsoft Corp.,* 84F. Supp. 2d9, 9. (1999)

[299] *United States v. Microsoft Corp.,* 84F. Supp. 2d9, 115. (1999)

[300] *United States v. Microsoft Corp.,* 84F. Supp. 2d9, 116. (1999)

[301] *United States v. Microsoft Corp.,* 84F. Supp. 2d9. (1999)

[302] *United States v. Microsoft Corp.,* 84F. Supp. 2d9, 117. (1999)

[303] *United States v. Microsoft Corp.,* 84F. Supp. 2d9, 130. (1999)

It is noteworthy that, in addition to employing a selectively high pricing strategy and withholding other technical support from IBM, Microsoft proposed a substitute way for IBM to abandon its own operating system, OS/2: "the PC Company would receive an $8 reduction in the per-copy royalty for Windows 95 if it mentioned no other operating systems in advertisements for IBM PCs, adopted Windows 95 as the standard operating system for its employees, and ensured that it was shipping Windows 95 preinstalled on at least fifty percent of its PCs two months after the release of Windows 95".[304] This offer raised the following question: if IBM accepted the suggested solution, would the selective price discount that IBM received constitute an infringement of competition law?

Under cost-price theory, if IBM accepted the price, the issue would be the pricing competition between OS/2 and Windows 95. Such pricing would create a primary line problem and would have an exclusionary effect. In order to examine whether the hypothetical exclusion of OS/2 would be non-complaint with competition law rather than being justified based on price efficiency, it is necessary to examine whether Microsoft's pricing could be rational based on cost considerations. Another relevant question is what cost benchmark should be used in considering the price–cost relationship for software products.

B. COST TEST USED IN ANALYSING THE LEGALITY OF A PRICE IN THE EU AND THE US

To answer these questions, we must examine the pricing tests used in analyses of exclusionary pricing. According to the European Commission's information on abusive exclusionary conduct, the average avoidable cost and the long-run average increasing cost are used for this purpose.[305] Indeed, these are the two main cost floors used in contemporary analyses of abusive practises.

1. COST TEST USED IN THE EU

"Avoidable cost is a cost that varies directly with output, rising as more output is produced and falling as less output is produced".[306] The AAC is the cost per unit that can be avoided. "AAC covers all the costs, including both variable costs and product-specific fixed costs, that could have been avoided if the company had not produced a discrete amount of additional output".[307] IT is a cost benchmark that can indicate economic inefficiency and intent to exclude. If a commodity is traded at a price below the AAC, then this is economically irrational; the

[304] *United States v. Microsoft Corp.,* 84F. Supp. 2d9 (1999).

[305] *Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings* 2009/C 45/02, 26.

[306] Lipsey G, Courant PN, E*conomics*, p 167 (HarperCollins, 11th edn 1996).

[307] Gunnar Niels,Helen Jenkins,James Kavanagh, *Economics for Competition Lawyers* p 192 (Oxford University Press, 2011).

"[f]ailure to cover AAC indicates that the dominant undertaking is sacrificing profits in the short term and that an equally efficient competitor cannot serve the targeted customers without incurring a loss".[308] The supplier acts in this manner to exclude its competitors from the market. The use of the avoidable costs test in below-cost pricing analysis was analysed by William J. Baumol, who held that any individual price that is not below the average avoidable cost cannot be predatory.[309] Because a selective price cut can constitute either discriminatory pricing or predatory pricing, the AAC is a key index for determining similar kinds of exclusive pricing. However, it is not suitable for determining pricing in the software market because it cannot reflect the cost structures of different products. For products with high marginal costs, the AAC can be an efficient index of rationality, whereas it is not relevant for products with very low marginal costs and high fixed costs. In telecommunications, the cost created by extra output is simply that of a cable or a mobile telephone card.[310]

In addition, in some cases, the AAC does not include fixed costs because the cost of an extra unit of output does not always increase the fixed cost. Software is this type of product because of its high fixed costs and low marginal costs. Under the AAC test, the AAC of a software product would be approximately zero. Clearly, this is not an appropriate figure for use in assessing cost-price relationships so as to evaluate pricing abuse in the software market. The AVC and ATC cost tests, which were used in *ECS/AKZO*, are also not suitable as benchmarks in the software market because the AVC test uses what is essentially the same cost structure. It is also difficult to calculate the ATC because the total output of the software is difficult to determine.

2. COST TEST USED IN THE US

Long-run average incremental cost is the per-unit cost of producing the predatory increment of output whenever such costs were incurred. More precisely, the LAIC of a product is the firm's total production cost (including the product) less what its total cost would have been had it not produced the product, divided by the quantity of the product produced. LAIC thus includes all product-specific costs incurred in the research, development and marketing of the predatory product or increment of sales even if those costs were sunk before the period of

[308] *Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings* 2009/C 45/02, 26.

[309] William J. Baumol, *Predation and the Logic of the Average Variable Cost Test*, 39 J. L. & Econ. 49 (1996).

[310] William H. Melody, T*elecom reform: principles, policies and regulatory practices,* p 134 (Lyngby, 2001). (Customers provide their own terminal equipment, which will probably be located on the premises of the provider. This option requires investment in optical cables with capacity exceeding the internal needs of the provider. In many cases excess capacity will already exist. This approach will be relatively cheap in investment, since the marginal cost of extra fibre pairs is relatively small, given that cables have to be installed for internal needs. On the other hand, it will be relatively costly to establish new optical cables with the sole purpose of leasing).

predatory pricing.[311] The definition of LAIC consists of two parts: long-term costs and average incremental costs. Long-run costs are included because many costs are variable in the long term and because the total cost may change.[312] The average incremental cost is included because it is a cost that, firstly, is not measured over the firms' whole output but only over that increment of output used to supply the additional predatory sales, and secondly, it includes not only variable cost but any fixed costs incurred in expanding to serve the new sales.[313]

As a cost benchmark that can be used to detect competitive pricing in products with high fixed costs and low marginal costs, the LAIC method is widely used in the telecommunications sector. In 1996, the U.S. Federal Communications Commission (FCC) released a Report and Order intended to help identify competitive pricing in telecommunications. The FCC concluded that the prices that new entrants pay for bundled and unbundled services should be based on the total service long-run incremental cost of a particular network element for local telephone companies. This item was described as the ""Total Element Long-Run Incremental Cost' plus a reasonable share of forward-looking joint and common costs".[314] The FCC asserted that the TELRIC is a competitive price in a market with high pre-entry costs and low marginal costs and that "the prices that potential entrants pay for these elements should reflect forward-looking economic costs to encourage efficient levels of investment and entry".[315] In addition, the LAIC is used as a cost floor in U.S. telecommunications cases and EU post cases to assess competitive pricing.[316]

The applicability of the LAIC test is bolstered by its usefulness within the telecommunications sector. The adaptability of the LAIC test to analyses of competition within the software industry is apparent. The software sector has the same cost structure as the telecommunications sector. Like software, telecommunications are characterised by very large investment costs as a condition of market entry. Most of the costs of a software product are incurred in the development phase, and other costs such as advertising and sales costs are low. The LAIC is an appropriate test that can take investment costs into account. Low marginal cost is another feature of both sectors. In telecommunications, the cost of serving an extra terminal

---

311 Bolton, Patrick, Brodley, Joseph F. and Riordan, Michael H., *Predatory Pricing: Strategic Theory and Legal Policy*, 88 Georgetown Law Review 2239 (1999). Available at http://www.justice.gov/atr/public/hearings/single_firm/docs/218778.pdf. (visited 27 April 2012, 42).

312 N. Gregory Mankiw, *Principles of Microeconomics,* 272 (South-Western Cengage Learning, 2009) (because many decisions are fixed in the short run but variable in the long run, a firm's long run cost curves differ from its short run curves. Figure 6 shows fixed cost are variable in the long run, the average –total –cost curve in the short run differs from the average-total-cost curve in the long run).

313 Massimo Motta, C*ompetition policy theory and practice*, 448 (Cambridge University Press, 2004); Sappington, David E.M.; Sidak, J. Gregory, *Competition Law for State-Owned Enterprises* 71 Antitrust L.J. 479, p 488 (2003).

314 *In the matter of implementation of the local competition provisions in the telecommunications act of 1996 CC Docket* No. 96-98 at 6.

315 *In the matter of implementation of the local competition provisions in the telecommunications act of 1996 CC Docket* No. 96-98, 673.

316 *Southern Pacific Communications Co. v. American Tel. and Tel. Co.,* 740 F.2d 980, 238. (D.C. Cir. 1984); European Commission Decision 2001/354, March 20, 2001, COMP/35.141 - Deutsche Post AG.

user is low, and the sale of an extra unit of software requires only the cost of copying the software, which is also low. Therefore, the LAIC test is suitable for measuring pricing practises in the software sector. Using the LAIC test, we can determine whether there are cost justifications for the pricing suggested in the Microsoft case. More specifically, we can measure the LAIC of Windows 95 and then compare it with the price that Microsoft offered to IBM.

C. SUMMARY OF SECTION V

Despite the fact that abusive discriminatory pricing is not common in the software market, a US case shows that potential anticompetitive hazards still exist. As the previous parts suggest, in assessing the relevant anticompetitive effects, normal cost criteria, for instance AAC, AVC and ATC, are inapplicable. LAIC includes both fixed cost and marginal cos, and so it is a suitable standard for assessing exclusionary discriminatory pricing in the software market.

VI. IMPLICATIONS FOR THE COMPETITIVE TREATMENT OF SOFTWARE SALES

A. SOFTWARE DISCRIMINATORY PRICING IS OFTEN BASED ON EFFICIENCY

Price discrimination can facilitate competition in an oligopoly. Only those instances of price discrimination that generate a serious decrease in competition—for instance, those that exclude competitors from the market without increasing efficiency—will be prohibited by competition law.

The issues that arise in the software industry differ from those that arise in traditional industries. Selling strategies must be flexible for a firm to maintain solvency. Also, given that the demand for software is highly dynamic, a firm may be unable to survive financially unless it employs discriminatory pricing. Firms have become more and more likely to create different versions of the same product with different prices in order to increase sales. This sales strategy allows software suppliers to greatly curb piracy, improve allocative efficiency, and, most importantly, recover their investment costs.

Given that significant switching costs exist in the software market, discriminatory software pricing is not an efficient way to influence the innovation competition process.

B. THE LAIC PRICE TEST SHOULD BE ADOPTED WHEN ASSESSING SOFTWARE PRICING PRACTISES

Discriminatory software pricing may distort competition. In addition to considering the issue of efficiency in software markets, one must also consider the cost-price relationship. Indeed, this is the main method used for identifying exclusionary practises in traditional industries. Due to significant differences between the cost structures of the software market and the markets for traditional industries, the price floors used for the latter are less applicable to the former. The

LAIC has advantages as a price floor because it takes into account the cost structure of the software product. The LAIC can successfully calculate "costs that are incurred exclusively on behalf of one particular product but whose magnitude is not increased when the output of that product rises".[317] Many software firms operate in more than one market, and it is possible to take into account costs that are shared between products when using the LAIC.[318] The LAIC can also filter these costs out of its calculations. Moreover, the "LAIC measures the present worth of the productive assets by replacement cost, and not by historic costs which may give little indication of their current value".[319]

In addition to considering the accuracy of the cost per unit, LAIC also takes into account the costs incurred in developing the software product. Unlike the variable cost calculations used with traditional products, calculations for software must take into account the costs that are incurred in the development stage. This distinction should not be forgotten in competitive pricing calculations. Thus, the LAIC is uniquely suitable for use in assessing software price abuse.

The LAIC has been widely adopted in the telecommunications sector in both the EU and the US as a suitable and accurate cost test for products or services that involve high fixed cost and low marginal cost. The accuracy of the LAIC test has been affirmed by the US Supreme Court. In *US West Communications, Inc. (US West) v. Wyoming Public Service Commission (PSC)*,[320] US West claimed that PSC's [321] implementing rules, fashioned according to the Wyoming Telecommunications Act of 1995, which provided TSLRIC as the criteria for assessing the cost and price of telecommunications service, were flawed, because the rules incorporated irrelevant costs. The Supreme Court held that the PSC rules were null and void and explained that: "It cannot be questioned that the legislature's intent in passing the Wyoming Telecommunications Act of 1995 was to promote competitive telecommunications markets in Wyoming. The legislature apparently believed that placing the floor price for services at TSLRIC would accomplish this goal. If the PSC disagrees with the statutory enactment, the solution is with the legislature, not in the promulgation of rules which deviate from the legislative expression".[322]

VII. CONCLUSION

[317] William J. Baumol, *Predation and the Logic of the Average Variable Cost Test*, 39 J. L. & Econ. 57, p 58 (1996).

[318] Bolton, Patrick, Brodley, Joseph F. and Riordan, Michael H., *Predatory Pricing: Strategic Theory and Legal Policy* 88 Geo. L.J. 2239 (1999). Available at http://www.justice.gov/atr/public/hearings/single_firm/docs/218778.pdf. (Visited 27 April 2012). (LAIC is a superior cost measure over ATC for a multi-product firm because it does not require courts to allocate joint and common costs, an undertaking which lacks a precise methodology and is particularly unsuited for jury solution).

[319] Bolton, Patrick, Brodley, Joseph F. and Riordan, Michael H., *Predatory Pricing: Strategic Theory and Legal Policy,* 88 Geo. L.J. 2239 (1999).

[320] *US West Communications, Inc. v. Wyoming Public Service Commission*, 989 P.2d 616 (Wyo.1999).

[321] Wyoming Public Service Commission: http://psc.state.wy.us/.

[322] *US West Communications, Inc. v. Wyoming Public Service Commission*, 989 P.2d 616 (Wyo.1999).

In general, software price discrimination allows providers to become and remain solvent and permits continuing innovations in technology. It also allows for more consumption. Both results in turn significantly reduce costs.[323] This pricing method, based on the unique characteristics of the industry, negative effects competition, however in analysing the possible existence of exclusionary practises in the software market, we must still consult the basic rules, but we must also take note of the significant difference between markets. The current rules are generally applicable to traditional industries, which can be characterised as driven by price-focused competition. In contrast, the software market is a new kind of market in which innovation competition is the focus. The cost structure and the role of innovation in this market should be stressed when assessing possible breaches of competition law. The latter policies, in turn, should be less restrictive with regards to certain practises in the new industries. It is important to facilitate both competition and innovation in an innovation-driven industry.

Due to significant differences between the software and traditional industries, many modes of empirical analysis are inapplicable to the software industry. Although the basic rules of competition still apply, it is necessary to adjust the method used to assess competition rather than simply appropriating what is used for traditional industries. In analyses of the software market, traditional methods of assessing pricing should not be used. Instead, the cost benchmark LRAIC can be used to precisely and comprehensively determine the cost per unit.

[323] Jürgen Bitzer, *The Computer Software Industry in East and West: Do Eastern European Countries Need a Specific Science and Technology Policy* ' (1997). DIW Discussion Paper No. 149. Available at SSRN: http://ssrn.com/abstract=68977.
(Visited 27 April 2012) (there is a direct linkage between the number of users and the price of the software product, because the development costs are distributed among the number of users).