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## Market Power and Competition Law in the Software Industry

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## **Part III: Pricing Practises in the Software Industry**



## CHAPTER 2.

# SOFTWARE PREDATORY PRICING AND COMPETITION LAW - ASSESSING BELOW-COST PRICES<sup>115</sup>

### ABSTRACT

Below-cost pricing may elicit lawyers to contemplate market power, market barriers and predatory pricing, all of which constitute routine thinking on abusive pricing. This chapter observed that below-cost pricing occurs in the software market under traditional circumstances and finds that, as is typical with a New Economy industry, the software market exposes different factors that are not evident in the markets upon which traditional predatory pricing theory was based. These factors, such as extremely high switch/entry barriers and negligible marginal costs, result in pricing practises that are significantly different from those in traditional markets. A below-cost price, which traditionally would be considered predatory, may be necessary in the software market. Thus, in this context, a below-cost price would not be considered abusive, but rather, would be considered (almost) efficient. On the basis of these observations, this chapter concludes that as below-cost pricing frequently occurs in software markets, although it can be based on efficiency enhancement, there is the potential for competition law violation, and it is important to distinguish pro-competitive below-cost pricing from predatory pricing. Finally, this chapter analyses the occurrence of below-cost pricing and offers an approach for analysing it as it relates to the software market.

### I. INTRODUCTION

Low prices are both a goal of competition laws and a symbol of a competitive market. In price competition, every competitor cuts the prices of its products in order to attract consumers. According to the perfect competition model, in a fully competitive market, the competitive price is close to cost and consumer welfare is greatly enhanced by this low price. To attract more consumers, a supplier with cost advantages can offer a price close to the product's cost and lower than that of other suppliers. This 'below-cost' price may eliminate other competitors and create a monopoly of the market. This process is a legitimate way of eliminating competitors and monopolising the market.

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<sup>115</sup> This Chapter was published in European Competition Law Review in 2012. *Software Predatory Pricing and Competition Law - Assessing Below-Cost Prices*, 33 E.C.L.R. 413 (2012). This chapter examines dominant-firm implemented pricing of software products. It is an indispensable component of Part III because below-cost pricing in the software market is suspicious of exclusionary effect. It is parallel to the next two chapters, which respectively investigate discriminatory pricing and resale price maintenance of software products.

Some suppliers may offer artificially below-cost prices in order to eliminate their competitors, even when they do not, in fact, have a cost advantage. This type of predatory pricing practise is prohibited by competition law. Under modern competition law, in order for a practise to constitute predatory pricing, the predator must (1) offer a price that is below a certain cost standard and (2) maintain a monopoly position after eliminating its competitors.<sup>116</sup> The first condition requires considerable market power to eliminate competitors and can generally be fulfilled by a dominant firm. The second condition requires a market barrier high enough to prevent the entry of other suppliers. These conditions are rarely satisfied simultaneously. The courts hold: “[by] a consensus among commentators[,] . . . predatory pricing schemes are rarely tried, and even more rarely successful”.<sup>117</sup> Scholars argue that a strong policy against predatory pricing will, in fact, discourage suppliers from offering low prices, which will in turn significantly affect vigorous price competition at the expense of the consumer.<sup>118</sup>

The software market is a unique market in that the pricing strategies within it often satisfy all the conditions of predatory pricing. In practise, extremely low prices are offered within the software market. Software is a network economy that offers a first-mover advantage, where large networks can easily form and where all competition aims to establish a dominant network. In most instances, the market is monopolised by a single firm (i.e., Microsoft). The durable nature of software as a good and the presence of network effects in the market may lead to the establishment of a dominant firm and high entry barriers. Under such conditions, competing firms may have to offer software at extremely low prices so as to enter the market. For example, firms may offer free software to attract consumers and lock them into a competitor network.

This chapter examines the characteristics of software and the software market. It will show that software pricing practises challenge traditional competition rules with respect to predatory pricing. The software market offers an environment that is susceptible to predatory pricing. Moreover, in the software industry, market conditions and functions of the predatory pricing strategy differ from those found in the traditional markets. As a consequence, competition policies against predatory pricing may need to be re-evaluated. Furthermore, in real market operations, many below-cost prices are the result either of efficiency or lead to efficiency. Distinguishing efficiency-justified low prices from predatory pricing is difficult. Analysing several

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<sup>116</sup> United States antitrust law: The Sherman Antitrust Act (Section Two); European Union competition law: Article 102 of the Treaty on the Functioning of the European Union; P.R. China anti-monopoly law: Chapter II, Chapter III.

<sup>117</sup> *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 589-90 (1986).

<sup>118</sup> Daniel A. Crane, *The Perverse Effects of Predatory Pricing Law*, 28, *Regulation* 26 (2005); William J. Baumol & Janusz A. Ordover, *Use of Antitrust to Subvert Competition*, 28 *J.L. & Econ.* 247, p 255 (1985); Michael L. Denger & John A. Herfort, *Predatory Pricing Claims After Brooke Group*, 62 *Antitrust L.J.* 541, 541 (1994); Joseph F. Bradley & George A. Hay, *Predatory Pricing: Competing Economic Theories and the Evolution of Legal Standards*, 66 *Cornell L. Rev.* 738, p 790 (1981); Peter C. Carstensen, *Predatory Pricing in the Courts: Reflection on Two Decisions*, 61 *Notre Dame L. Rev.* 928, p 938 (1986); Richard J. Pierce, Jr., *Is PostChicago Ready for the Courtroom? A Response to Professor Brennan*, 69 *Geo. Wash. L. Rev.* 1103, p 1106 (2001).

below-cost pricing strategies, including both those found in software packages and those in other product markets, this chapter identifies some points that are useful in distinguishing justified low pricing from predatory pricing, and offers an approach for analysing possible predatory pricing in the software market.

The chapter starts by reviewing the general theoretical and legal background of predatory pricing. Part III describes the conditions of the software market that influenced pricing practices and that must be considered in competition analysis. Part IV examines below-cost prices in software sales. In analysing predatory pricing, the paper suggests an approach for analysing unreasonable below-cost pricing in the software market. Part V concludes the chapter.

## II. SOFTWARE MARKET CONDITIONS

Differences in market condition mean that the elements for competition that must be considered differ. The software market is a rather new economy, and it differs from the traditional market. Thus, an identification of certain characteristics of the software market is important for competition analysis, as both the analyses and the regulation rules are based on traditional markets.

### A. SOFTWARE IS A NETWORK ECONOMY

Under a network effect, as the number of current users for a product or service increases so too does the number of users for the complementary products or services. This phenomenon is caused by consumers, and as a large network can attract a large group of consumers, so suppliers can utilise network effects to achieve economies of scale.<sup>119</sup> There are two types of network effects. One affects a product that is compatible with its complementary products: these effects can arise when a system consists of two distinct components, *A* and *B*, both of which are purchased by a single user. For example, *A* may be the operating system needed to make word processing programme *B* work. Positive feedback arises when an increase in the number of users who adopt component *A* leads to an increase in the benefits that consumers can enjoy from the purchase of component *B*.<sup>120</sup> The other affects competing products. If an increasing number of consumers use one product, then these existing users can attract other consumers that have not yet purchased this product. These buyers appreciate the extra value that they can receive from the current user of a product. Such value is abundant; for example, new consumers will have access to communication with current users, they can obtain help with using the product from current users, and they can obtain advice if they do not know which product is best suited for them.

<sup>119</sup> Farrell J & Saloner G. *Standardization, compatibility and innovation*, 16 Rand J. Econ. 70 (1985); Katz M & Shapiro C. *Network externalities, competition and compatibility*, 75 Am. Econ. Rev. 424 (1985); Richard A. Posner, *Antitrust Law*, p 246. (University of Chicago Press, 2nd edn, 2003).

<sup>120</sup> Michael L. Katz & Carl Shapiro, *Antitrust in software markets*, available at <http://faculty.haas.berkeley.edu/SHAPIRO/software.pdf>, at 32 (visited 29 May 2012).

Additionally, they can also share their experiences with the current users of the product. Subject to these benefits, consumers will choose a product that has a large group of users. As an increasing number of consumers join the network and as this network increases in size, so more consumers are encouraged to join the network. Network effects are especially apparent in innovation markets where a first-mover advantage is manifest. The first mover to a new market usually captures most of the users of a new market and creates a winner-takes-all or winner-takes-most phenomenon. Because of consumer concentration, the market begins to tip towards the larger network, and so the current consumers become locked in.

As a result of consumer concentration in one network, both consumers and the dominant supplier benefit from a larger network in which the dominant supplier can easily scale its output and achieve a profit. This advantage intensifies competition among players in network economies to compete or invest in obtaining a dominant market position. Competition for dominant market position, as described in market leader theory,<sup>121</sup> positively affects the competition in the market because of network externalities. Specifically, the benefits generated by the network market leader attract competitors and incentivise competitors to invest in efforts to become the market leader.

Network competition is more complex if there is a dominant network present in the market, because in the marketplace, competitor networks may attempt to be compatible with the dominant leader. With respect to competition, the dominant network may use certain standards to attract more consumers. For example, web browsers and programming languages are driven to standardisation for the same reasons PC-based operating systems are. That is, developers and consumers are both likely to gravitate towards the system that they think will come to dominate the market, and by doing so, they ensure that the system does, in fact, become dominant. Economists refer to this phenomenon as the ‘tipping effect’,<sup>122</sup> where network competition involves gaining consumers from the dominant network and greater network standards are used to prevent competitors from entering the market. “... consumers could not switch from PC systems to server systems without incurring substantial costs, PC systems that were not compatible with leading chips were more expensive, there were fewer applications written to run on OS (operating system) developed non-compatible systems, and switching to non-compatible systems required purchase of new peripherals and transfer of files, user of compatible PC system was unlikely to abandon investment in that system by switching to thin-client network system merely because monopoly price was being charged for OS, and, since majority of software

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<sup>121</sup> J Schumpeter, *Capitalism, Socialism and Democracy*, (New York, Harper & Row, Publishers, Inc, 1942); F Modigliani, *New Developments on the Oligopoly Front*, 66 J. Polit. Econ. 215 (1958). See F Etro, *Innovation by Leaders*, 114 Econ. J. 281 (2004); F Etro, *Stackelberg Competition with Endogenous Entry*, 118Econ J 1670 (2008); F Etro, *Aggressive Leaders* 37 Rand J. Econ. 146 (2006).

<sup>122</sup> Forrell, Joseph & Solaner, Garth, *Competition, Compatibility and Standards: The Economics of Horses, Penguins and Lemmings*, (1986). UC Berkeley: Department of Economics, UCB. Retrieved from: <http://escholarship.org/uc/item/48v4g4q1> (visited 29 May 2012); McGowan David, *Regulating Competition in the Information Age: Computer Software as an Essential Facility under the Sherman Act*, 18 Hastings Comm. & Ent. L.J. 771 (1995).

developers wrote and would continue to write applications for defendant's OS, there were significant barriers to entry for developers of competing OSs".<sup>123</sup>

The scale economy of the demand side has a significant impact on the structure of the market, and this is of great concern for the competition. Consumer concentration tends to cause those consumers who have not made a purchase to join the dominant network. This effect causes the dominant network to become even stronger and more stable. The number of market players begins to decline. Finally, market power is accumulated in a single dominant firm and the market structure becomes highly concentrated. In turn, the network becomes a switching cost that any competitor must forgo.

The corresponding effects of a dominant market power and a concentrated market structure on the network renders pricing abuses, such as predatory pricing, more feasible. Because of the benefits created by network effects, a dominant market player that sets competitive prices will have an advantage over any competitor of equal efficiency. Predatory pricing is more exclusive in network markets, as it appears to be less necessary to adopt it against competitors with the same efficiency. Predatory pricing becomes necessary if the dominant network is facing a more efficient competitor, as a more efficient competitor may either bring a homogeneous product at a reduced cost or offer an advanced/superior product. When facing a firm with an advanced or superior product, a dominant firm may utilise predatory pricing as its final option for maintaining its market position.

The software market is a typical network market.<sup>124</sup> If new software is introduced to the marketplace, a new market opens and the first mover is bound to attract the majority of users. If a dominant software product is presented to the market, consumers will choose a network with the most users because of its compatibility with the dominant software. Thus, software markets are often viewed as monopolies. For example, the Internet browser market was first dominated by Netscape,<sup>125</sup> but Netscape was soon followed by Microsoft's Internet Explorer.<sup>126</sup> The same

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<sup>123</sup> *U.S. v. Microsoft Corp.* 84 F.Supp.2d 9 (D.D.C. 1999).

<sup>124</sup> Carl Shapiro & Hal R. Varian, *Information Rules: a strategic guide to the network economy*, (Harvard Business School Press 1999). See also Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 Calif. L. Rev. 479 (1998); Erik Brynjolfsson & Chris F. Kemerer, *Network Externalities in Microcomputer Software: An Econometric Analysis of the Spreadsheet Market*, 42 Manag. Sci. 1627 (1996); Neil Gandal, *Competing Compatibility Standards and Network Externalities in the PC Software Market*, 77 Rev. Econ. Stat. 599 (1995); Mark Shurmer, *An investigation into sources of network externalities in the packaged PC software market*, 5 Inf. Econ. Policy. 231 (1993); Roman Beck, *The Network(ed) Economy: The Nature, Adoption and Diffusion of Communication Standards*, (Deutscher Universitäts-Verlag, 2006). (A prominent example of a stable oligopoly is the operating system software market for computers with Microsoft Windows as the dominant standard and Linux, as well as Mac OS for Apple Macintosh as sturdy clusters. Although Microsoft extended the positive feedback effects of its standards by adding complementary applications (e.g., by integrating Windows Internet Explorer), it was not able to displace its competitors completely. The former example indicates that standards on network effect markets can tend to lead to natural monopolies).

<sup>125</sup> *U.S. v. Microsoft Corp.* 84 F.Supp.2d 9 (D.D.C. 1999), at 72.

<sup>126</sup> *U.S. v. Microsoft Corp.* 84 F.Supp.2d 9 (D.D.C. 1999), at 372, 373. Judge Jackson found that the actual market share of Internet Explorer was greater than 60 percent, and likely to continue to increase.

scenario occurred in the video games software market. Nintendo served as the market leader in 1985 but lost its position to Sony in 1995. Ten years ago, however, Nintendo earned its way to the forefront of the market once again.<sup>127</sup>

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## B. SOFTWARE IS A DURABLE GOOD

Durable goods are goods that have long life cycles such that consumers can use these goods for a long time without having to replace them. When researching the durability phenomenon, economists find that it plays a major role in market management.

From the 1970s onwards the durable goods phenomenon has gradually developed into microeconomic theories. Swan found that competitors will make their products only as durable as those of their competitors and that this level of durability, called ‘optimal durability’, is efficient.<sup>128</sup> Coase noted that a durable good supplier with a monopoly on the market may confront a declining demand for its products, as its consumers will believe that the supplier will charge a higher price for early buyers and therefore opt to wait and make their purchases later.<sup>129</sup> Hendel and Lizzeri analysed the adverse selection of consumers with different deserving prices. Such consumers will compare a new product with a second-hand product before making their purchase.<sup>130</sup> Durability has important implications for price competition. Firstly, if a product is durable and faces demand elasticity, the supplier may, to some extent, be forced to set different prices for different buyers with different deserving prices. This phenomenon is similar to price discrimination, which is prohibited by competition law. Thus, it will require effort to distinguish between the two phenomena. Secondly, the durability of the product can form a second-hand market. The used product may compete with both the supplier’s and competitors’ products, whereas the second-hand product is not controlled by either of them.

Software is a durable product, “software ‘wears out’ only due to technological change or planned obsolescence, not based on normal wear and tear such as applies for durable equipment”.<sup>131</sup> However, unlike most durable goods, it has no second-hand market, as the

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<sup>127</sup> Hongju Liu, *Dynamics of Pricing in the Video Game Console Market: Skimming or Penetration?*, 47 J Marketing Res. 429 (2010) table one.

<sup>128</sup> Peter Lawrence Swan, *Durability of Consumption Goods*, 60 Am. Econ. Rev. 891, p 892 (1970); Peter Lawrence Swan, *The Durability of Goods and Regulation of Monopoly*, 2 Bell J Econ 356, p 357 (1971); Peter Lawrence Swan, *Optimum Durability, Second-Hand Markets, and Planned Obsolescence*, 80 J. Polit. Econ. 575, p 582 (1972).

<sup>129</sup> R. H. Coase, *Durability and Monopoly*, 15 J. L. & Econ. 144, p 148 (1972).

<sup>130</sup> Igal Hendel and Alessandro Lizzeri, *Interfering with Secondary Markets*, 30 Rand J. Econ. 1 (1999); Igal Hendel and Alessandro Lizzeri, *Adverse Selection in Durable Goods Markets*, 89 Am. Econ. Rev. 1097 (1999); Igal Hendel and Alessandro Lizzeri, *The Role of Leasing Under Adverse Selection*. 110 J. Polit. Econ. 113 (2002).

<sup>131</sup> Michael L. Katz and Carl Shapiro, *Antitrust in software markets*, available at <http://faculty.baas.berkeley.edu/SHAPIRO/software.pdf>, at 32. (Visited July 5, 2012). Jeffrey A. Eisenach & Thomas M. Lenard (editor). *Competition, Innovation and the Microsoft Monopoly: Antitrust, in The Digital Marketplace*, p 36 (Springer 1999). See also Klaus M. Schmidt & Monika Schnitzer, *Public Subsidies for Open Source? Some Economic Policy Issues of the Software Market*, 16 Harv. J. Law & Tec 473 (2003). (Software is a durable good. Once installed, it could in principle run forever, and it “wears out” only due to technological change).

software trade is controlled by licences under which the targeted user is confirmed after the purchasing deal is made. The inability to resell nearly prevents current users from switching to other substitute software, and consumers are locked in to secondary markets, such as upgrading markets. Current consumers must discard their current software and pay for new software. Thus, they incur a value loss whenever they abandon their current software and adjust to the new working environment. Such value loss hardens the competition from competitor software suppliers. As in normal price competition, competitors offer lower prices to attract competitor clients. Thus, the high switching cost in the software market may outweigh any competitive price cut. At the same time, large price cuts, even those that are below cost and that may be prima facie predatory, will not be effective in attracting competitors' consumers.<sup>132</sup>

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### C. SOFTWARE HAS HIGH FIXED COSTS AND LOW MARGINAL COSTS

Software is a product that “is often expensive to create but once created the cost of making additional copies usually is low”.<sup>133</sup> The initial investment for entry – the developing cost – is high for the software market, and this in turn imposes a limit on the number of market players. As the developing cost adds a high entry barrier that deters most investors, a software market with a concentrated market structure has naturally developed.

The low marginal cost of software is negligible. Given this characteristic, competition theory, which states that a competitive price<sup>134</sup> is close to a marginal cost, is not applicable. In response to competition, the software supplier that sets a price close to the marginal cost with the intention of competing with others is not rational, as it will not be able to recover its fixed cost.

The high fixed cost and low marginal cost of software make it difficult to identify the per unit cost of a software product – something which is important in analysing pricing abuse practises. A product does not often have a cost structure if most of the cost is fixed and the variable part of the cost is minimal. In analysing the cost–price relationship, cost benchmarks that rely on marginal costs are useless in the software sector. Perhaps a new technology that can identify the per unit cost of software is needed.

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### D. SOFTWARE SUPPLIERS COMPETE WITH INNOVATIVE PRODUCTS

The software market is an innovative market, and this aspect is significant for competition in the marketplace. Innovation markets are high-tech markets, and as such they involve investment in research and development (R&D). It must be acknowledged that most markets involve R&D

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<sup>132</sup> Because such pricing practises are not against new users, but are targeted at competitors' customers, any above a price of zero is value loss because once they switch, they will suffer huge switching cost. Besides, the switch may generate extra costs.

<sup>133</sup> Richard A. Posner, *Antitrust Law*, 2nd ed, p 246 (University of Chicago Press, 2003).

<sup>134</sup> Phillip Areeda and Donald F. Turner, *Predatory Pricing and Related Practices under Section 2 of the Sherman Act*, 88 Harv. L. Rev. 697, p 697, 711 (1975). (Pricing at marginal cost is the competitive and socially optimal result).

practises. However, innovation markets are so called because innovation is the main activity of the market and thus the decisive factor in competition in the market (while the same is not true for traditional markets). In the competition process, new products are introduced to the market after the innovation research has been conducted. The new products are superior to the current product, and because of this competitors must invest in the new product if they wish to remain competitive. As investment is risky and costly, investors will not invest in homogeneous products because whether the homogeneous product will generate a competitive advantage is uncertain.

When facing competition, current suppliers may favour introducing advanced products to the market rather than engaging in price competition. As in markets where innovation and investment are particularly important, advanced products or relevant technologies have wide effects on technology-sensitive consumers, complementary products or service suppliers and competitor suppliers. In such a market, a dominant player aggressively invests in R&D to obtain a technology advantage over its competitors. The technology improvement is more likely to attract the technology-sensitive consumers away from low innovative competitors. This part of the consumer market will enlarge the current network of the dominant player. This market structure change may cause supplementary product suppliers to invest more in products that are compatible with the advanced technology. As technology and product changes affect the technological environment by rendering competitors' product technologies obsolete, these changes serves as a means of eliminating competitors from the market because competitors must also invest in R&D to compete with the technical advantage of the dominant player, and the capital and technical investments may be too great or unaffordable for the weaker competitors. Therefore, fragile competitors may leave the market, in an expected return from innovation competition.<sup>135</sup> The predictable outcome of the innovation strategy has advantages over price predation, as price competition attacks the solvency of competitors, whereas innovation competition attacks competitors both technologically and financially. Furthermore, from a predator's perspective, price predation causes a loss in capital, whereas innovation predation offers innovation fame and technological advancement. Thus, innovation replaces price as the main form of competition in an innovation market and distinguishes the innovation market from the traditional market. Another advantage is that product innovation has a more significant impact on social welfare than a simple price cut. Competition law views innovation and cost reduction as parallel defences for anticompetitive practises.

The innovation character implies more than simple competition. Investing in software is costly, and software investors face the risks associated with the R&D involved in software

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<sup>135</sup> The innovation competition greatly resembles the innovation predation, which was introduced by Hurwitz, James D. & Kovacic, William E: *Judicial Analysis of Predation: The Emerging Trends*, 35 Vand. L. Rev. 140, p 145 (1982). In the paper, they indicated that price predation works as a fake efficient cost reduction, while innovation predation works as a fake welfare enhancing innovation.

production and the risk of not recovering their investments. Thus, a large capital investment is one condition that causes entry barriers to the software market to remain high. Subject to this requirement, a number of competitors may not be large, and large capital investments create fixed or sunk costs that must be considered when calculating per unit cost.

In addition, a first-mover advantage and winner-take-all/most phenomenon are manifest in the software market. These phenomena render the software market more of a monopolised market. If one company introduces new software, as the first mover it is likely to take all or most of the market share. For example, in the case of Internet browsers, as soon as Netscape released Navigator, on 15 December, 1994, the product began to enjoy dramatic acceptance by the public; shortly after its release, consumers were already using it far more than any other browser product.<sup>136</sup> Nintendo's video game software and Microsoft's personal computer operating system also experienced this phenomenon after their early entry into the relevant markets.<sup>137</sup> Thus, innovation competition causes the software market to become naturally concentrated, as market leaders can easily form without or before the competition process. Moreover, competition in the market often occurs between the dominant and non-dominant firms.

As a high-technology product, software involves certain technology standards in its development, maintenance and operating procedures. This characteristic can lead to high entry barriers. If one software programme becomes popular, then its technology standard may easily become the standard for the market, as in the case of computer software, including: the Microsoft Windows operating system; the MPEG standard for compressing video data; Adobe PostScript, a page description language; and Adobe Acrobat, a standard for making documents 'portable'.<sup>138</sup> These standards may form one type of market barrier for new entrants and introduce compatibility problems, as these technology standards often facilitate network effects. Moreover, certain technological standards are more easily associated with IP rights, which make it more difficult to conduct competition analysis.

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## E. SUMMARY OF SECTION II.

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<sup>136</sup> *U.S. v Microsoft Corp.* 84 F.Supp.2d 9.(D.D.C. 1999), at 72.

<sup>137</sup> Carl Shapiro and Hal R. Varian, *Information Rules: a strategic guide to the network economy*, at 178 (Harvard Business School Press, 1999). (Nintendo entered the U.S. market for home video games in 1985, the market was considered saturated, and Atari, the dominant firm in the previous generation, had shown little interest in rejuvenating the market. Yet by Christmas 1986, the Nintendo Entertainment System NES was the hottest toy on the market).

<sup>138</sup> Carl Shapiro, *Setting Compatibility Standards: Cooperation or Collusion?* <http://haas.berkeley.edu/~shapiro/standards.pdf>, at 3 (visited 29 May 2012). Similar effects see: Douglas D. Leeds, *Raising the Standard: Antitrust Scrutiny of Standard-Setting Consortia in High Technology Industries*, 7 Fordham Intell. Prop. Media & Ent. L.J., 641 (1997); Jeffrey Church & Neil Gandal, *Network Effects, Software Provision, and Standardization*, 40 J Ind Econ. 85 (1992); McKenzie & Melonie L, *How Should Competing Software Programs Marry - The Antitrust Ramifications of Private Standard-Setting Consortia in the Software Industry*, 52 Syracuse L. Rev. 139 (2002). Lemley, Mark A. *Intellectual Property Rights and Standard-Setting Organizations*, (2002). UC Berkeley: Boalt Hall. Retrieved from: <http://escholarship.org/uc/item/776358>, at 2 (visited 29 May 2012); Anton, James J & Yao, Dennis A, *Standard-Setting Consortia, Antitrust, and High-Technology Industries*, 64 Antitrust L.J. 247 (1995).

The nature of the software market as described above, including the allocation of costs to different stages of software production and distribution, as well as innovation competition as among software products, leads to two observations: first, below-cost pricing occurs often in the software markets; and second, traditional competition rules related to predatory pricing may not apply well to the software market. The next part will describe the conditions for and methodology of predatory pricing and the competition law designed to stop it.

### III. PREDATORY PRICING AND ITS COMPETITION EFFECT: THEORETICAL AND LEGAL FUNDAMENTALS

Predatory pricing is a market practise that differs depending on whether it is implemented as a merger or a conspiracy (which is the greatest competition concern among market operators). Predatory pricing achieves competition aims not by directly affecting competitors but rather by influencing consumers. Thus, firms may affect competitors through consumer choice. The principles of these indirect effects on competition and the regulation of predatory pricing are now examined.

#### A. PREDATORY PRICING

In general, predatory pricing refers to the practise of offering products at loss-generating prices to customers until such a time as competitors either are driven out of the market or agree to cooperate. After successfully implementing the predatory pricing strategy, the predator can then charge monopoly prices to maximise its profits. A loss-generating price is normally a price that is below the product's certain test of cost. Normally, at this price, the predator will realise an increase in negative profit with the expanding allocation of its product.

As predatory pricing is similar to competitive low pricing or to competitive price cuts, it is difficult for scholars and judges to distinguish between them. “[T]he mechanism by which a firm engages in predatory pricing—lowering prices—is the same mechanism by which a firm stimulates competition; because cutting prices in order to increase business often is the very essence of competition ...[;]”.<sup>139</sup> Competition is a mechanism for taking customers away from competitors, and so it is rational for market participants to lower their prices in order to drive competitors out of the market. Additionally, “price cutting, even by a dominant firm, is frequently innocent and desirable”.<sup>140</sup> Nevertheless, there are two established elements that can be used to distinguish predatory pricing from competitive low pricing: a loss-generating price and the consequent monopoly pricing. With respect to monopoly pricing, it is insufficient to

<sup>139</sup> *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 113 S.Ct. 2578, at II A [9][10][11]. As Professor Hovenkamp points out, “[i]ntent to ‘exclude’ is consistent with both efficient practices (research and development) and inefficient ones (predatory pricing)” See Herbert Hovenkamp, *Federal Antitrust Law Policy: The Law of Competition and Its Practice*. 252 (West Publishing Company, 1994).

<sup>140</sup> Gorge A Hay, *The economists of predatory pricing*, 51 Antitrust L.J. 374 (1982).

independently classify the pricing as predatory, as it can be experienced even if competitors are excluded from the profit-gaining price. Similarly, it is insufficient to label a pricing strategy predatory only on the basis that the price is loss-generating. Furthermore, in practise, litigation often intervenes before monopoly pricing occurs. As a result, in order for pricing to be predatory, the price must be loss generating and the possibility of monopoly pricing must exist.

Arguments regarding the occurrence of predatory pricing are to be found in literature dating from the second half of the twentieth century. Some economists have examined predatory pricing with economic technology and have determined that it is not rational for the predator to engage in price predation. Relying on some economic analyses and empirical observations, these economists have concluded that price predation is costly and is unlikely to succeed because if a firm attempts to gain or maintain a monopoly position, it must suffer a loss greater than that of the targeted firms. In contrast, acquiring or conspiring strategies may be less costly. Furthermore, even if the below-cost strategy succeeds, it may not succeed in preventing new companies from entering the market during the loss recoup period. Therefore, it is unlikely that this strategy will be adopted in practise.<sup>141</sup> Such arguments have influenced court decisions. For example, in *Matsushita Electric Industrial Co. v. Zenith Radio (Matsushita)*,<sup>142</sup> it was ruled that a predatory pricing conspiracy is by nature speculative. Any agreement to price below the competitive level requires conspirators to forgo profits that free competition would offer them. The forgone profits may be considered an investment in the future. For the investment to be rational, the conspirators must have a reasonable expectation of recovering, in the form of later monopoly profits, more than the losses suffered.<sup>143</sup>

After signalling theories<sup>144</sup> were introduced to competition analysis, predatory pricing was considered a rational behaviour in the context of economic analysis. According to the fame

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<sup>141</sup> The author writes this description generally based on the following literature: Roland H. Koller, *The Myth of Predatory Pricing: An Empirical Study*, 4 Antitrust L. & Econ. Rev. 105 (1971); McGee, *Predatory Price Cutting: The Standard Oil (N.J.) Case*, 1 J.L. & Econ. 137 (1958); McGee, *Predatory Pricing Revisited*, 23 J.L. & Econ. 289 (1980); Bork, R, *The Antitrust Paradox: A Policy at War with Itself*, 20 (Basic Books, Inc., 1978). Brodley & Hay, *Predatory Pricing: Competing Economic Theories and the Evolution of Legal Standards*, 66 Cornell L.Rev. 738 (1981); George A. Hay, *A Confused Lawyer's Guide to the Predatory Pricing Literature, in Strategy, Predation, and Antitrust Analysis*, 155 (S.Salop ed.1981); Easterbrook, *Predatory Strategies and Counterstrategies*, 48 U Chi L Rev 263, p 268. (1981).

<sup>142</sup> *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 589-90 (1986).

<sup>143</sup> *Matsushita Electric Industrial Co. v. Zenith Radio* 475 U.S. 590, Supreme Court Reporter, 1357 (1986).

<sup>144</sup> Greg LeBlanc, *Signalling Strength: Limit Pricing and Predatory Pricing*, 23 Rand J. Econ. 493 (1992); Drew Fudenberg and Jean Tirole, *A Signaling Jamming Theory of Predation*, 17 Rand J. Econ. 366 (1986); J. Roberts, *A signaling model of predatory pricing*, pp 75–93. Oxford Economic Papers (Supplement), (N.S.), 38 (1986); Patrick Bolton. Joseph F. Brodley & Michael H. Riordan, *Predatory Pricing: Strategic Theory and Legal Policy*. 88 GEO. L. J. 2239 (2000). (the predator lowers prices in order to mislead the prey and potential entrants into believing that market conditions are unfavorable. These are plausible predatory strategies because a firm's decision to enter or to leave a market is necessarily based on its evaluation of expected future revenues and costs. Most firms contemplating entry or exit from an industry do not have all the relevant information to determine future revenues and costs. To the extent that an incumbent firm is better informed than others about cost or other market conditions, or can manipulate and distort market signals about profitability, it may be able to influence the expectations of its rivals through its pricing decisions or other actions. For example, an incumbent firm may be able to induce exit or prevent entry by setting low prices if its rivals believe that the incumbent's low prices reflect low costs).

predation doctrine<sup>145</sup>, in markets with asymmetric information, signalling strategies may enable a predator to deliver negative information (e.g., the predator has a financial or cost advantage) to frustrate competitors even if the information is artificial.<sup>146</sup> For those who doubted whether predation fame affects competitors, the deep pocket doctrine was convincing. Tesler, who analysed several economic theories, found that firms that have substantial reserves can remove competitors even if their acquisition or conspiracy negotiations were unsuccessful. “The critical role of reserves in this argument should be noted. To present a credible threat the potential monopolist needs more reserves than the firm it seeks to remove from competition”.<sup>147</sup> Additionally, “there is some evidence that young firms are more vulnerable to bankruptcy than are older, more established firms. With asymmetric information, however, an equilibrium strategy for the low-cost entrant is to finance with debt and thereby separate himself from the high-cost type. This engenders a predatory response by the incumbent”.<sup>148</sup> After these theoretical analyses, affirmative cases began to emerge both in the EU and the U.S.,<sup>149</sup> and most economists now accept that predatory pricing occurs if certain market conditions are satisfied.

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## B. MARKET CONDITIONS FOR A SUCCESSFUL IMPLEMENTATION

As previously discussed, a combination of dominant market power or the superior market position and a high barrier for entry makes it rational for a market player to engage in predatory pricing practises. These two conditions together constitute the necessary condition for a successful predatory pricing strategy.

Market power is a prerequisite for eliminating competitors. As an exclusionary practise, the aim of predatory pricing is to take consumers away from competitors. To successfully attract these consumers, a firm must offer something the competitor cannot or does not offer. Low prices are usually sufficient for a consumer to switch loyalty. However, this situation is quite different from another type of exclusivity practise, called tying, where consumer cooperation is

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<sup>145</sup> Patrick Bolton, Joseph F. Brodley & Michael H. Riordan, *Predatory Pricing: Strategic Theory and Legal Policy*, 88 GEO. IJ. 2239 (2000). (Reputation effects may be present when the predator sells in two or more markets or in successive time periods within the same market. In such situations one market or time period may serve as a demonstration market, where the predator engages in overt predatory conduct, and the other market or time period provides the recoupment market, where the predator reaps the benefits from its predatory plan. The predator establishes a reputation for aggressive conduct in the demonstration market that induces potential entrants to believe that it will price aggressively in the future when faced with new competition. This raises entry barriers, allowing the predator to increase prices in the recoupment market).

<sup>146</sup> David M. Kreps & Robert Wilson, *Reputation and Imperfect Information*, 27 J. Econ. Theory 253, p 256 (1982); Paul Milgrom & John Roberts, *Predation, Reputation, and Entry Deterrence*, 27 J. Econ. Theory 280 (1982).

<sup>147</sup> L. G. Telser, *Cutthroat Competition and the Long Purse*, 9 J.L. & Econ. 267 (1966); see also McGEE, J.S., *Predatory Price Cutting: The Standard Oil (NJ.) Case*, 1 J. L. & Econ. 137 (1958).

<sup>148</sup> Michel Poitevin, *Financial signaling and the 'deep-pocket' argument*, 20 *Rand J. Econ.* 26 (1989).

<sup>149</sup> *Utah Pie Co. v. Continental Baking Co.*, 386 U.S. 685 (1967), and 23 cases were adjudged to have engaged in predation that Roland H. Koller II statisticed in article "The Myth of Predatory Pricing: An Empirical Study", 4 Antitrust L. & Econ. Rev. 105 (1971) ". EU case: 85/76 *Hoffman-La Roche v Commission* [1979] ECR 461.

not required because the consumer is forced to switch.<sup>150</sup> Predatory pricing involves the adoption of lower prices in order to persuade consumers to switch. Following this mechanism, a competitive price will not deter or be exclusive to competitors with equal or more efficiency. According to many studies, a competitive price is close to cost.<sup>151</sup> Thus, an eliminating price must be below a competitive price (i.e., it must be below cost). If suppliers supply products at a below-cost price, then competitors may respond by exiting the market or by offering a defensive below-cost price. However, if competitors compete with the below-cost price, then they will eventually collapse. These circumstances lead to the deep-pocket doctrine,<sup>152</sup> which states that the competitor with the greatest market power will eventually witness the exit of its competitors from the market, after which the standing competitor begins the process of recouping the losses incurred during the below-cost battle.

Consistent with the above description, predatory pricing is considered to be a practise that abuses a dominant market position,<sup>153</sup> because only dominant market participants possess the deep pockets or the staying power needed to stand until competitors exit. It is noteworthy that market power is not limited to financial advantages, as it varies among different markets. For instance, in markets with network effects, market power can result from owning a larger network. However, although market power varies in form, it can easily be observed via market share.

A market entry barrier that is high enough to stop market entry is needed as a market condition to guarantee that a predator will recoup its losses and enjoy monopoly pricing. After successfully eliminating its competitors, the predator will offer its product at a price that is higher than the previous competitive price. The high price can, in turn, create a profit space for rational entrants. If the entry barrier is not high enough, then new entrants will compete with the predator, and the price will soon become a competitive one. This process will hinder the predator's predatory behaviour, as the predator cannot recoup the losses and enjoy the monopoly price. Thus, the two-stage strategy can only succeed when the entry barriers are high enough to deter all entrants.

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<sup>150</sup> Richard A. Posner, *Antitrust Law*, p207. (second edition University of Chicago Press 2003). (Predatory pricing, with which I begin, depends on the purchaser's willingness to buy from the predator (or the intended victim) at the predatory price).

<sup>151</sup> Baker, Jonathan B & Bresnahan, Timothy F. *Empirical Methods of Identifying and Measuring Market Power*, 61 *Antitrust L.J.* 3 (1992). Competition will keep price at the competitive level, close to cost. See also: Richard S. Markovits, *Oligopolistic Pricing Suits, the Sherman Act, and Economic Welfare: A Response To Professor Posner*, 26 *Stan.L.Rev.* 493 (1976). (their competitive advantages would make such behaviour profitable even if they assumed that he would set his price equal to his marginal costs and. For economic analysis) see Agnar Sandmo, *On the Theory of the Competitive Firm Under Price Uncertainty*, 61 *The Am. Econ. Rev.* 66 (1971).

<sup>152</sup> Guido Calabresi: *The Cost of Accidents: A Legal and Economic Analysis*, 9 *J. L. & Econ.* 259 (1966). Michel Poitevin, *Financial Signalling and the "Deep-Pocket" Argument*, 20 *Rand J. Econ.* 26 (1989).

<sup>153</sup> Article 102 of the Treaty on the Functioning of the European Union. Any abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it shall be prohibited as incompatible with the internal market in so far as it may affect trade between Member States...

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## C. LAWS TARGETING PREDATORY PRICING

In the first step of a predatory pricing strategy, the predator lowers its price, and competitors soon follow. This initial step eliminates the less efficient competitors and benefits consumers in the short term. Eventually, however, even the competitors with equal or more efficiency will be driven out of the relevant market. This outcome, in turn, is detrimental to competition and leads to long-term consumer loss. In the second step, the predator increases the price to a monopoly level, which results in consumer welfare loss. In the light of these harms created by illegally achieving and abusing monopoly power, laws are made to prevent predatory pricing efforts from reaching monopoly power and reducing competition.

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### 1. THE UNITED STATES PREDATORY PRICING LAWS

Passed in 1890, the Sherman Act condemns predatory pricing as both an abuse of monopoly power and an illegal means of achieving monopoly power. If the intent is to achieve monopoly power, predatory pricing is prohibited and considered an offence, which “every person who shall monopolize, or attempt to monopolize.....shall be deemed guilty of a felony...”<sup>154</sup> Passed in 1914, the Clayton Act<sup>155</sup> was designed to prohibit the selective reduction of prices to eliminate competitors. According to the Clayton Act, primary-line discrimination using predatory price cutting to serve the purpose of elimination. In other words, discriminatory suppliers use selective below-cost pricing to drive competitors away.

As considerable market power is needed in order to implement a predatory pricing strategy, regulators face the problem of determining the appropriate threshold of market power for predatory pricing practises. In preventing potential market participants from achieving monopoly power through predatory pricing, most US courts agree that there is a minimum market share threshold required for market participants to achieve monopoly power<sup>156</sup>:

while the market share necessary to show an attempt to monopolize is difficult to quantify, a leading text has offered a general scale that a court may cautiously apply taking into consideration the proof offered for the other two elements: (1) claims of less than 30% market shares should presumptively be rejected; (2) claims involving between 30% and 50% shares should usually be rejected, except when conduct is very likely to achieve monopoly or when conduct is invidious, but not so much so as to make the defendant per se liable; (3) claims

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<sup>154</sup> 15 U.S.C.A. § 2.

<sup>155</sup> 15 U.S.C. §§ 12, 14-27, 44 (1970).

<sup>156</sup> Herbert Hovenkamp, *Federal Antitrust Policy: The Law of Competition and Its Practice*. p 287 (The third edition Thomson/West 2005). (Most other courts use numbers in the same range, with a few indicating that a rising market share is a stronger indicator of sufficient power).

involving greater than 50% share should be treated as attempts at monopolization when the other elements for attempted monopolization are also satisfied.<sup>157</sup>

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## 2. THE EUROPEAN UNION PREDATORY PRICING LAW

The EU directly forbids predatory pricing as an abuse of dominant market position: “any abuse by one or more undertakings of a dominant position ..... shall be prohibited .....”<sup>158</sup>

For determining the appropriate threshold of market power for predatory pricing practises, the EU has adopted a market share-based standard, which is similar to that of US:

it is very likely that very high markets shares, which have been held for some time, indicate a dominant position. This would be the case where an undertaking holds 50 % or more of the market, provided that rivals hold a much smaller share of the market. In the case of lower market shares, dominance is more likely to be found in the market share range of 40 % to 50 % than below 40 %, although also undertakings with market shares below 40 % could be considered to be in a dominant position. However, undertakings with market shares of no more than 25 % are not likely to enjoy a (single) dominant position on the market concerned”.<sup>159</sup> But, “a substantial market share as evidence of the existence of a dominant position is not a constant factor and its importance varies from market to market according to the structure of these markets, especially as far as production, supply and demand are concerned.”<sup>160</sup>

Although statutes generally prohibit predatory pricing, they do not provide specific guidelines on enforcement. Therefore, courts have great flexibility in determining whether pricing is predatory, and a significant body of case law on predatory pricing exists.

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## 3. DIFFERENT PERIODS OF PREDATORY PRICING LAWS

The case law on standards for determining predatory pricing is characterised by three periods: the intent period, the cost period and the recoup period. In the intent period, which lasted from the passage of the Sherman Act to the 1970s<sup>161</sup>, the courts relied on proof of intent to monopolise or exclude competitors when identifying predatory pricing. This standard of intent is evident in the case law. In *Standard Oil*: “the combination of the stocks of the various corporations trading in petroleum and its products in the hands of a holding company, with the

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<sup>157</sup> *M & M Med. Supplies & Serv., Inc. v. Pleasant Valley Hosp., Inc.*, 981 F.2d 160, (1992-2).

<sup>158</sup> Article 102 of the Treaty on the Functioning of the European Union.

<sup>159</sup> DG Competition discussion paper on the application of Article 82 of the Treaty to exclusionary abuses, at 31 (December 2005).

<sup>160</sup> *Hoffmann-La Roche v Commission* Case 85/76, E.C.R. 461, at 40 (1979).

<sup>161</sup> Phillip Areeda and Donald F. Turner, *Predatory Pricing and Related Practices under Section 2 of the Sherman Act* 88 Harv. L. Rev. 697 (1975).

intent to exclude others from the trade, and thus centralize in the combination the perpetual control of the movement of these commodities in the channels of interstate and foreign commerce, constitutes a violation of the prohibitions of Act July 2, 1890 (Sherman Antitrust Act )”.<sup>162</sup> In *Utah Pie*: “a reasonable probability may be inferred that its willful misconduct may substantially lessen, injure, destroy or prevent competition?...the courts recognized the inferential value of sales below cost on the issue of intent”.<sup>163</sup>

Following Areeda and Turner’s published article of 1975 that defined the cost standards for determining predation,<sup>164</sup> intent was no longer an indispensable element in cases on predatory pricing.<sup>165</sup> Courts believe: “a monopolist to fall within section 2 of the Sherman Act must have the power and the intent to monopolize, but the section does not demand any ‘specific’ intent, since no monopolist monopolizes unconscious of what he is doing”.<sup>166</sup> As a consequence, a certain measurement of cost was adopted as primary evidence for predatory pricing to prevail in court. In *California Computer*<sup>167</sup>: “in the absence of any showing that computer manufacturer priced its disk products below marginal cost, there was no showing of predatory pricing as a means of obtaining or maintaining a monopoly”.<sup>168</sup> In their article, Areeda and Turner introduced the average variable cost (AVC) standard as a practical cost benchmark in determining predatory pricing, a standard that has carried great weight not only in US courts but also in EU courts. In *AKZO* it was ruled that prices below average variable costs (that is to say, those which vary depending on the quantities produced) by means of which a dominant undertaking seeks to eliminate a competitor must be regarded as abusive. A dominant undertaking has no interest in applying such prices except that of eliminating competitors so as to enable it subsequently to raise its prices by taking advantage of its monopolistic position, since each sale generates a loss, namely the total amount of the fixed costs (that is to say, those which remain constant regardless of the quantities produced) and, at least, part of the variable costs relating to the unit produced.<sup>169</sup>

In 1993 the Brook Group decision<sup>170</sup> terminated the trend of courts using below-cost pricing as the main standard for deciding predatory pricing cases, and added the recouping of previous

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<sup>162</sup> *Standard Oil Co. of New Jersey v. U.S.*, 221 U.S. 1, 31 S.Ct. 502 U.S. (1911).

<sup>163</sup> *Utah Pie v. Continental Baking Co.*, 386 U.S. 685, 87 S.Ct. 1326 (1967), at FN12.

<sup>164</sup> Phillip Areeda & Donald F. Turner, *Predatory Pricing and Related Practices under Section 2 of the Sherman Act*, 88 Harv. L. Rev. 697 (1975).

<sup>165</sup> *A.A. Poultry Farms, Inc. v. Rose Acre Farms, Inc.*, 881 F.2d 1396 (7th Cir. 1989); *Morgan v. Ponder*, 892 F.2d 1355 (8th Cir. 1989); Case C-62/86, *AKZO Chemie BV v. Commission*, E.C.R. I-3359. at 65 (1991) (the exclusionary consequences of a price-cutting campaign by a dominant producer might be so self-evident that no evidence of intention to eliminate a competitor is necessary).

<sup>166</sup> *U.S. v. Aluminum Co. of America* 148 F.2d 416 (2d Cir. 1945).

<sup>167</sup> *California Computer Products Inc v. International Business Machines Corp*, 613 F. 2d 727 (1979).

<sup>168</sup> *California Computer Products Inc v. International Business Machines Corp*, 613 F. 2d 727 (1979), at 31.

<sup>169</sup> *AKZO Chemie BV v. Commission*, Case C-62/86 E.C.R. I-3359 (1991), at 71.

<sup>170</sup> *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 113 S. Ct. 2578.

losses as a prerequisite for deciding a predatory pricing case. This standard remains in effect today.

The Brook group decision established a two-tier framework for analysing predatory pricing (i.e., the court requires “a plaintiff must prove (1) that the prices complained of are below an appropriate measure of its rival's costs and (2) that the competitor had a reasonable prospect of recouping its investment in below-cost Prices”).<sup>171</sup> The importance of recouping losses was stressed: “without recoupment, even if predatory pricing causes the target painful losses, it produces lower aggregate prices in the market, and consumer welfare is enhanced”.<sup>172</sup> Although the two-tier framework also includes some inherent type of cost–price analysis, it does not state that the price in the predatory pricing strategy must be below a specific standard of cost.

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#### D. COST TEST USED IN IDENTIFYING ILLEGAL LOW PRICE

After the cost–price relationship was introduced into price analysis, several cost benchmarks were adopted to identify illegal low prices. A theoretical analysis regarding price standards used in analysing below-cost prices follows. This part analyses the various cost tests developed to date. The analysis looks at the advantages and disadvantages of each cost test, as well as the required condition for the application of each. The analysis aims at describing the theoretical and methodological background conditions necessary in order to assess the competitive effects of selling software at a low price.

Although the marginal cost appears to be theoretically appropriate, according to Areeda and Turner, it lacks practical feasibility.<sup>173</sup>

The AVC test is introduced in Areeda and Turner's paper: variable costs, as the name implies, are costs that vary with changes in output. They typically include such items as materials, fuel, labour directly used to produce the product, indirect labour such as foremen, clerks and custodial help, utilities, repair and maintenance, and per unit royalties and licence fees. The average variable cost is the sum of all variable costs divided by output.<sup>174</sup> It is the correct test on principle, since a firm that sells below its average variable cost is clearly not loss-minimizing. At a price less than average variable cost, a firm is earning no return and could incur fewer losses by ceasing operations.<sup>175</sup> The AVC test was widely used by US and European courts from 1975 to

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<sup>171</sup> *Brooke Group Ltd v Brown & Williamson Tobacco Corp* 509 U.S. 209. (1993).

<sup>172</sup> *Brooke Group Ltd v Brown & Williamson Tobacco Corp* 509 U.S. 209. (1993).

<sup>173</sup> Phillip Areeda and Donald F. Turner, *Predatory Pricing and Related Practices under Section 2 of the Sherman Act* 88 Harv. L. Rev. 697 (1975).

<sup>174</sup> Phillip Areeda and Donald F. Turner, *Predatory Pricing and Related Practices under Section 2 of the Sherman Act* 88 Harv. L. Rev. 697, p 700 (1975).

<sup>175</sup> Phillip Areeda and Donald F. Turner, *Predatory Pricing and Related Practices under Section 2 of the Sherman Act* 88 Harv. L. Rev. 697, at p 717 (1975), and foot note 17. (If, however, price is below average variable cost at all levels of output, the firm can minimize losses only by ceasing operations.)

1993,<sup>176</sup> and because of its adoption, fewer plaintiffs succeeded in litigation. A study of the reported US predatory pricing decisions from 1975 (the year of the Areeda–Turner article) to 1982 found that plaintiffs prevailed in only 4 out of 48 decided cases (or 8% of the total).<sup>177</sup> However, under the AVC test, it is difficult to define variable cost, as some costs that are not variable in the short term may be variable over an extended period of time. Furthermore, the AVC test was later proved to be only sufficient for ruling that a price below the AVC is abusive, as the court in *AKZO* held that a price above the AVC but below the average total cost (ATC) is abusive only if the price is part of a strategy to eliminate a competitor.<sup>178</sup>

The ATC is a cost benchmark that is often used to analyse predatory pricing. “Costs are divided into fixed costs, variable costs and total cost. Fixed costs do not vary with changes in output. Variable costs vary with changes in output. Total cost is the sum of fixed and variable costs. Average total cost is obtained by dividing total cost by output”.<sup>179</sup> Prices above the ATC are normally not predatory, as there will be no profit or cost loss, and selling a product below the ATC is normally a rational business strategy, as the ATC consists of variable costs and fixed costs. If prices are subject to demand decline, setting them below the ATC may recover variable costs (some scholars refer to these costs as overhead costs)<sup>180</sup> and part of the fixed costs, while the unrecovered fixed costs can be recovered through future sales of additional units. Therefore, there are problems when choosing long-term and short-term ATCs.<sup>181</sup> In addition, there is no precise point or price below the ATC that is considered predatory. Thus, the ATC cannot be used independently as a cost test in assessing price rationality, and so there is a need for a lower limit index. There are problems involved in measuring total costs, particularly in multiproduct operations where it is necessary to allocate common costs. In the real market, even in single-line business there is the problem of properly amortizing costs with an investment aspect, such as capital equipment and advertising.<sup>182</sup>

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Since the average cost of production of each unit is greater than the revenue realized from its sale, any output greater than zero increases the firm's losses. At price P1 on the diagram in note 14 supra, the loss-minimizing firm will shut down).

<sup>176</sup> According to Westlaw US case search, there are approximately 70 US federal and state cases used variable cost as a price floor between 1975 and 1993.

<sup>177</sup> D. Hurwitz & William E. Kovacic, *Judicial Analysis of Predation: The Emerging Trends*, 35 Vand. L. Rev. 140, p 145 (1982) foot note 295 (success rate fell to eight percent); see also Stephen C. Salop & Lawrence J. White, *Private Antitrust Litigation: An Introduction and Framework in Private Antitrust Litigation: New Evidence, New Learning*, p 3, 42 (1988) (over roughly comparable period plaintiffs obtained favorable judgments in 7% of cases filed with predatory pricing claim, as compared with success rate of 11% for all antitrust claims).

<sup>178</sup> *AKZO Chemie BV v. Commission*, Case C-62/86 E.C.R. I-3359 (1991).

<sup>179</sup> *Caller-Times Pub. Co., Inc. v. Triad Communications, Inc.* 791 S.W.2d 163, 58 BNA USLW 2649, Trade Cases P 69,004. FN3 (1990).

<sup>180</sup> Cento Veljanovski, *Deterrence, Recidivism and European Cartel Fines*, 7 J. Comp. L. & Econ. 871 (2011); Cento Veljanovski, *The Genesis of Cartel Investigations: Some Insights from Examining the Dynamic Interrelationships between US Civil and Criminal Antitrust Investigations*, 4 J. Comp. L. & Econ. 61 (2007); Brian Coner Levin, *Killing Life Partners: Why Viatical Settlements Are Securities in Light of SEC v. Mutual Benefits Corporation and Other Recent Cases That Explicitly Reject SEC v. Life Partners*, 6 J. Bus. & Sec. L. 71 (2006).

<sup>181</sup> Williamson, *Predatory Pricing: A Strategic and Welfare Analysis*, 87 Yale L.J. 311 (1977).

<sup>182</sup> Gorge A. Hay, *The economists of predatory pricing* 51 Antitrust L.J. 361, p 361 (1982).

The ATC is used as an upper limit cost standard in both theoretical and case analyses.<sup>183</sup> In *AKZO*, the ATC is used as a company standard with the AVC: “prices below average total costs, that is to say, fixed costs plus variable costs, but above average variable costs, must be regarded as abusive if they are determined as part of a plan for eliminating a competitor. Such prices can drive from the market undertakings which are perhaps as efficient as the dominant undertaking but which, because of their smaller financial resources, are incapable of withstanding the competition waged against them”.<sup>184</sup> Besides this, the analysis is partly based on the evidence of predatory intent. For example, the Fifth Chamber found that AKZO’s selective below-ATC price apparently implied an exclusive intent: the prices charged by AKZO to its own customers were above its average total costs, whereas those offered to customers of ECS were below its average total costs.<sup>185</sup>

Average avoidable cost (AAC) is the average per unit cost that the predator would have avoided during the period of below-cost pricing had it not produced the predatory increment of sales.<sup>186</sup> From the definition, we may conclude that if market participants try not to avoid the avoidable costs, they are conveying two signals: (1) a predatory intent, and (2) a predatory investment in eliminating competitors. As a cost benchmark, the AAC avoids the insufficiency of marginal costs. In addition, the AAC test includes both fixed costs and variable costs, and it determines whether a cost is variable in the long run. It is used as a standard for enforcing exclusive practises in the EU: failure 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.<sup>187</sup>

The long-run average incremental cost (LAIC) is a cost benchmark used in sectoral regulation and court cost analysis. Incremental cost is a generic concept that refers to the increase in the firm’s total cost when it expands its output of a particular product or products by some specified increment, holding constant the amount of other products that the firm produces. Often, the increment in question is the entire output of the relevant product. Average incremental cost is incremental cost per unit of the output in question.<sup>188</sup> With respect to incremental cost and the character scale economy, which will expand cost into different markets in the future and thus generate forward-looking costs, the long-run calculation can predict future

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<sup>183</sup> Phillip Areeda and Donald F. Turner, *Predatory Pricing and Related Practices under Section 2 of the Sherman Act* 88 Harv. L. Rev. 697, p 705 (1975). (... pricing behaviour should be deemed non-predatory so long as the prices equal or exceed average total cost).

<sup>184</sup> *AKZO* [1991] E.C.R. I-3359, at 72.

<sup>185</sup> *AKZO* [1991] E.C.R. I-3359, at 114.

<sup>186</sup> Richard Craswell & Mark R. Fratrik, *Predatory Pricing Theory Applied: The Case of Supermarkets v. Warehouse Stores*, 36 Case W. Res. L. Rev. 26 pp 26, 27 (1985).

<sup>187</sup> *Guidance on its enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings*. OJ C 45, 24.2.(2009), at 26.

<sup>188</sup> Sappington, David E.M & Sidak, J. Gregory, *Competition Law for State-Owned Enterprises*, 71 Antitrust L.J. 488 (2003).

costs and allocate costs to current and future users. Thus, the calculation can provide a complete foundation for the calculation of average costs.<sup>189</sup> The LAIC has an original relationship with the price regulation of the US telecoms sector. According to the US telecommunications regulation code,<sup>190</sup> the LAIC is described as “total element long-run incremental cost” (TELAIC). The total element long-run incremental cost of an element is the forward-looking cost over the long run of the total quantity of the facilities and functions that are directly attributable to or reasonably identifiable as incremental to, such element”.<sup>191</sup> In the definition, TELAIC is the standard cost incurred by an individual firm to produce a given element, and the cost is exclusively the forward-looking cost of producing this element. Representative of the total elements, TELAIC takes all costs into account. Thus, this cost benchmark is often used with products that have complex cost allocation structures. The advantage of identifying the product-specific cost is especially appreciated by courts when adjudicating predatory pricing cases.

The LAIC has been used as a tool to determine a competitive price in cases involving US telecom industry. In *AT&T Communications of Southern States, Inc. v. BellSouth Telecommunications, Inc.*, a competitor local exchange carrier sought judicial review of the state public service commission's resolution of a dispute with an incumbent local exchange carrier over the terms of an interconnection agreement. Here, the District Court, Hinkle, J., held that: “(1) commission did not abuse its discretion by employing Total Service Long Run Incremental Cost method when calculating forward-looking costs; ....”<sup>192</sup> The LAIC test has also been used in EU cases to calculate an accurate cost for specific services. In *Deutsche Post AG*, for example, the European Commission found that Deutsche Post AG (DPAG) operated in more than three services, including the commercial parcel service, the mail-order parcel service and the ‘reserved area’.<sup>193</sup> The applicants alleged that DPAG offered its commercial parcel service at below-cost prices with the aim of ousting competitors from the market. DPAG covered the resultant losses with the aid of the profits made in reserved area services, namely letter post.<sup>194</sup> The Commission reviewed the economic status and found that firms can withstand a loss from the below -cost selling of certain

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<sup>189</sup> Sappington, David E.M; Sidak, J. Gregory, *Competition Law for State-Owned Enterprises*, 71 Antitrust L.J. 489 (2003). (Average-incremental cost generally is the long-run figure obtained after plant and equipment are adjusted so as to minimize the average cost of the pertinent output. It is therefore often called long-run average incremental cost).

<sup>190</sup> *US telecommunications regulation code* 47 C. F. R. § 51.505.

<sup>191</sup> *US telecommunications regulation code* 47 C. F. R. § 51.505. (Forward-looking economic cost. (a) In general. The forward-looking economic cost of an element equals the sum of: (1) The total element long-run incremental cost of the element, as described in paragraph (b); and (2) A reasonable allocation of forward-looking common costs, as described in paragraph (c). ....standalone costs are the total forward-looking costs, including corporate costs, that would be incurred to produce a given element if that element were provided by an efficient firm that produced nothing but the given element).

<sup>192</sup> *AT&T Communications of Southern States, Inc. v. BellSouth Telecommunications, Inc.*, 122 F.Supp.2d 1305, N.D.Fla., September 28, 2000 (NO. 4:97CV262-RH). See also *Michigan Bell Telephone Co. v. Lark*, (NO. 06-11982) (September 26, 2007); *Bellsouth Telecomm., Inc. v. Kentucky Pub. Serv. Comm'n*, 613 F.Supp.2d 903, E.D.Ky., (NO. CIV.A. 3:08-33-DCR) (May 01, 2009).

<sup>193</sup> COMP / 35. 141 - Deutsche Post AG. At 4,5(2001).

<sup>194</sup> COMP / 35. 141 - Deutsche Post AG. At 4,5(2001), at A.

products because the loss can be balanced by revenues from other products. To justify the stand-alone cost of certain products, firms use the incremental cost as a cost benchmark.<sup>195</sup>

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#### E. SUMMARY OF SECTION III.

The above analysis initially reviews the definition of predatory pricing and the possible effects of conducting it. The analysis concludes that, although predatory pricing normally takes the form of below-cost pricing, not all such pricing is predatory. The analysis then examines how predatory below-cost pricing is analysed under the established framework of competition law. In addition, the analysis also examines the cost tests used in identifying predatory pricing. This analysis provides the foundation for assessing below-cost pricing in the software market, which is the theme of the next part.

#### IV. PREDATORY PRICING OF SOFTWARE

The fourth part of this chapter assesses below-cost pricing in the software market on the basis of the background knowledge introduced above. Due to the inherent characteristics of the software market, for example, the unbalanced cost structure (high R&D cost and low supply cost), network competition and strong innovation, the marketing of software, especially pricing practises, is highly flexible. The below-cost pricing common in the software market is analysed. It is noted that although software products mainly compete via quality, they also compete via price.

Below-cost pricing can lead to competitive harm to the software market. At the same time, however, procompetitive or harmless below-cost pricing exist, and so it is necessary to analyse the standards used to assess allegedly predatory pricing of software, and, in particular the standard for distinguishing between predatory software pricing from normal below-cost software pricing. The final part of this section provides this analysis.

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#### A. LOSS-LEADER PRICE

Loss-leader selling is defined as follows. An item is offered for sale below ‘cost’ to attract customers; any loss from this bargain is recouped by raising prices of other items; thus the customers attracted are deceived. As a result, competition in loss-leaders grows so severe that no recoupment through deception is possible, and the merchant, his employees, and his producers suffer from chaos in the market.<sup>196</sup> In its earlier stages, this strategy was deceptive, as the seller

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<sup>195</sup> COMP / 35. 141 - Deutsche Post AG. At 4,5(2001), at 6,7.

<sup>196</sup> No author name offered, *State Legislation Prohibiting Sales below Cost*, 52 Harv. L. Rev. 1143 (1939). See also Carl D. McDaniel & William R. Darden, *Marketing* 370 (Allyn and Bacon, Inc., 1987). (Loss-leader pricing “is an attempt ... to induce store patronage through selling a product near cost or even below cost to attract customers” who presumably will also purchase other goods at a profit).

would increase the prices of its other products to compensate for the loss generated by the low-price selling, a practise that led to its reputation as a low-price seller.

Modern economists find that loss-leader selling is economically rational without deception. McDaniel and Darden defined the loss-leader strategy as “leader pricing (sometimes called loss leader pricing) is an attempt by marketing manager to induce store patronage through selling a product near cost or even below cost to attract customers”,<sup>197</sup> and loss-leader pricing has been deemed a legitimate practise by modern EU member state case law. In *Re Autodesk S.A. v. E.C.C.*,<sup>198</sup> Autodesk S.A. is a subsidiary of the American Autodesk group and it markets in France software for computer-aided design and manufacturing, which covers computer-aided design and computer-assisted drafting.<sup>199</sup> Autodesk introduced a selective distribution agreement called ‘Autocad authorized dealer’. The agreement included a clause prohibiting the sale of software programmes as loss leaders, which is defined by the agreement as “an offer of software programmes with the aim of attracting customers likely to purchaser other products or services or to promote your business, and not with the aim of making a profit”;<sup>200</sup> “Clause 2(a) of the general conditions A of the authorized dealer agreement provides that no ‘site’ may offer a software programme as a ‘loss leader’ or by ‘mail order’”.<sup>201</sup>

The Competition Council ruled against Autodesk S.A in response to a firm called Techno Direct, that Autodesk had “contravened Article 85(1) of the E.C. Treaty and Section 7 of Ordinance 86–1243 on 1 December 1986 (hereinafter Section 7) by reason of practices in the sector of software for computer-aided design and computer-assisted drafting.”<sup>202</sup> Techno Direct ordered the Competition Council “to amend the terms of the Autodesk authorized dealer agreement and to pay a pecuniary sanction of 200,000 FF.”<sup>203</sup> The Paris Court of Appeal ruled on the application lodged by Autodesk S.A. for the annulment and quashing of the Competition Council’s decision, as the court found the use of the loss-leaders to be lawful: “the clause prohibiting the sale of software programs as loss-leaders went beyond the scope of this term as defined by the circular of 22 December 1980, upon which the applicant (Section 7) seeks to rely.”<sup>204</sup>

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<sup>197</sup> Carl D. McDaniel & William R. Darden, *Marketing*, p 370 (Allyn and Bacon, Inc., 1987).

<sup>198</sup> *Re Autodesk S.A.* Before the Cour d'Appel (Court of Appeal), Paris 28 October 1997. E.C.C. 1 [1999].

<sup>199</sup> *Re Autodesk S.A.* Before the Cour d'Appel (Court of Appeal), Paris 28 October 1997. E.C.C. 1 [1999], at 1.

<sup>200</sup> *Re Autodesk S.A.* Before the Cour d'Appel (Court of Appeal), Paris 28 October 1997. E.C.C. 1 [1999], at 1,14.

<sup>201</sup> *Re Autodesk S.A.* Before the Cour d'Appel (Court of Appeal), Paris 28 October 1997. E.C.C. 1 [1999], at 8.

<sup>202</sup> *Re Autodesk S.A.* Before the Cour d'Appel (Court of Appeal), Paris 28 October 1997. E.C.C. 1 [1999], at 1.

<sup>203</sup> *Re Autodesk S.A.* Before the Cour d'Appel (Court of Appeal), Paris 28 October 1997. E.C.C. 1 [1999], at 1.

<sup>204</sup> *Re Autodesk S.A.* Before the Cour d'Appel (Court of Appeal), Paris 28 October 1997. E.C.C. 1 [1999], at 1,14: This chapter mentions cartel law (Article 81 (1) of the EC Treaty(Now Article 101 TFEU)) in passing; it does not discuss this subject in detail because cartel law governs concerted price fixing, whereas this chapter focuses on unilateral price restraint. The main reason for mentioning cartel law here is because of the practice in cartels of adding a price restriction clause in agreements.

Contrary to EU case law, loss-leader pricing (LLP) is prohibited by Article 1074 of the Unlawful Practices Act (in the US).<sup>205</sup> This clause addresses an extreme phenomenon where LLP is used as a strategy that exclusively targets competitors. Although a similar clause appeared in a smaller scope (Alicia,<sup>206</sup> California), it shows that under LLP, competitors that only supply the loss-leader product would not withstand the profit loss and would be driven out of the market.

Although LLP always appears to introduce low prices, which can benefit the consumer and be pro-competitive, it can also be abused as a predatory pricing strategy. However, LLP is more difficult to scrutinise than normal predatory pricing. In *Wal-Mart Stores, Inc., v. American Drugs, Inc.*,<sup>207</sup> the Supreme Court approved Wal-Mart Stores' loss-leader practises: "judge Brown, J., held that: (1) violation of Unfair Practices Act section prohibiting below-cost sales required showing that below-cost sales were made with intent to destroy competition; (2) use of loss leader strategy could not be inferred to show intent to destroy competition; and (3) Arkansas Unfair Practices Act did not provide sufficient statutory basis for inference of specific intent to destroy competition based solely on showing of some below-cost pricing".<sup>208</sup> We can infer the following from this case. First, the intent of eliminating competitors is an important factor in finding LLP to be predatory. However, proving this intent is difficult for a plaintiff. Second, even if there is an exclusion effect of LLP, this effect must be considered under the legislative purpose of competition law, which aims to foster competition and to allow consumers to enjoy competition welfare (low price) rather than enabling the protection of a certain competitor.

As LLP easily induces competition law concerns, market participants use this strategy carefully. Such caution is especially warranted in the software market, as below-cost marketing is often needed in software sales. After the judgement in *Microsoft II*,<sup>209</sup> scholars argued over whether Microsoft's practise of giving away its Internet Explorer (IE) product was predatory,<sup>210</sup> as some believed that Microsoft's free offering of IE had the predatory intent of terminating

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<sup>205</sup> See *California Unlawful Practices Act, Business and Professions Code* § 1704. (It is unlawful for any person engaged in business within this State to sell or use any article or product as a "loss-leader" as defined in Section 17030 of this chapter. Section 17030 : "Loss-leader" means any article or product sold at less than cost: (a) Where the purpose is to induce, promote or encourage the purchase of other merchandise; or (b) Where the effect is a tendency or capacity to mislead or deceive purchasers or prospective purchasers; or (c) Where the effect is to divert trade from or otherwise injure competitors).

<sup>206</sup> *Oklahoma Unfair Sales Act*, Okla. Stat. Ann. tit. 15, § 598.3. (It is hereby declared that any advertising, offer to sell, or sale of any merchandise, either by retailers or wholesalers, at less than cost as defined in this act with the intent and purpose of inducing the purchase of other merchandise or of unfairly diverting trade from a competitor or otherwise injuring a competitor, impair and prevent fair competition, injure public welfare, are unfair competition and contrary to public policy and the policy of this act, where the result of such advertising, offer or sale is to tend to deceive any purchaser or prospective purchaser, or to substantially lessen competition, or to unreasonably restrain trade, or to tend to create a monopoly in any line of commerce).

<sup>207</sup> *Wal-Mart Stores, Inc., v. American Drugs, Inc.*, 319 Ark. 214, 891 S.W.2d 30 (1995).

<sup>208</sup> *Wal-Mart Stores, Inc., v. American Drugs, Inc.*, 319 Ark. 214, 891 S.W.2d 30 (1995).

<sup>209</sup> *U.S. v Microsoft Corp.* 84 F.Supp.2d 9.(D.D.C. 1999).

<sup>210</sup> Andrew Watson, *Predatory Pricing in the Software Industry*, Rutgers L. Rec (1998) - litigation-essentials.lexisnexis.com; Hazlett, Thomas W, *Microsoft's Internet Exploration: Predatory or Competitive*, 9 Cornell J. L. & Pub. Pol'y. 29 (1999).

Netscape's profit gain, and such termination could bar a potential entrant from the computer operating system market.<sup>211</sup> Although Netscape was close to introducing its own computer operating system, Microsoft remained the dominant firm in this market. Microsoft responded that giving away its browser product for free was a valid business model, one followed by many software companies, because it would generate future revenues. For example, a free browser could help Microsoft establish an Internet portal on which it could sell advertising.<sup>212</sup> Moreover, although Microsoft left some evidence that proved its intent was to quash Netscape<sup>213</sup> and it did eliminate Netscape as a competitor, the court did not find Microsoft to be in violation of antitrust law. What made Microsoft exempt from predatory condemnation was its free-forever-and-for-everyone strategy because, although Microsoft met the below-cost elimination condition, it failed to recoup its losses by later charging for the product.<sup>214</sup>

Summary.

Loss leader pricing is a form of below-cost pricing which resembles predatory pricing. Despite their similarities, they differ substantially. First, loss leader pricing is not aimed at eliminating competitors, but rather at attracting more customers; second and most important, the sacrifice of profit in the LLP process will be compensated for by sales of other products, which is very different from the predatory practise of setting prices initially low to corner a market, followed by the introduction of a much higher price.

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## B. PENETRATION PRICE

Penetration pricing (PeP) is a strategy that "... the technique of offering low prices to early customers so as to build up an installed base and influence the choices of later adopters".<sup>215</sup> As it easily and commonly occurs in network economies, some scholars define it within a network background:<sup>216</sup> a strategy called 'penetration pricing' is adopted in order to build an installed base of users and thus make its technology more attractive to later users.<sup>217</sup> As a market expansion strategy, PeP is similar to price promoting in traditional industries. Professors Bolton, Brodley and Riordan have analysed price promotion using a hypothetical pizza case. When introducing a

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<sup>211</sup> Max Schanzbach, *Network Effects and Antitrust Law: Predation, Affirmative Defenses, and the Case of U.S. v. Microsoft*, 2002 *Stanf Technol Law Rev.* 4 (2002).

<sup>212</sup> Gilbert, Richard J. and Katz, Michael L., *An Economist's Guide to U.S. v. Microsoft*, 15 *J Econ Perspect* 35 (2001).

<sup>213</sup> Gilbert, Richard J. and Katz, Michael L., *An Economist's Guide to U.S. v. Microsoft*, 15 *J Econ Perspect* 35 p 37-40 (2001).

<sup>214</sup> *United States v Microsoft Corp.* 253 F.3d 34 (DC Cir. 2001), at 32. (The rare case of price predation aside, the antitrust laws do not condemn even a monopolist for offering its product at an attractive price, and we therefore have no warrant to condemn Microsoft for offering either IE or the IEAK free of charge or even at a negative price).

<sup>215</sup> Stanley M. Besen & Joseph Farrell, *Choosing How to Compete: Strategies and Tactics in Standardization*, 8 *J Econ Perspect*, 122 (1994).

<sup>216</sup> Katz, Michael L & Carl Shapiro, *Technology Adoption in the Presence of Network Externalities*, 94 *J. Polit. Econ.* 822, (1986). Penetration pricing seems a natural strategy in network industries, and appears prominently in the theory.

<sup>217</sup> Joseph Farrell, *Standardization and Intellectual Property*, 30 *Jurimetrics J.* 43 (1989).

new type of pizza, the supplier sets a below-cost price to attract customers and introduce them to the advantages of the new product. After the promotion period, the supplier increases the price of the new pizza and recoups the below-cost investment from the improved price of the new pizza.<sup>218</sup>

The PeP phenomenon has the same function as predatory pricing in eliminating competitors; the difference is, below-cost pricing is necessary in the network economy. The network economy enables market operators to compete with one another under network effects. Network effects add extra value for customers other than the product cost, which becomes a barrier to market expansion and entry.<sup>219</sup> The current network is a major obstacle for competitors hoping to enlarge their market share or for firms planning to enter a network market. Thus, a price that can penetrate the current network is needed for market expansion and entry. Software market promotion with PeP is common. “Netscape, the current leader in the browser market, built up an 80% market share by giving away more than six million copies of its browser over the course of six months. After the introductory period, however, Netscape began to charge for its browser. Today, Netscape relies on browser sales for more than half its revenue”<sup>220</sup>; the ‘carpet-bombing’ of America with AOL software – some 250 million free copies were distributed by AOL through 1996 – was another classic campaign to surge past rivals and create critical mass. AOL rose, somewhat incredibly – from just 5 million subscribers in 1994 to over 17 million in 1999 – to dominate, by a large margin, the country's Internet Service Provider (ISP) sector.<sup>221</sup>

PeP is widely accepted and used if there is vigorous competition in the network market. The software market is a typical network market. In a software network, once a customer is locked in, it is usually difficult for them to switch because software is a durable good, and switching to new software means extra purchasing and extra costs to adjust to the new network. Thus, penetration pricing that is below cost is no longer sufficient to induce software consumers to switch products. Instead, symbolic pricing, selective giveaways or even minus pricing is commonly used by companies aiming to expand into and enter the software market. These penetration strategies aim to use low prices to expand market share. Expanding market share is especially important for

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<sup>218</sup> Patrick Bolton, Joseph F. Brodley & Michael H. Riordan, *Predatory Pricing: Strategic Theory and Legal Policy*, 88 Geo. L.J. 2239 (2000). (Tasty-Frozen, a leading manufacturer of frozen pizzas, develops a new kind of cheese that retains its flavor and texture much better than that of other frozen pizzas...To convince consumers that the new pizza tastes better, Tasty-Frozen considers in-store sampling...At the end of the three months of promotion, Tasty-Frozen raises its price. Consumers remain loyal, having come to appreciate the new pizza's improved taste. While the manufacturer sustained large losses during the three-month promotional period, after that time, the firm earns substantial profits from both its higher prices and economies of scale).

<sup>219</sup> Melamed, A. Douglas, *Network Industries and Antitrust*, 23 Harv. J. L. & Pub. Pol'y 147 (1999). (network industry entry barriers make predatory strategies for excluding or weakening marketplace rivals more feasible). See also U Johansson & U Elg, *Relationships as entry barriers: a network perspective*, 18 Scand J Manag 395 (2002). (The use of a network perspective can bring new insights to bear on entry barriers to markets at the level of the firm and can complement and enhance Porter's view of entry barriers in important aspects).

<sup>220</sup> Robert D. Hof, *Netspeed at Netscape*, Business Week pp 38-44 (1997).

<sup>221</sup> Hazlett & Thomas W, *Microsoft's Internet Exploration: Predatory or Competitive*, 9 Cornell J. L. & Pub. Pol'y. 42 (1999).

software vendors during the market entry stage, particularly where alternative software systems already have a large installed base, as it allows the new entrant to gain enough customers to form a network. “At a later stage – after reaching a critical mass – it may be possible for the vendor to increase prices”.<sup>222</sup> Typical software penetration price practises were adopted by Netscape and Microsoft. “Netscape led the way in making software available free of charge over the internet... it can serve as an extremely efficient, low-cost means of distributing... software”.<sup>223</sup> Additionally, “Netscape also pioneered the idea of plug-ins, software written by third parties that enhance the functionality of the basic Navigator program... Making quality enhancements available free is a variant on penetration pricing”.<sup>224</sup>

Although PeP prevails in the network economy, concerns over the abuse of below-cost selling procedures by the dominant firm exist. After all, any firm has the freedom to expand its market share through PeP. Such abuse is plausible because PeP and predatory pricing share the same procedure for below-cost selling periods. In other words, if a dominant firm is brought to the courtroom for its exploration of predatory pricing in a market, it will cite PeP as a defence. This concern is not unfounded, since PeP must be distinguished from predatory pricing both theoretically and practically.

PeP and predatory pricing both have market expansion effects. Both offer prices low enough to attract consumers, and the low prices succeed in gaining consumer cooperation. Although some apparent elements separate the two (e.g., PeP is a temporary characteristic or the result of introducing a new product), these elements are not the most important distinguishing factors. PeP and predatory pricing differ in that the latter can recoup losses. There are investments in profit loss for both PeP and predatory pricing, but as an abuse of market power, predatory pricing has distinct aspects. After successfully adopting predatory pricing, competitors with either equal or advanced efficiency will be eliminated, and the predator can charge any price above competition level, regardless of whether its product bears efficiency. A predator can only recoup its losses by imposing monopoly pricing after eliminating its competitors. In contrast, a PeP practitioner poses either the same efficiency or superior efficiency. A product of the same

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<sup>222</sup> Lehmann S & Buxmann P, *Pricing Strategies of Software Vendors*, 1(6) Bus Inf Sys Eng 452, p 458 (2009).

<sup>223</sup> Carl Shapiro and Hal R. Varian, *Information Rules: a strategic guide to the network economy*, pp 292, 293 (Harvard Business School Press, 1999).

<sup>224</sup> Microsoft penetration pricing practises are: Microsoft’s first step was to make Internet Explorer available free on-line. This tactic made a lot of sense as part of Microsoft’s catch-up strategy. In fact, Microsoft has gone even further, actually paying OEM’s and ISPs to give preference to Internet Explorer over Navigator, by making Internet Explorer the “default” browser. The company has also publicly stated that explorer will be free “now and in the future,” an obvious attempt at expectations management. See Carl Shapiro & Hal R. Varian, *Information Rules: a strategic guide to the network economy*, pp173-225 (Harvard Business School Press 1999). Case study please see *Storis, Inc. v. GERS Retail Systems, Inc.* 1995 WL 337100 (D.N.J.). (Defendants GERS Retail Systems Inc, distributed retail stores aids computer software by mail, to Plaintiff Storis’S customers only, a brochure which stated: If you’re looking for the most advanced retail system and you don’t think your Storis system is it, then do we have a great deal for you! ... Trade-in your Storis software for free Sequel system software ... and if you’d like one of our optional modules that you don’t already have—we’ll give it to you for 50% off!).

efficiency may survive in the market, as the consumer favours more choice at the same price level. Therefore, a more efficient supplier can recoup its losses through later selling. For cost reduction efficiency, a firm can recoup its losses by selling at a competitive price, while for innovation efficiency, a firm can recoup its losses by selling an advanced product.

The effects of the penetration strategy in the software market are slightly different from those in the traditional market. As the marginal cost of software is extremely low, the market penetration cost is low. Thus, PeP is more plausible. As locked-in effects and high switching costs exist, software users are often unable to switch. Thus, companies inevitably offer free software in order to gain customers from a competitor network. With the presence of vigorous competition, even negative pricing is a reserved choice for market penetration. Moreover, the penetration mainly targets the existing customers of competitors, and predatory pricing is less likely to be effective among this group of customers. A detailed analysis of this takes place in part D below.

Summary.

Penetration pricing and predatory pricing both employ below-cost pricing. This is done to secure a customer base, and requires that the price be below the price of a firm's competitors', which is normally below cost. However, PEP differs from predatory pricing in two main ways: first, predatory pricing but not PEP is conducted by a dominant firm, and second, a penetration pricing strategy does not involve a subsequent period of recouping profit.

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### C. LEARNING BY DOING

According to the theory of learning by doing (LBD), learning occurs from practise, and applying the learnt experience to the next practise is beneficial. With the adoption of cumulated experience, later practises will cost less or present with improved quality. LBD has been regarded as an important theory since the 1930s.<sup>225</sup> These scholars observed aeroplane assembly procedures and found that the greatest number of labour hours was required for the assembly of the first aeroplane, compared with the number of hours required for the assembly of subsequent aeroplanes using the same procedure. Furthermore, the labour hours spent on subsequent aeroplanes, constructed under same working conditions, declined according to the production and time order: "that the number of labor-hours expended in the production of an airframe (airpaeroplanelane body without engines) is a decreasing function of the total number of airframes of the same type previously produced. Indeed, the relation is remarkably precise; to produce the Nth airframe of a given type, counting from the inception of production, the

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<sup>225</sup> T. P. Wright, *Factors Affecting the Cost of Airplanes*, 3 *Journal of Aeronautical Sciences* 122 (1936); Kenneth J. Arrow, *The Economic Implications of Learning by Doing*, 29 *Rev. Econ. Stud.* 156 (1962); Asher, H, *Cost-Quantity Relationships in the Airframe Industry*, (The Rand Corporation (Santa Monica), 1956); Alchian, A, *Reliability of Progress Curves in Airframe Production*, 31 *Econometrica* 679, pp 679-693 (1963).

amount of labor required is proportional to  $N^{-1/3}$ .<sup>226</sup> This direct relationship between learning effects, cost reduction and product improvement has important implications for competition practises.

LBD can notably reduce production costs. The lessons learnt from past manufacturing experiences are adopted and implemented by suppliers when producing subsequent units of a product, significantly reducing the cost of manufacturing. This principle has great influence on pricing practises because it is rational for operators to set prices below the cost of the current or previous products without any predatory intent. As producers balance the cost between current products and future products, even prices below the current cost may generate profit from future production and sales.

Economic scholars have also demonstrated that in addition to the significant reduction of cost, LBD also improves product quality vis-à-vis the introduction of new product<sup>227</sup> and innovation leadership.<sup>228</sup> For the innovation outcome, cumulative technology improvements can lead to a leapfrogging effect. According to this phenomenon, learning by doing is an innovation approach that gradually results in technical change. After a technique has evolved to a certain extent, the technique will catch up and leapfrog the current advanced technology.<sup>229</sup> This phenomenon highlights the importance of cumulative technology improvements and their adoption in innovation.

Improved product quality or innovation induced by LBD also enables market participants to set prices below cost in order to become competitive, because the losses incurred via current below-cost selling can be recouped by future production and sales of an advanced product. Thus LBD helps explain why below-cost pricing often occurs in an innovation market. For example, this effect appeared in the semi-conductor sector during the 1970s and 1980s, when there was a dispute between Japan and the US over low prices in the memory chip market. As the production

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<sup>226</sup> T. P. Wright, *Factors Affecting the Cost of Airplanes*, 3 *Journal of Aeronautical Sciences* 122 (1936).

<sup>227</sup> Nancy L. Stokey, *Learning by Doing and the Introduction of New Goods*, 96 *J. Polit. Econ.*, 701 (1988). (A dynamic general equilibrium model is developed in which goods are valued according to the characteristics they contain, the set of goods produced in any period is endogenously determined, and learning by doing is the force behind sustained growth. It is shown that the set of produced goods changes in a systematic way over time, with goods of higher quality entering each period and those of lower quality dropping out); Wesley M. Cohen and Daniel A. *Innovation and Learning: The Two Faces of R & D*, 99 *Econ. J.*, 596 (1989). (The ease and character of learning within an industry will both affect R&D spending and condition the influence of appropriability and technological opportunity conditions on R&D). Ricardo Cabral & Michael J. *Adoption of a Process Innovation with Learning-by-Doing: Evidence from the Semiconductor Industry*, 49 *J. Ind. Econ.* 278 (2001). (Different types of knowledge may be accumulated with experience in each given generation of semiconductor technology).

<sup>228</sup> Alwyn Young, *Invention and Bounded Learning by Doing*, 101 *J. Polit. Econ.* 443 pp 443-472 (1993). (Models of endogenous technical change fall into two broad, and yet surprisingly disjoint, categories. On the one hand, there are models of "invention" (e.g., Romer 1990; Segerstrom, Anant & Dinopoulos 1990; Grossman and Helpman 1991), in which technical change is the outcome of costly and deliberative research aimed at the development of new technologies. On the other hand, there are models of "learning by doing" (e.g., Arrow 1962; Lucas 1988), in which technical change is the serendipitous by-product of experience gained in the production of goods).

<sup>229</sup> Brezis, E S, *Economic growth, leadership and capital flows: the leapfrogging effect*, 7 *J Int Trade Econ Dev* 26 (1998); Elise S. Brezis, Paul R. Krugman & Daniel Tsiddon, *Leapfrogging in International Competition: A Theory of Cycles in National Technological Leadership*, 83 *Am. Econ. Rev.* 1211 (Dec., 1993).

of memory chips spread globally and international competition in the US market expanded, so competitors from Europe and Japan were introduced. Until the beginning of 1980, Japanese suppliers monopolised this market with low prices that were considered predatory by US suppliers. As a result, the practises of the Japanese suppliers were investigated by the US Department of Justice.<sup>230</sup> Finally, the two countries negotiated and decided to set prices according to foreign market values.<sup>231</sup>

To examine whether the solution is fair, Flamm developed a model of pricing and production over the life cycle of a high-technology industry,<sup>232</sup>

in IM DRAMs (and in other industries with significant learning and scale economies, capacity constraints, and short product life cycles), prices over some time interval will fall below common measures of average cost and marginal cost, even with no strategic behavior (like predation) assumed on the part of producers. Therefore, antidumping trade laws that forbid pricing below some measure of average cost will snare 'normal' competitive behavior in the net they cast. Moreover, consumer welfare losses from successful cartelization of a market like that for DRAMs can greatly exceed the monopoly rents collected by producers.<sup>233</sup>

This finding illustrates that the semi-conductor sector is subject to the learning effect and that the Japanese low prices have a relationship with cost reduction. Aggressive regulation on these efficiency-enhanced low prices can hinder price competition and result in profit loss for the consumer.

Although LBD pricing is enhanced by efficiency, even a dominant firm can adopt it safely without inviting scrutiny over predatory practises. However, this below-cost pricing does not eliminate competition concerns entirely, as it can lead to the elimination of competitors.

Below-cost selling may drive competitors out of the market, help a company form a market monopoly and lead to monopoly pricing, and because of this, a predator may claim that it is engaging in LBD to defend its predatory pricing. Hence, there is a need to distinguish between LBD and predatory pricing. According to the theoretical literature, losses from LBD below-cost price selling can be recouped from future cost reductions or innovative products. Thus, the below-cost price is only below the cost of the current or previous products, as it is above the average cost in the long run. At the same time, losses from predatory below-cost price selling can

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<sup>230</sup> Hereafter DOJ.

<sup>231</sup> Kenneth Flamm, *Mismanaged trade: Strategic policy in the semiconductor industry*, Chapter one and two. (Brookings Institution, Washington. 1996).

<sup>232</sup> In which learning economies and scale economies, as well as capacity constraints, are important. I apply this model using empirical parameters relevant to the production of 1-megabit dynamic random access memories (1M DRAMs)... The resulting simulations produce more realistic outcomes than have earlier attempts to model semiconductor production. Precise specification of how learning economies operate is a crucial issue.

<sup>233</sup> Kenneth Flamm & Peter C. Reiss, *Semiconductor dependency and strategic trade policy*, Brookings Papers on Economic Activity: Microeconomics, pp 252, 253. (1993).

only be recouped during the monopoly pricing period that occurs after eliminating competitors. If a defendant is engaged in predatory litigation and can offer evidence that the below-cost selling is related to cost savings or the possibility of introducing innovative products, then it is on a learning curve, and this explanation is sufficient to justify its below-cost pricing. If such evidence is not available, then it probably will be subject to an investigation for predatory practices.

The software market is characterised by innovation, and as a result product upgrades and new products continually replace old products. Therefore, LBD effects are more likely to accompany software development and marketing. Applying experiences in innovation and technology accumulation usually leads to advanced technology and advanced as well as cost reductions in R&D. It is reasonable for a software supplier to set its price below cost if the above situation is reasonably expected.

Summary.

The “learning by doing” process, which results in low prices, shares some common characteristics with predatory pricing, such as, for instance, prices below cost and the elimination of competitors. There are also major differences. Firstly, the low price from learning by doing is set for both present and future products, while a predatory low price involves initially a profit-sacrificing price, followed by a recouping price; secondly, the learning by doing low price is based on improved production methods or on cumulative production experience and is efficiency-based, while predatory low prices do not have these characteristics.

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#### D. THE UNJUSTIFIED BELOW-COST PRICE

The software market is an innovation-based economy where the supplier wins by developing advanced software products and where price is generally ineffective as a strategy against competition. However, price still plays a significant role, as it is necessary to convince consumers to purchase the innovative software. Given the differences in customer preferences, technology-sensitive consumers will be attracted to advanced software, whereas consumer groups that are price sensitive are less likely to be attracted to advanced software. Moreover, if a firm has no technology advantage over its competitors, it is more likely to use price as part of a competitive strategy.<sup>234</sup> Such price competition results in an environment that is vulnerable to pricing abuse.

To be competitive, firms must gain consumers from their competitors. This is true in the software market, but here different groups of software customers have different consumer

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<sup>234</sup> There are a lot of webpage reflecting Microsoft engaged in predatory pricing when selling its antivirus software. In which Microsoft were not considered have technique advantage among other suppliers. Just name a few:  
<http://www.guardian.co.uk/technology/blog/2006/jun/21/microsoftaccus> (visited 29 May 2012);  
<http://www.zdnet.com/blog/spyware/microsofts-predatory-pricing-of-security-software/830> (visited 29 May 2012);  
<http://www.gfi.com/blog/microsoft-practices-predatory-pricing/> (visited 29 May 2012).

preferences. Because of network effects, a considerable portion of customers will be locked into a network. Moreover, as there is a large switching cost posed to these consumers, they will be unwilling to switch unless the firm's competitors give away their software or bring revolutionary software products to the market. Thus, this group of consumers are not likely to bring profits to the competitors, and the competitors may only be able to derive value if customers can enlarge the scope of the competitors' network by switching. A give-away price is needed for such a switch, and thus profitable competition may occur among consumers who have not yet made a purchase. These consumers are more sensitive to price, and firms are more likely to use predatory pricing to compete for them. This group of customers will compare the price, quality and network value of a software product. Their purchase can both ensure a firm's profit gain and enlarge its existing network. Suppliers with software products of basically the same value may inevitably engage in a price war. Below-cost pricing within this group of consumers is likely to be predatory pricing. Give-away prices or negative pricing within these networks would be considered predatory pricing, as the companies would invest in profit loss by engaging in these practises.

When competing with a dominant network, competitors of equal efficiency will not be a threat. The threat stems from competitors of superior efficiency. In the software market, network effects and durability factors make switching to an equal software product expensive. Furthermore, the practise of market tipping compels consumers to tend to choose the larger network. Thus, a software supplier of equal efficiency will be disadvantaged when competing with a supplier of a larger network, even if it sets its prices at a competitive level. A firm of superior efficiency may have the following two conditions: similar products with lower costs and similar costs with advanced products. The first situation encourages price competition, and the cost advantage can be, to some extent, offset by the network advantages from a dominant network. Under the second situation, a dominant supplier with no technology advantage will lose market power if it does not invest in improving its technology or lower its price. As discussed above, technology competition may take a long time to catch up in order to and eliminate a competitor, while price is a relatively quick way of doing so, as it can be changed as needed. However, whether the effectiveness of a low price in eliminating a superior software product must be determined.

Given that Microsoft eliminated Netscape by giving away IE, one may argue that a low price can eliminate a superior product if certain criteria are satisfied. In a market that exhibits significant network effects and high switching costs, a firm with intellectual property protection in the incumbent product may gain monopoly control without having a superior product.<sup>235</sup> In

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<sup>235</sup> H. Maura Lendon, *The Linux Revolution*, 15 Intellectual Property Journal 143 (2000) part 7 b (i). Competitive Concerns in a Network Economy. See also Krina Griva & Nikolaos Vettas, *Price competition in a differentiated products duopoly under network effects*, 23 Infor Econ & Policy, 85 pp 86, 87

*Beyond Telex v. IBM*,<sup>236</sup> the court held that aggressive price competition by IBM might have the effect of driving out competitors that had become a powerful force in stimulating innovation. Thus, the court may have sought to favour innovation over price competition because of a perception that aggressive price competition would lead to less innovation and that in the computer industry the long-term value to society of technical innovation exceeds the short-term cost to consumers of high prices and reduced present output.<sup>237</sup> Thus, low pricing can eliminate all types of competitors, and advanced technology is equally fragile in front of low prices. Predatory pricing law must also consider the harm that predation causes by frustrating innovation and lowering the incentive to innovate.

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#### E. A SUGGESTED APPROACH TO ANALYSING PREDATORY PRICING IN THE SOFTWARE MARKET

Identifying predatory pricing in the software market involves first finding a proper criterion for assessing the competitive effect of below-cost pricing. Part E established such a standard. Secondly, it is important to distinguish between exclusionary and non-exclusionary below-cost pricing. This section introduces a few types of below-cost pricing in the software industry, most of which are not exclusionary. Much of the below-cost pricing in the software industry is not actually below cost when it is assessed under cost criteria that account for the characteristics of software products. This section incorporates the cost test analysed in section III D into the assessment of below-cost sales of software so as to provide a more accurate assessment.

If a firm chooses pricing as the path to exclude its competitors, the correspondent predatory assessment must be based on the cost–price relationship principle. As the players in the software market are operating in an innovation market, they can still use price to eliminate their competitors and then impose monopoly pricing on their consumers. Predatory pricing in the software market will also adhere to the following procedure: first, a company invests in profit loss pricing, and second, it recoups its losses through monopoly pricing. Thus, the traditional standards for identifying predatory pricing should generally be applicable in the software market.

However, when applying the traditional standards, adjustments should be made because there are sector-specific characteristics in the software market. For instance, the cost structure of

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(2011). (When, in addition to horizontal characteristics, the products differ with respect to their qualities, we find that, if the network effect is relatively weak, the high-quality firm captures a larger share of the market and the low-quality firm a smaller one, depending on the quality difference. If the network effect is relatively strong, either the low-quality firm or the high-quality firm may capture the entire market; however, for the low-quality firm to capture the entire market, the quality difference cannot be too large relative to the network effect). Melamed, A. Douglas, *Network Industries and Antitrust*, 23 Harv. J. L. & Pub. Pol'y 147 (1999), (The same demand-side economies of scale that induce the formation of a network in the first place can serve as barriers to competition against the network, even by those who might offer a superior alternative).

<sup>236</sup> *Telex Corp. v. IBM Corp.*, 367 F. Supp. 258, (N.D. Okla. 1973), rev'd, 510 F.2d 894, 521 (10th Cir.) cert. denied, 96 S. Ct. 8. (1975).

<sup>237</sup> Robert E. Bartkus, *Innovation Competition: Beyond Telex v. IBM*, 28 Stan. L. Rev. 285 (1976).

the software product, network competition and innovation competition are all sector-specific factors. Traditional standards use the cost–price relationship to infer predatory intent and the possibility and legality of exclusion. The AVC, ATC, AAC and LAIC are all used as benchmarks: they help to identify whether the cost of a product can be recovered by the current price. For the software market, these benchmarks are only partially applicable. According to the cost structure of software, fixed costs constitute most of the total cost of a software product, and this cost structure does not change. The fixed costs or total cost can be fully recovered through a certain amount of sales when or before they are confronted by competition. Once the cost has been recovered, the courts cannot treat below-cost pricing as predatory pricing simply because they cannot recover the cost. Thus, the above-cost benchmark is inapplicable, as any non-negative price is a pure profit gain for a firm with zero cost.

Under the above consideration, assessing predatory pricing in the software market should require two steps. The first step is identifying whether a software firm has recovered its cost. If a firm has not recovered its cost using below-cost pricing, it may be suspected of having predatory intent and the potential to exclude its competitors. In this case, further investigation is justified. However, there is a problem with choosing cost benchmarks, as marginal costs, such as the AVC test, have two problems. One problem concerns the identification of marginal costs in the long run. The other problem is that fixed costs are not included in the calculations; therefore, these cost tests are apparently not suitable for a software price assessment. The ATC, which is the total cost divided by the number sold, has two inadequacies. It is generally a price upper limit used to justify a price that is not predatory. In addition, the ATC does not explicitly calculate the per unit cost of an extra output. The LAIC is a cost suitable for determining whether the price of a software product is a loss-generating price. As an unbalanced cost structure, a certain part of the cost, such as the variable cost, is no more comprehensive, and the total element of the LAIC can include all needed costs. Additionally, software firms tend to engage in more than one product.<sup>238</sup> There is a potential danger in operating only on single products, as a company may easily be eliminated by an efficient loss-leader price (e.g., Netscape).<sup>239</sup> This strategy will generate common costs that are shared by all products. In turn, these common costs inevitably lead to the use of an increasing cost standard (LAIC) to make a precise calculation of the stand-alone cost of certain products.

If a software firm has recovered its product cost through previous customers, it is likely to favour adopting predatory pricing to eliminate its competitors. In this situation, it is difficult to

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<sup>238</sup> Despite of both operating computer operating system and other utility software, Microsoft also engaged in antivirus software, mobile phone operating system software etc. Besides, its recent mergers for instance Skype, Motorola and 3Com also indicate this trend.

<sup>239</sup> Max Schanzbach, *Network Effects and Antitrust Law: Predation, Affirmative Defenses, and the Case of U.S. v Microsoft* 2002 *Stanford Technology Law Review* 4 (2002).

find legal reasons for the illegality of predatory pricing. For example Article 102(a) TFEU explicitly states that predatory pricing will not be applicable in this situation because all above zero prices are profitable. Thus, the firm cannot be considered to be engaged in unfair price prohibition.

In the above situation, a software supplier has great pricing freedom. Against competitors of equal efficiency, an eliminative price will be below the competitor's cost. Against competitors of superior efficiency, the competition is between a low price and a superior product. The low price will inevitably cover price-sensitive customers. As discussed in the previous section, a price that is low enough to eliminate a competitor with a superior product raises the question of whether the elimination is a violation of competition law.

Since all market suppliers aim to maximise their profits, elimination may not be a rational strategy even if the supplier has recovered its investment cost. For a software supplier that has recovered its cost, the most threatening competitor is not the competitor that has equal efficiency or a cost advantage but the competitor that offers an advanced product. If a dominant software product competes with an advanced product in the market and the company producing the former does not want to improve its product quality, then the most rational strategy is not to eliminate the advanced product but to cover all price-sensitive customers. As the market power for the monopolist is its zero cost and dominant network, it has no technology advantage over its competitors; therefore, eliminating the superior product with a below-cost price will be an abuse of market power.<sup>240</sup> Moreover, quality-sensitive customers pose an obstacle, as they are unlikely to be attracted to the low price. Thus, covering all price-sensitive customers is the way to maximise profit, and prices that can cover price-sensitive consumers offer a competitive advantage (prices at this level are a competitive price). At this price level, even competitors of the same efficiency are eliminated, and the elimination of such competitors should not be considered a predatory practise. If the competitive below-cost price is not adopted, then the market will gradually be covered by the advanced product and the monopolist will obtain nothing. This outcome is not fair for a monopolist that is in a profit-collecting stage.

If the monopolist still wants to eliminate the superior product, it can do so if the price of its product is unreasonably low. There are cases where low-price products have eliminated advanced products. In the internet browser market, after Netscape's success, Microsoft quickly developed IE and soon gave it away. Netscape was eliminated. This outcome suggests that only a price close to a giveaway price can win over technology-sensitive customers and hence eliminate a superior software product. Although this giveaway price does not deliver profits, if it is the first step of a

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<sup>240</sup> Robert E. Bartkus, *Innovation Competition: Beyond Telex v IBM*, 28 Stan.L.Rev. 285 (1976).

predatory pricing strategy, it could eventually generate profits if monopoly pricing is adopted after the advanced product is eliminated.

#### F. SUMMARY OF IDENTIFYING SOFTWARE PREDATORY PRICING

Low price sales of software are often seen in the software market, and predatory pricing of software is an exclusionary conduct hidden among these low prices. The suggested approach helps to identify anticompetitive low prices from two aspects. First, the LAIC test should be adopted in analysing the below-cost sales of software – it is currently the best available cost test in assessing the cost structure of software. It is capable of identifying the cost of an extra copy of software, and most exclusionary below-cost sales of software can be identified. Second, the approach provides an analysis of below cost sales of software after the R&D costs have been recovered. In this situation, the cost of an extra copy of software is zero; whether the low-price is anticompetitive depends on the price level of a competitor with equal efficiency.

As below-cost pricing frequently occurs in software markets, there is the potential for competition law violation, and it is important to distinguish pro-competitive below-cost pricing from predatory pricing.

#### V. CONCLUSION

This research suggests that, because software differs substantially from physical products, the traditional industrial economic and competition analysis analysis may need to be adjusted for the software market:

1) The software market is a typical New Economy where competitors compete with innovative software. At the same time, high innovation costs act as high barriers for market entry. Thus, the network effects have the function of both tipping the market towards a single dominant network and imposing high switching costs on consumers. As a result, there is a greater danger of predatory pricing in this new economy than in the old industries.<sup>241</sup>

2) The software market offers a complex competition environment, and because of this predatory pricing is a temptation for the dominant supplier when they are targeting more efficient suppliers, as a more efficient supplier can easily form their own network by adopting a selective give-away or market penetration strategy that targets the customers from a dominant network. Once such a competitor gains the minimum mass for a network, they will threaten the dominant supplier's dominant position. To lose a dominant network means the loss of a dominant position, although the supplier may have recovered their costs or gained profits from previous customers.

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<sup>241</sup> Richard A. Posner, *Antitrust Law*, p 255 (University of Chicago Press, 2nd ed 2003); Michael L. Katz & Carl Shapiro, *Antitrust in software markets*, available at <http://faculty.haas.berkeley.edu/SHAPIRO/software.pdf>. (visited 29 May 2012); Melamed, A. Douglas, *Network Industries and Antitrust*, 23 Harv. J. L. & Pub. Poly 147, p151 (1999).

Thus, predatory pricing is favoured as a strategy for preventing small competitor networks from competing with the predator in the future.

3) At the same time, below-cost pricing is common in software sales, because most of it is the result of efficiency or an important step towards efficiency. Therefore, competition law should allow these efficiency-related low prices, as they help to achieve both a low price for consumers and accelerate competition. Additionally, because price competition is a secondary choice in competing in the software market, competition law would benefit from adopting more lenient policies towards these low prices.

4) When identifying predatory pricing in the software market, competition law enforcement will have difficulty distinguishing predatory pricing from reasonable below-cost pricing. As the marginal cost of software is negligible, a zero price or negative price for market promotion may appear to be risky. However, in fact, such prices are reasonable. For instance, without these prices, it is nearly impossible to establish a network in a market with a competing dominant network.<sup>242</sup> It is also difficult to assess the cost–price relationship of a software product, as this relationship is subject to the demand elasticity and common costs generated in multi-product operating.

Thus far, the LAIC is a suitable cost benchmark for assessing the cost–price relationship of a software product because it can both reflect the substantial part of the innovation cost and specify the per-unit costs. If the price of a software product is below LAIC, the price is exclusionary unless there are objective justifications for it. In the situation where the LAIC of a software product approaches zero, whether the pricing of this software is predatory depends on whether it is below the price of an equally efficient competitor's software.

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<sup>242</sup> Max Schanzbach, *Network Effects and Antitrust Law: Predation, Affirmative Defenses, and the Case of U.S. v Microsoft* 2002 *Stanf Technol Law Rev.* 4 (2002). Available at [http://stlr.stanford.edu/STLR/Articles/02\\_STLR\\_4/index.htm](http://stlr.stanford.edu/STLR/Articles/02_STLR_4/index.htm) (visited 29 May 2012). (Indeed, as described above, without penetration pricing it may be impossible for networks to form at all). Priest, George L., *Rethinking Antitrust Law in an Age of Network Industries*, Yale Law & Economics Research Paper No. 352. (2007). Available at SSRN: <http://ssrn.com/abstract=1031166> (visited 29 May 2012). (Thus, apparent below cost pricing -- that is, setting price below the cost of joining to the individual consumer -- is essential in order to create optimal network size).