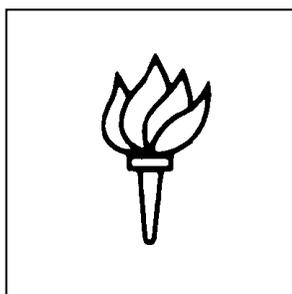


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The Hidden Costs of Free Goods: Implications for Antitrust Enforcement

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THE HIDDEN COSTS OF FREE GOODS: IMPLICATIONS FOR ANTITRUST ENFORCEMENT

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I. Introduction

A. The Growth of “Free”

Today a growing number of goods and services are provided in the marketplace free of charge.¹ Some examples include Linux's operating system, Google's search engine, Facebook's or Twitter's social network, Wikipedia's online encyclopedia, YouTube's on-line video and music streaming services, Dropbox's online storage services, and Typepad's blogging platforms. While the phenomenon of free consumer goods is not new, there has been a rapid growth in the number of free goods and services (hereinafter: "free goods"); indeed, “free” and “the appearance of free” have become part of our ecosystem.²

This phenomenon has been driven by changes in modes of the production, distribution, and dissemination of information that have substantially reduced incremental costs. Such changes have encompassed not only commonly recognized methods such as the digital distribution and digital

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¹ While our analysis applies in many instances to products and services that are sold at a price that is less than the variable cost of production, we will limit our discussion to those that are sold (or given away) at a zero price. Yet, as research has shown, one of the differences between these two categories often lies in the consumer's perception: in contrast to a low-priced offer which often devaluates the product, a free offer often does not create such an effect and, at a minimum, devalues the product less than if it were offered for a low, discounted price. See, Mauricio M. Palmeira and Joydeep Srivastava, *Free Offer ≠ Cheap Product: A Selective Accessibility Account on the Valuation of Free Offers*, 40(4) JCR 644 (2013). Our definition also captures situations in which the consumer pays indirectly, for example, by providing information about his or her preferences.

² See, for example, Jonathan M. Barnett, *The Host's Dilemma: Strategic Forfeiture In Platform Markets For Informational Goods* 124 HARV. L. REV. 1861 (2011); John M. Newman, *Copyright Freeconomics*, 66 VANDERBILT L. REV. 1407 (2013).

dissemination of information, but have also expanded through new technologies to include methods such as bio-printing and 3D printing.³

Furthermore, the more that customer attention, personal information, and/or information-on-information become important intangible assets in the digital economy, the more common become exchanges in which information becomes a currency for what might otherwise be perceived as a free good.⁴ The spreading phenomenon of free goods is consistent with and perhaps even stimulated by the lower weight given by many consumers to privacy, and the high degrees of leniency towards the provision of targeted information.⁵ These trends have allowed firms to use the increased demand created by free goods to provide profitable services such as targeted ads. Of particular note is the seemingly irrational effect of free goods on consumer choices, as lately confirmed by studies in behavioral economics.⁶ Finally, free goods create externalities: the more individuals are accustomed to free goods in one market, the more they expect to receive them in related markets.

B. Free Raises Analytical Issues

Naturally, this abundance of free goods has brought to the forefront issues regarding their welfare effects and the appropriate regulatory and enforcement tools. Cases such as the *Microsoft/Skype* merger and *Kinderstart vs. Google*, analyzed below, mandate enforcement agencies to closely examine

³ Mark Lemley, *IP in a World without Scarcity* (Stanford Public Law Working Paper No. 2413974, 2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2413974 and sources cited there.

⁴ See, e.g., Howard A. Shelanski, *Information, Innovation, and Competition Policy for the Internet*, 161 U. PA. L. REV. 1663, 1678 (2013); Preliminary opinion of the European Data Protection Supervisor, Privacy and Competitiveness in the Age of Big Data (March 2014); David E. Evans, *Attention Rivalry Among Online Platforms*, 9(2) JCLE 313 (2013).

⁵ See, e.g., Daniel O'Brien and Doug Smith, *Privacy in Online Markets: A Welfare Analysis of Demand Rotations* (working paper No. 323, 2014), available at: <http://www.ftc.gov/reports/privacy-online-markets-welfare-analysis-demand-rotations>; David S. Evans, *The Online Advertising Industry: Economics, Evolution, And Privacy*, THE JOURNAL OF ECONOMIC PERSPECTIVES 37 (2009).

⁶ See, e.g., CHRIS ANDERSON, *FREE: THE FUTURE OF A RADICAL PRICE* (2009) and Chris Anderson, *Free! Why \$0.00 Is the Future of Business*, WIRED MAGAZINE: 16.03, Mar. 2008, http://archive.wired.com/techbiz/it/magazine/16-03/ff_free?currentPage=all (last visited Nov. 2, 2014) (arguing that free pricing is an inevitable and a normatively acceptable approach to pricing internet services in a digital world, due to the abundance of resources, which enables firms to leverage this abundance and give services away while profiting from other services that remain scarce, as well as due to the efficiencies in the provision of digital services. The “near-zero” marginal cost associated with digital distribution makes it possible to share services with a large number of individuals with only negligible increases in cost.)

the effectiveness of existing tools to deal with the special issues raised by free goods.

More often than not, free goods and services provide real benefits to consumers and are clearly pro-competitive. However, this is not always so. Under some circumstances the provision of free goods raises complex questions with regard to their overall welfare effects. We show that despite the fact that the consumer does not pay a direct price, there are indirect “prices” that reflect the opportunity cost associated with the consumption of free goods. These indirect prices can be overt or covert, in the same market in which the product is distributed or in related markets, monetary or non-monetary, and short-term or long-term. The obvious effect of free goods is to lower the ability of at least some firms to provide competing goods. Yet this, in itself, is not a reason to limit the provision of free goods, which may increase social welfare. We suggest, however, that the provision of free goods might affect dimensions of competition other than price, in ways that can affect welfare negatively.

The negative effects of the short-term provision of free goods by a monopolist have been recognized and are restricted under the predatory pricing prohibition, based on a two-staged strategy in which the price is raised and initial losses recouped once the threat of entry or expansion is lifted. In this paper we seek to explore the more difficult cases - those in which the free product will *always* be provided for free.

Most of the economic literature on free goods has focused on two-sided markets in which the free good is provided in exchange for attention or information.⁷ We analyze the welfare effects of additional cases that are becoming commonplace in our economy. These include a strategy of offering two versions of the same product, the simple version for free and the more developed version for profit (“freemium”), or providing a product for free in order to create a large consumer basis that could then be sold, for profit, to other firms. One of the most intriguing cases we explore focuses on the welfare effects of free goods that are offered even though their provision is not profit

⁷ See, e.g., Evans, *supra* note 4; John M. Newman, *Antitrust in Zero-Priced Markets* (2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2474874.

maximizing in any market. Free and Open Source Software ("FOSS") and free goods that are provided for philanthropic reasons serve as good examples. The welfare effects of these different types of free goods are analyzed in light of conventional analysis as well as new research pointing to the "irrational" behavioral response of consumers who are faced with a free option.

This welfare analysis serves as a basis for the exploration of the antitrust implications of the provision of free goods, which has been relatively neglected.⁸ Indeed, as this paper shows, free goods raise significant issues for antitrust enforcement, which run the gamut from market definition to market power and to the evaluation of the competitive effects of mergers and more generally to strategic business behavior. In outlining the substantial analytical antitrust issues that are raised when goods and services are offered for free,⁹ we emphasize the recognized need to analyze products or services that are companions to those that are offered for free and we suggest new areas for exploration.¹⁰ Our analysis suggests the limitations of existing antitrust tools in dealing with some types of free goods and the need to broaden the scope or employ other regulatory tools when antitrust has reached its limits. We reject the position expressed by some courts and scholars that free goods should not come under antitrust scrutiny.¹¹

Analytical questions of this type are best evaluated through the lens of specific problems and cases. We use three main case studies in this paper.

⁸ For studies which focused on a specific kind of good see e.g., Brendan O'Flaherty, *Need and generosity: how markets for free goods equilibrate*, 54(1) J URBAN ECON 157 (2003)(analyzing philanthropic goods); David McGowan, *Legal Implications of Open-Source Software*, U. ILL. L. REV. 241 (2001); Greg R. Vetter, *"Infectious" Open Source Software: Spreading Incentives or Promoting Resistance?*, 36 RUTGERS L.J. 53 (2004); Heidi S. Bond, *What's So Great About Nothing? The GNU General Public License and the Zero-Price-Fixing Problem*, 104 MICH. L. REV. 547 (2005); Brian W. Carver, *Share and Share Alike: Understanding and Enforcing Open Source and Free Software Licenses*, 20 BERKELEY TECH. L.J. 443 (2005); Michal Tsur and Shay David, *A License to Kill (Innovation)? Open Source Licenses and Their Implications for Innovation* 1 (2005), available at <http://ssrn.com/abstract=858104>; Barnett, *supra* note 2; Michal S. Gal, *Viral Open Source: Competition vs. Synergy*, 8 JCLE 469 (2012)(all focusing on FOSS). For general studies of the effects of free goods on antitrust analysis see, e.g., Evans, *supra* note 4; Fabio Polverino, *Hunting the Wild Geese: Competition Analysis in a World of «Free»*, *Concorrenza e mercato* 545 (2012), available at <http://ssrn.com/abstract=2145545>.

⁹ This reality is reflected by David Evans who notes that "[a] price of zero provides a red flag that the textbook model of competition and standard antitrust analysis do not apply to the product in question." David S. Evans, *The Antitrust Economics of Free*, 7(1) COMPETITION POL'Y INT'L 71 (2011).

¹⁰ *Id.* See also James Ratliff and Daniel L. Rubinfeld, *Is There a Market for Organic Search Engine Results and Can Their Manipulation Give Rise to Antitrust Liability?* JCLE (2014).

¹¹ See analysis below.

First, we explain how the offer of a forever free browser by Microsoft was a means of increasing the barrier to entry in the market for PC-based operating systems by cross-subsidization and was arguably a means of anti-Netscape predation. Second, we exemplify the antitrust implications of a two-sided market through the free use of Google's search engine. Third, we analyze the potential welfare-reducing non-monetary effects of the offer of free newspapers.

In the section that follows we review the literature on the zero pricing of goods and services and analyze the welfare effects of free goods. Section III offers the three cases as illustrative examples of the difficult conceptual problems that face antitrust enforcers (both public and private) in evaluating the welfare effects of free goods. In Section IV we build on the two previous sections to analyze some of the most important implications for antitrust enforcement. Section V concludes.

II. Motivations and Welfare Effects of Free Goods

A. Motivations for the Supply of Free Goods

1. Traditional Analysis

Firms offer free goods for a variety of economic reasons.¹² Thus, the offer of free goods might be a means of increasing revenues in product markets (e.g., introducing free products to grow consumer demand in network markets).¹³ Alternatively, the offer of free experience goods may be an effective means of growing demand for a product whose value is only appreciated after it

¹² See, generally, Busa P. Cunningham et al., *Free pricing model: Can business really make money by giving away for free?* (Working Paper, University of Texas, Austin, 1999), available at <http://cci.mcombs.utexas.edu/research/white/free-price.htm>; John M. Gallagher and Yu-Ming Wang, *Network Externalities and the Provision of Composite IT Goods Supporting the E-Commerce Infrastructure*, 9(1) ELECTRONIC MARKETS 14 (1999); Romuald E.J. Rudzki and Shaomei Li, *The Economic Paradox of the "Freebies" Phenomena: How and Why Companies Give Stuff Away for Free*, 1(4) DIRECT MARKETING 180 (2007); Lee et al., *Analysis of pricing strategies for e-business companies providing information goods and services*, 51 COMPUTERS & INDUSTRIAL ENGINEERING 72 (2006); Make Money Around Free Content – Wired How-to Wiki, http://howto.wired.com/wiki/Make_Money_Around_Free_Content (last visited Nov. 2, 2014).

¹³ See, for example, Danny Ben Schahar and Assaf Jacob, *Selective Enforcement of Copyright as an Optimal Monopolistic Behavior*, 3(1) CONTRIBUTIONS TO ECONOMIC ANALYSIS & POLICY 1 (2004); *In re Apple iPod iTunes Antitrust Litig.*, 796 F. Supp. 2d 1137 (N.D. Cal. 2011).

has been consumed.¹⁴ Indeed, an increasingly common marketing strategy is to offer a basic product for free, and charge for its premium versions or added features ("freemium" examples include LinkedIn Business, Adobe, and Spotify).¹⁵ Furthermore, zero pricing may be motivated by the goal of increasing revenues in markets for complementary products that operate in more lucrative markets (e.g., service-based revenue models).¹⁶ Finally, free products are often used in multi-sided platform markets which take advantage of cross network effects (e.g., free newspapers which increase attention to ads, free internet search services in return for personal information).¹⁷ Of course, a business strategy may combine several of these motivations.

While free goods are not a new phenomenon, they are common today, especially in digital markets. This may be partially explained by the fact that the marginal cost of supply of digital products and services is often extremely low (the cost of offering an additional consumer the option of downloading the

¹⁴ Nelson, Philip, *Information and Consumer Behavior*, 78(2) JOURNAL OF POLITICAL ECONOMY 311 (1970); Miguel J. Villas-Boas, *Dynamic Competition with Experience Goods*, 15(1) JOURNAL OF ECONOMICS & MANAGEMENT STRATEGY 37 (2006).

¹⁵ This "freemium" strategy can be exemplified by the marketing strategy of Adobe. The basic Adobe reader is distributed for free, thereby increasing the demand for software that writes Adobe files. The enhanced versions of the Adobe software (that allow readers, for example, to highlight or comment on certain passages), is not free. Similarly, Google enables users to view part of books, but charges for viewing additional parts that were not presented.

¹⁶ See, for example, ROY G. D. ALLEN, *MATHEMATICAL ANALYSIS FOR ECONOMISTS* (Brunton Press, 2008)(1938); Evans, *supra* note 9; Barnett *supra* note 2; Polverino, *supra* note 8. Some zero-price complementary goods might be explained based on the theory of two-part tariffs, which are based on a fixed access charge for the good and a variable charge for consumables, based on their use. See JEAN TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* (1988). Others might be explained by multi-sided markets which serve two or more distinct groups of consumers that contribute to total revenue. See, e.g., E. Glen Weyl, *A Price Theory of Multi-Sided Platforms*, 100(4) AMER. ECON. REV. 1642, 1642-72 (2010); David S. Evans & Richard Schmalensee, *Markets with Two-Sided Platforms*, 1 ISSUES IN COMPETITION L. & POL'Y 28 (2008); Evans, *id* ("the complementary product for members of one group of consumers is the members of the other group of consumers. If the elasticities of demand and cross-dependencies between the demands of each group line up properly, it is possible that the profit-maximizing price for one of the products is zero.") Examples involve charge cards (charging a transaction fee from merchants), free internet searches (charging advertisers), restaurant reservations sites (charging participating restaurants).

¹⁷ See, e.g., David S. Evans and Richard Schmalensee, "*The Industrial Organization Of Markets With Two-Sided Platforms*", COMPETITION POLICY INTERNATIONAL 1 (2005); Jean-Charles Rochet and Jean Tirole, *Two-Sided Markets: A Progress Report*, 37(3) THE RAND JOURNAL OF ECONOMICS 645 (2006); Marc Rysman, *The economics of two-sided markets*, 23(3) THE JOURNAL OF ECONOMIC PERSPECTIVES 125 (2009).

product and using it is very small).¹⁸ Moreover, it often does not cost much to disseminate information digitally, thereby further reducing transaction costs. Accordingly, the supplier can afford to convert only a small fraction of consumers to paying customers (e.g., in upgraded versions) and still be profitable.¹⁹ As Lemley has pointed out, advances in 3D printing, bio-printing and robotics may also add to the economy of free.²⁰

Free goods might also be used as part of predatory or exclusionary strategies. Ben Shachar and Jacob offer an interesting example, in which the owner of a copyright enforces his right in a selective manner, implying that some users can use it for free.²¹ The underlying strategy is to deter potential competitors from entering the market by lowering prices (to zero) for those consumers characterized by a relatively high elasticity of demand for the incumbent's products, even at the cost of immediate profit loss. This strategy, which may allow for almost immediate recoupment, is especially profitable in markets with strong network effects which can lead to market-tipping.

Finally, the "price" of the good that is offered for free is often seen in non-monetary forms, such as information that is revealed about consumers' preferences.²² The more significant the network effects of such gathered information, the more the value to the information aggregator and the greater the potential of harm to competition in the information market. Google serves as example: data on consumer preferences obtained through the provision of free search services serves as an input in the market for information on consumer's preferences. This value of these data increases in correlation to Google's advantage from aggregating this information with other sources of information to achieve a comparative advantage in the market for information-

¹⁸ See, e.g. Richard A. Posner, *Antitrust in the New Economy*, 68 *Antitrust Law Journal* 925 (2001) ("Intellectual property is characterized by heavy fixed costs relative to marginal costs...dramatically so in the case of software, where it is only a slight overstatement to speak of marginal cost as zero.")

¹⁹ CHRIS ANDERSON, *THE LONG TAIL: WHY THE FUTURE OF BUSINESS IS SELLING LESS OF MORE* 223 (2008). See also Hal Varian, *Versioning Information Goods*, University of California, Berkeley (1997), available at <http://people.ischool.berkeley.edu/~hal/Papers/version.pdf>.

²⁰ See, e.g., Lemley, *supra* note 3.

²¹ Ben-Shachar and Jacob, *supra* note 13.

²² See, e.g., Chris Jay Hoofnagle and Jan Whittington, *Free: Accounting for the Costs of the Internet's Most Popular Price*, 61 *UCLA L. REV.* 606, 608 (2014) ("exchanges [involving free products] often carry a hidden charge: the forfeit of one's personal information.").

on-information. Such marketing and expansion strategies have long been acknowledged and analyzed,²³ although their antitrust implications are only beginning to be studied in depth.

All of the strategies just discussed are driven by a monetary profit maximization motive. But, it is important to realize that a growing number of goods are provided free of charge based on motivations that are intrinsic and not purely economic. One example is Free and Open Source Software, such as Linux, MySQL and Apache, which are often the product of social networks in which software developers collaborate voluntarily.²⁴ Motivations of contributors to open-source software are diverse, including social interactions via cooperative creative activity, the creation of better software for self-use, gifting, creating an alternative to an existing monopoly, and reputational development.²⁵

Another motivation is philanthropic, both individually motivated and public-regarding. Food and shelter are common examples, as is the provision of free daycare services or cultural events. The provision of free goods might alternatively be driven by motives such as public recognition, influence, or political power. Control of the written or broadcast media is an obvious example.²⁶ Providing free goods might also be based on psychological motivations, such as remorse. For example, a tomato grower who sold contaminated tomatoes all his life might decide, in his later years, to distribute organic tomatoes for free. Alternatively, it might be based on such a deep

²³ See, e.g., Evans, *supra* note 9.

²⁴ See, e.g., Carver, *supra* note 8; YOCHAI BENKLER, *THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM* (2006); Niva Elkin-Koren, *What Contracts Can't Do: The Limits of Private Ordering in Facilitating a Creative Commons*, 74 *FORDHAM L. REV.* 375 (2005).

²⁵ See, e.g., Josh Lerner and Jean Tirole, *Some Simple Economics of Open Source*, 50(2) *JOURNAL OF INDUSTRIAL ECONOMICS* 197 (2002); Il-Horn Hann et al., *Economic Returns to Open Source Participation: A Panel Data Analysis*, Third Annual Workshop on Economics of Information Security, University of Minnesota, MS. (2004), available at <http://opim.wharton.upenn.edu/wise2004/sun412.pdf>; Karim R. Lakhani & Robert G. Wolf, *Why hackers do what they do: understanding motivation and effort in free/open source software projects*, in *PERSPECTIVES ON FREE AND OPEN SOURCE SOFTWARE* (Josef Feller et al. eds., 2003); Alexander Hars and Shaosong Ou, *Working for Free? Motivations of Participating in Open Source Projects*, 6 *INTERNATIONAL J. OF ELECTRONIC COMMERCE* 25 (2002); Chaim Fershtman and Neil Gandall, *Open Source Software: Motivation and Restrictive Licensing*, 4 *INTERNATIONAL ECONOMICS AND ECONOMIC POLICY* 209 (2007).

²⁶ Studies include O'Flaherty, *supra* note 8; McGowan, *supra* note 8; Vetter, *supra* note 8; Bond, *supra* note 8; Carver, *supra* note 8; Tsur and David, *supra* note 8; Barnett, *supra* note 8; Gal, *supra* note 8 (all focusing on open source software).

rivalry between producers that one will do everything to keep his rival out of his market.

On occasion, it will be instructive to distinguish between non-monetary free goods for which the consumer pays in another "currency" (such as privacy, media diversity, etc.), and those for which the consumer does not pay at all, at least not in the short run. Our primary emphasis will be on this latter case, which poses the biggest challenge to the intuitively appealing view that free goods increase welfare.

2. The new learning: The "free effect"

The zero price point has become more and more ubiquitous for another reason. Suppliers of the free good may be taking into account an important newly-acknowledged lesson from behavioral economics. While the allure of free is intuitive, recent studies have shown that a free good can have a much stronger lure than its actual value.²⁷ Zero often serves as a focal point, signaling to consumers that the product or service has a substantially higher benefit than if the same product or service was made available at a very low, but positive price. This effect has been found to be so important, that it is often called "the zero price effect" or "the free effect." In the discussion that follows, we summarize some of the major studies confirming its existence.

Shampanier, Mazar, and Ariely conducted experiments on the psychology of free prices. They found that when faced with a zero price, dramatically more participants chose the cheaper option, despite the fact that they gave up an alternative that better served their otherwise revealed preferences. Accordingly, individuals appear to act as if zero pricing of a good not only decreases its cost, but also adds to its value.²⁸ The experiments were based on consumer choices when faced with different-quality chocolates (Hershey's and Lindt), and under different price menus, some of which involved

²⁷ In formal terms, there is an increase in the proportion of consumers choosing the free product Y and a decrease in the proportion of consumers choosing product X, when the prices of the products go from $[P_Y, P_X]$ to $[0, P_X - P_Y]$.

²⁸ Kristina Shampanier et al., *Zero as a Special Price: The True Value of Free Products*, 26 (6) *MARKETING SCIENCE* 742 (2007). The authors attribute this behavioral response to "affect," suggesting that zero price options having no downside invoke a more positive "affective" response that would otherwise be expected. See also DAN ARIELY, *PREDICTABLY IRRATIONAL, REVISED AND EXPANDED EDITION: THE HIDDEN FORCES THAT SHAPE OUR DECISIONS*, 49-63 (2008).

a zero price for the lower-quality good. The authors found that a price of zero is more powerful than a five times larger price reduction that remains within the range of positive prices.²⁹ Furthermore, they demonstrated that the zero-price effect is not driven by transaction costs.³⁰ These findings were confirmed in later studies.³¹ Dengler,³² for example, also found that a free product is so extraordinarily attractive that another, much preferred, alternative is forgone.

Other studies confirm that the results hold even when the free good is part of a costly product bundle. Spiegel, Benzion, and Shavit³³ experimented with combinations of products with the same final price. These were offered in different marketing forms, including 'buy one, get one free' and a 50% discount on both products. The experiment showed that consumers usually preferred getting one product for free over getting a 50% discount on each of two products, thereby confirming the "free effect" in a multi-product setting: Consumers over-valuated the free products, even when it was the same as the 50% discount.

The "free effect" was also found to exist with regard to complementary goods. In a study of the tourism industry by Nicolau and Seller,³⁴ the authors studied preferences for high value and for low value hotels. When the low value hotel offered a free breakfast, the demand for the low value hotel increased, beyond the market value of the breakfast.³⁵ In contrast, Spiegel et al. found that

²⁹ *Id.*, at 747.

³⁰ Shampanier et al., *supra* note 28.

³¹ See, e.g., Francisco Guilherme Sousa Pereira Saraiva, *Free Products and Their Impact on Consumer Behavior*, (2011)(Published M.A dissertation, Porto University), available at <http://repositorio-aberto.up.pt/bitstream/10216/61112/2/DissertacaoFranciscoSaraiva2011Free%20Products%20and%20Their%20Impact%20on%20Consumer%20Behavior.pdf>; Sarah Dengler, *Freebie Frenzy: Experimental Evidence of the Zero Price Effect*, (Working Paper, 2013), available at <http://www.sarahdengler.com/wp-content/uploads/Draft-4-FINAL.pdf>; Juan L. Nicolau and Ricardo Sellers, *The Free Breakfast Effect An Experimental Approach to the Zero Price Model in Tourism*, 51(3) JOURNAL OF TRAVEL RESEARCH 243 (2012).

³² Dengler, *Id.*

³³ Uriel Spiegel et al., *Free Product as a Complement or Substitute for a Purchased Product - Does it Matter?* 2(2) MODERN ECONOMY 124 (2011).

³⁴ Nicolau and Ricardo, *supra* note 31.

³⁵ See also, Juan L Nicolau, *Battle Royal: Zero-price effect vs relative vs referent thinking*, 23(3) SPRINGER SCIENCE 661 (2012).

the "free effect" disappeared when the products were perfect complements, since consumers treated them as an inseparable package.³⁶

The existence of a "free effect" was also confirmed in an interesting natural experiment. When Amazon introduced free shipping in some European countries, the price in France was mistakenly reduced not to zero, but to a negligible positive price (about 10¢). Whereas the number of orders increased dramatically in the countries with free shipping, there was not much change.³⁷

Several explanations have been proposed for this "free effect." Shampanier et al. found strong evidence that free evokes a positive affect and that this affect impacts the decision-making process.³⁸ Dengler agrees, suggesting that when faced with "free," consumers are affective rather than rational decision makers, perhaps due to an emotional response or to a cognitive bias. In her words: "there is just something irresistible about "getting something for nothing," or feeling like we got a great bargain."³⁹ In addition, the decision to choose a free product is a much simpler decision, and that simplicity could be the driver of higher demand.⁴⁰

All of these studies were performed on relatively inexpensive goods and many were performed on students.⁴¹ It is still unclear how much the "free effect" would change consumers' decisions with regard to costlier goods or would affect other groups in society, including corporate entities.⁴² Yet these studies make clear that free is not simply one point on the continuum of low cost alternatives. Discounts to zero may have a much larger effect on demand than they save the consumer in actual monetary terms and cannot be explained by a classic analysis of rational consumer behavior.

One plausible conclusion is that free goods have "nudge" qualities which help push consumers to make choices they otherwise might not have made,

³⁶ Spiegel *et al.*, *supra* note 33.

³⁷ Shampanier, *supra* note 28, at 756.

³⁸ *Id.* For the "Affect" see Melissa L. Finucane. *et al.*, *The Affect Heuristic in Judgments of Risks and Benefits*, 13 JOURNAL OF BEHAVIORAL DECISION MAKING 1 (2000).

³⁹ Shampanier *et al.*, *supra* note 28.

⁴⁰ *Id.*, 753. Additional yet untested explanations of free include signaling to oneself and to others, endowment of what is perceived as a "gift", and loss aversion.

⁴¹ Shampanier *et al.*, conducted a survey based on hypothetical options, which found that the effect of zero is not limited to small prices and meaningless decisions, *Id.*, at 755.

⁴² For a similar result see *Id.*

resembling those suggested by Thaler and Sunstein.⁴³ Yet while Thaler and Sunstein suggest the use of nudge strategies to design policies to change the conduct of consumers who behave irrationally and so are not advancing their own interest, in market settings "nudge" can be used to change the conduct of consumers to prefer a product which does not advance their otherwise revealed preferences. This result is further strengthened by findings that once accustomed to a free good, consumers' willingness to pay for the product is significantly reduced, often below the product's value.⁴⁴

B. Effect of Free Goods on Competition and Welfare

Free goods pose a special challenge. While free goods create obvious benefits to consumers, they have the potential to create negative effects on both competition and welfare.⁴⁵ In this section we analyze such effects.

As a starting point, it is helpful to recognize that some of the most basic market-related assumptions made in economic models do not hold when a free good is provided. One such assumption is that the price of a good covers (or more than covers) its costs of production, at least in the long-run.⁴⁶ Even if we broaden our analysis to include related markets, some free goods will never cover their costs of production (e.g., philanthropic goods). A second assumption is that consumer demand generally will be positively related to the relative qualities of the goods provided in the market. However, when a free good is provided, the price of zero does not signify the product's stand-alone comparative advantage. Furthermore, as elaborated above, the "free effect" creates a gap between consumer demand and the product's relative qualities. A third example involves changes in output levels. It is generally assumed that

⁴³ RICHARD H. THALER AND CASS R. SUNSTEIN, *NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS* (2008).

⁴⁴ Evans, *supra* note 4 (firms that offered their products for free and tried to charge a low price lost a significant proportion of their customers).

⁴⁵ It should be emphasized that this article focuses on economic effects, and disregards psychological effects such as strengthening the self-respect of the provider and strengthening the motivation of others to give (see, e.g., Yochai Benkler, *Coase's Penguin, or Linux and the Nature of the Firm*, 112 *YALE L.J.* 369 (2002)), or in some cases harming the self-respect of the receiver of the free good.

⁴⁶ The effect on the free good market might resemble a reverse cellophane fallacy. See Debra J. Aron and David E. Burnstein, *Regulatory Policy and the Reverse Cellophane Fallacy*, 6(4) *JCLE* 973 (2008)(writing about below-cost regulated prices); see also, Polverino, *supra* note 8.

when output is increased, price is reduced. This is not necessarily the case, however, with free goods that are associated with one side of a two-sided market that is characterized by network effects.

It is worth emphasizing that the possibility that free goods might reduce welfare does not necessarily lead to the conclusion that antitrust enforcement or public regulation is justified. To prevent possible confusion, we have separated the discussion of the theoretical effects of free goods on welfare, which immediately follows, from an analysis of the possible antitrust enforcement issues that they raise, which is covered in section IV below.

1. Potential Positive Effects of Free Goods

Free goods produce a surplus to consumers, when the good is provided without any explicit payment (e.g., free organic tomatoes), or where the compensation to the producer is not regarded as a price by the consumer (e.g., increasing consumer exposure to the basic version of a software so those interested would buy an upgraded version). Some free goods enlarge usage and can also strengthen consumers' benefits from network effects. In platform markets, for example, a free good might, under some circumstances, increase user utility by maximizing cross-network effects.⁴⁷ A common example involves a night club which operates as a platform to connect two groups. If one group has a high elasticity of demand relative to the other, it might be optimal to allow the group elasticity to enter for free and to increase the price charged from the other group. This might achieve the desired allocation, thereby increasing the utility of both groups from the exchange.⁴⁸

Furthermore, free goods may create pro-competitive effects by encouraging firms to compete on quality as well as price.⁴⁹ Alternatively, the provision of free goods might be used by newcomers to overcome high entry

⁴⁷ Tirole, *supra* note 16; Raphael Fleischer and David A. Smith, *Two-sided Markets in the EU: An Attempted Demystification* (2012), available at <http://home.uchicago.edu/~davidsmith/research/TSM2012.pdf>.

⁴⁸ This is a special case of a two-part tariff. For an overview, see ROBERT S. PINDYCK AND DANIEL L. RUBINFELD, *MICROECONOMICS*, Chapter 11 (8th ed. 2012).

⁴⁹ See, e.g., Gal, *supra* note 8.

barriers into markets. This is especially important in markets in which network effects are significant and consumers' switching costs are high.

Moreover, some individuals may wish to contribute to the provision of free goods, which might, in turn, increase quality. Free and Open Source Software serves as a good example. In social-network projects, developers are motivated in part by the fact that the project is not profit-driven.⁵⁰ The free provision of the software can also motivate contributions to its creation in another way: as the number of users grows, so does the motivation of developers to take part in FOSS creation: it boosts the motivation of those who aim to create a world in which all source code is free and open; it strengthens those motivated by their own use of the FOSS, by increasing its value to them if the software creates network effects; and it motivates purely innovation-related developers as it creates a growing platform to which they can contribute. In the end, free provision of goods may allow for the introduction and use of goods that would otherwise not be supplied in the market.⁵¹

Relatedly, the provision of some free goods creates social effects on consumers that go well beyond the costs saved. Finally, the free provision of goods, enhanced by the "free effect," enables firms to increase demand for their product, thereby reaching a larger number of consumers. This, in turn, enables them to learn more quickly about limitations or potentials of the product and fix them more quickly, and potentially achieve scale economies, or strengthen the product's network effects,. It is reasonable, therefore, to take as a starting point the view that free is generally socially beneficial.⁵²

2. Possible Negative Welfare Effects of Free Goods

Despite the fact that the consumer does not pay a direct price for a free good, the change in the price dimension affects other dimensions of competition in ways that can (under some conditions) harm social welfare. Such effects can

⁵⁰ See, e.g., Lerner and Tirole, *supra* note 25; Hars and Ou, *supra* note 25; Karim R. Lakhani and Robert G. Wolf, , *supra* note 25.

⁵¹ Moreover, the free usage- and uploading of many internet resources creates a shared social space that affects and transforms some important social interactions.

⁵² See, for example, Bond, *supra* note 8 (referring to FOSS).

be overt or covert, in the market in which the free product is distributed, economic or non-monetary, short-term or long-term. While some of these effects have been recognized, we seek to unveil additional ones, based in part on the newly recognized "free effect." We start with the relatively easy and most recognized case (bundled goods).⁵³

A basic condition which underlies the potential negative effects of all types of free goods is the potential creation or strengthening of significant market power by the free goods provider.⁵⁴ Of course, market power can be based on the relative quality of the good, economies of scale, or network effects. Accordingly, market power is a necessary but not sufficient condition for negative effects to arise. The analysis should then focus on the effects of the free provision of a good on access to relevant market(s) by potential competitors and the overall effects of limitations on such access.

To begin, consider free goods which are bundled with other goods sold at positive prices.⁵⁵ It is commonly assumed that "the [long term] existence of a free good signals that there is a companion good, [and] that firms consider both products simultaneously in maximizing profit."⁵⁶ In such situations, free goods might have an exclusionary effect: it might be more difficult to enter the market where either good is sold, without entering both markets, thereby creating a barrier to entry. In order to compete, a competitor would either need to be able to offer the same, complementary product for free, offer another related product for free, or increase the value of its primary product substantially beyond the value attached by the consumer to the free good. Should entry barriers into either market be high, some firms might not enter, even if they can supply a more efficient product than is currently supplied in it. Such effects are strengthened by the observed reluctance of consumers to pay for anything that

⁵³ We do not deal with a potential claim that free leads to wasteful use by the consumer which, in turn, increases society's deadweight loss.

⁵⁴ How such market power is measured is a separate question, to be addressed in Section IV below.

⁵⁵ Of course, bundling will only be profitable if it enables recoupment of losses in the paid product market. The welfare effects of such bundling practices have been raised by the decision of the U.S. Third Circuit opinion with respect to the competitive effects of bundled loyalty rebates in *LePage's v. 3M*, 324 F. 3d 141 (3rd Cir. 2003). For an economic analysis, see Daniel L. Rubinfeld, *3M's Bundled Rebates: An Economic Perspective*, 72 U. CHI. L. REV. 243 (2005).

⁵⁶ Evans, *supra* note 9.

they have previously received for free.⁵⁷ Free goods might also create externalities on other markets: the more consumers are accustomed to receiving goods for free, the more they tend to expect to get other products of a similar kind (e.g., on-line services) for free and the higher the entry barriers into related markets.

The "free effect" increases this exclusionary effect beyond what has been recognized. This is exemplified by a study of the tourism industry performed by Nicolau and Seller,⁵⁸ in which consumers valued a package with a free breakfast much above their valuation of a breakfast. Observe that the "free effect" implies that the bundling firm will have to invest less in the quality of the tying product in order to create a comparative advantage, thereby increasing the exclusionary effect and reducing the need to invest in quality.

None of this implies that such exclusionary effects reduce welfare. Indeed, the provision of free goods changes the dynamics of competition in the market; it creates a built-in advantage for the provider of the free good and removes price as an effective instrument of competition. Yet one should not necessarily conclude that welfare is harmed. Competition is a means to an end (welfare), and once that end is met in a more efficient way, the justifications for protecting competition fail. Accordingly,, a further analysis is needed in order determine whether the benefits received by the consumer, including those stemming from network and cross-network effects, are not dwarfed by harm to her welfare in the long-run as a result of reduced competition.

A more difficult question arises with regard to the welfare effects of profit-making free-standing (i.e., unbundled) free goods. The provision of such goods is based on a wider strategy of interconnection: in the first stage goods are provided for free at a loss to the provider, which will be more than made up in the second stage.

⁵⁷ A study performed on micro-blogs such as Twitter indicated that 0% of users said that they would be willing to pay for its services. Justin Pierce, 2010 USC Annenberg Digital Future Study Finds Strong Negative Reaction to Paying for Online Services http://annenberg.usc.edu/News%20and%20Events/News/100726_CDFStudy.aspx (last visited Nov. 2, 2014).

⁵⁸ Nicolau and Ricardo, *supra* note 31.

In two-sided markets, profits are earned from two different groups of consumers, and demand by one group affects demand by the other. Newspapers offer an instructive example; here profits can accrue from both readers and advertisers: the more individuals that read the newspaper, the more advertisers would be willing to invest in buying ads. The "free effect" enables the supplier to increase demand on one side of the market, thereby increasing profits from the other side of the market. Facebook exemplifies this point: its service is provided to the consumer free of monetary charge,⁵⁹ but it sells targeted ads based on consumers' revealed preferences at prices which potentially cover their costs of providing free Internet services. This, in turn, makes entry into either market more difficult.⁶⁰ Significant scale economies, network effects, and/or multi-product network effects all increase entry barriers.

Free-standing profit-making free goods might alternatively be based on a two-staged strategy. A common example is free commercial software: in the first stage consumers get to know the product, thereby potentially increasing not only the consumer base but also the product's reputation and its network effects, and in the second stage some consumers buy upgrades, premium versions or other products and services of the firm, at prices that enable the firm to profit. The free provision of products also enables firms to better study the patterns of demand for their product and to test new products in the market more easily, thereby potentially increasing efficiency. Adobe and Cyota are successful software firms that operate based on such a strategy.

Alternatively, profits in the second stage can be based on the price paid by another firm for buying the firm's property rights in the product. The free provision of goods in the first stage enables firms to prove to potential buyers the benefits and potential demand for their products. The recent buy-out of Waze serves as an excellent example. Waze is a social-network-powered navigation system which uses information from its users to identify road congestions in real-time. Its services are currently provided for free. After

⁵⁹ Consumers pay in revealed preferences, in limitations to privacy and in their willingness to accept targeted ads.

⁶⁰ See, e.g., Gallagher and Wang, *supra* note 12, analyzing the two-level entry problem in the web server market.

several years of trial, Waze began to offer ads and coupons to services along the routes travelled, for which it charged ad providers. Yet, Waze's primary real profit came from its recent acquisition by Google, which wanted to improve its on-line navigation systems.⁶¹

What are the welfare effects of the provision of free standing profit-making free goods? As with all other free goods, the answer depends on the short and long-run benefits created net of any exclusionary or efficiency-reducing effects. Free-standing free goods might create exclusionary effects that are quite similar to those of bundled free goods: creating a two-level entry problem, with a rival required to enter more than one market, even if it can provide a high quality product only in one. Alternatively, they might create a temporal entry barrier, until the competitor company is bought by another that might start charging for the good.

Yet the unique nature of free goods requires a careful analysis before reaching a conclusion that welfare was harmed. For example, the level of maturity of the market for the free good should affect the analysis: creating a new market by increasing the exposure of consumers to goods not used before is not similar to gaining control over an existing market. Furthermore, to be profitable, the strategy should also create entry barriers into the high quality segment of the market (e.g., reputational effects where the market is characterized by high degrees of asymmetric information). Otherwise, a competitor might enter only the high quality segment, thereby reducing his costs relative to the firm which must also recoup its losses on the free product.⁶²

When evaluating the effects of free goods, all affected markets must be analyzed. Yet should we take into account, when evaluating the conduct of the free goods provider, its potential exclusionary effects if the assets were in the hands of another firm? We think not. As a case in point, consider the recent acquisition of Viber, the worlds-largest voice-over-ip provider, which provides its

⁶¹ See, e.g., Peter Cohan, *Four Reasons why Google Bought Waze*, Forbes <http://www.forbes.com/sites/petercohan/2013/06/11/four-reasons-for-google-to-buy-waze> (last visited Nov. 2, 2014).

⁶² For similar logic see Randal C. Picker, *The Razors-and-Blades Myth(s)*, 78 U. Chi. L. Rev. 225 (2011).

services for free. Viber was recently purchased by a Chinese manufacturer in order to access Viber's database of over 40 million subscribers.⁶³ Viber continues to provide its services free of charge. While there may ultimately be exclusionary effects, it is unlikely that these effects will be clearly observed at the first stage. We suggest that any benefits that the consumer gained absent the acquisition are not merger specific and consequently should not be included in the merger analysis itself.

What about free goods for which the price paid by the consumer is non-monetary?⁶⁴ In this case, the potential for negative effects on consumer welfare remains significant. Take, for example, a free good which creates value for its providers in the form of political influence. Such influence might harm social welfare beyond the benefits accrued to consumers. Accordingly, to the extent that the effects of such non-monetary prices on welfare can be observed and calculated, they should also be included in the analysis.⁶⁵

The potential negative effects of compensation in the form of free goods instead of compensation for past harms should also be recognized. One such example is the provision of free coupons as part of the settlement of antitrust price fixing. While free coupons may serve as a sorting mechanism for those claims that are valid and those that are not,⁶⁶ they have the potential to be anticompetitive in sustaining the market power of those firms that have violated the antitrust laws.⁶⁷

Finally, we reach the most challenging and least explored case of potential negative welfare effects: free-standing goods that are provided with no short-term price tag attached in any market. Here, the supplier receives his

⁶³ Such an acquisition can raise privacy issues, but this is beyond the scope of this paper.

⁶⁴ Observe that the strength of the link between the free good and the non-monetary price may vary. For example, the provision of a free good in order to create general good will towards a company might create a weaker link -from the point of view of the consumer- than the provision of free media outlets that promote a political party. In cases where the link is extremely weak, we might move to the next category of cases, elaborated below.

⁶⁵ The question of who is best placed to evaluate the height of these costs to society is a separate issue, partly dealt with in the next section.

⁶⁶ A. Mitchell Polinsky and Daniel L. Rubinfeld, *A Damage-Revelation Rationale for Coupon Remedies*, 23(3) J. OF LAW, ECONOMICS AND ORGANIZATION 653 (2007).

⁶⁷ A. Mitchell Polinsky and Daniel L. Rubinfeld, *The Deadweight Loss of Coupon Remedies for Price Overcharges*, LVI(2) J. OF INDUSTRIAL ECONOMICS 402 (2008).

benefit in the form of his perceived positive effects on others (e.g., providing shelter, exposing youngsters to music). The analysis requires an evaluation of questions such as whether we actually need a level playing field in order to increase social welfare, and if so, under which conditions. The common intuition is that such goods can do no harm to welfare. Yet, as we argue below, even such free goods can negatively affect welfare.

Real free goods obviously save consumer resources. Furthermore, given that such free goods involve non-monetarily-profitable investments, the consumer may enjoy the offer of new products or services that would otherwise not be introduced into the market, or that the consumer might otherwise choose not to consume (free music lessons for young children serve as a good example), thereby further increasing welfare.⁶⁸ Like a monetary free good, these free products or services may create pro-competitive benefits: If one cannot compete over price, one might compete over quality.

We identify two situations in which such goods can harm welfare. One involves a good that will not always be provided for free (e.g., funds run out). If the free provision of the product has led to the exit of all other competitors from the market and barriers to re-entry are high, the product might not be supplied for some time. While firms exit the market as part the natural competitive process, a firm offering a free good has a stronger potential to be the only firm remaining in the market. Yet its exit is similar in its effects to the exit of a profit-making monopolist whose assets were destroyed by fire. Therefore, unless we have reason to believe that the continued provision of the (free) product is of great importance to consumers, there is no good case for ensuring that the consumer has alternatives or that the producer does not exit the market abruptly.⁶⁹

Now consider the case of a free good which negatively affects the quality of the product or of its production.. On the one hand, the provision of a free good might strengthen incentives to compete over the other dimensions of

⁶⁸ We assume that the free good actually benefits the consumer (e.g., it does not include free drugs).

⁶⁹ Examples of industries in which the government has a strengthened incentive to ensure the stability of an industry include, for example, banks and insurance companies.

consumer choice, including quality, thereby contributing to dynamic efficiency. On the other hand, free provision might create a barrier to a profitable operation in the market, which harms welfare. Observe that investment in more efficient production technologies alone will never be able to overcome free supply (since the long-run costs of such an investment are never zero, even if marginal cost is), so that investments purely in such technologies will never be profitable. This implies that even if a new, improved technology can be developed by a profit-seeking competitor, the incentive to do so will be reduced. The incentive to invest in dynamic innovation depends on the cost of producing the product as well as the investment in new innovation relative to the perceived increase in quality and the reduction in production costs that might result from such an investment.

Even if free goods reduce dynamic or productive efficiency, is social welfare reduced? Not necessarily. Like competition, efficiency is a means to the larger end of increasing social welfare. Social welfare will be reduced only if investments in dynamic and productive efficiency would have significantly contributed to welfare. One such case applies when there are more efficient production technologies, but their development is hindered by free goods in a world in which current technologies are characterized by lock-ins and path dependencies. Another example involves markets in which the free good itself exhibits significant network effects. Any change implies switching costs, which, compounded by learning costs, implies that users are subject to lock-in effects once the free good has achieved scale.⁷⁰ Moreover, free goods might also create over-consumption and waste, since the consumer may not internalize the economic costs of production and consumption.

All the welfare-reducing examples discussed above raise a similar question: why would consumers choose the free good even if it harms their

⁷⁰ See, e.g., the pioneering works on path dependence: Paul A. David, *CLIO and the economics of QWERTY*, 75 AM. ECON. REV. 332 (1985); Brian Arthur, *Competing Technologies, Increasing Returns, and Lock-In by Historical Events*, 99 ECONOMIC JOURNAL 116 (1989). For some criticisms see Stan J. Liebowitz & Stephen E. Margolis, *The Fable of the Keys*, 30(1) J.L. & ECON. 1 (1990); Stan J. Liebowitz & Stephen E. Margolis, *Network Externality: An Uncommon Tragedy*, 8(2) J. ECON. PERSP. 133 (1994); Stan J. Liebowitz & Stephen E. Margolis, *Path Dependence, Lock-in and History*, 11 J.L. ECON. & ORG. 205 (1995); Stan J. Liebowitz & Stephen E. Margolis, *The Troubled Path of the Lock-in Movement*, 9(1) JCLE 125 (2012).

long-run welfare in this or in another market and create what Lowenstein has called "externalities"?⁷¹ We offer several reasons. First, while the benefits to the consumer are direct, the costs are often indirect and may accrue in markets other than the one in which the free good is distributed. For example, accepting a free newspaper saves costs of buying another one, or makes for a good pastime. Yet this may imply that other, more critical and fact-based sources of information are not accessed due to monetary or time limitations, indirectly affecting the democratic process in which public opinion serves as an important check on the use of political power. The consumer might therefore not be aware of such costs.⁷²

Second, even if aware of these costs, the consumer might not be able to correctly evaluate them. This is strengthened by what scholars call the "deceptive framing" of a free offer⁷³ and by the fact that the costs that competing free goods extract might also be different.⁷⁴ There is a potential collective action problem, whereby each consumer might not take into account the externalities he imposes on the collective welfare of society. An offer of free might therefore create a combination of bounded rationality, imperfect information, and strategic behavior such as free riding, leading to the conclusion that we cannot always rely on consumers' short-term preferences for free products as indicators of their long-term preferences and rely on them to ensure that long-term welfare is maximized.

All of the above analysis disregards fairness considerations. A fairness argument may be based on the perceived rules of the game: the

⁷¹ George Lowenstein *et al.*, *Utility Maximization and Melioration: Externalities in Individual Choice*, 6(3) JOURNAL OF BEHAVIORAL DECISION MAKING 149 (1993).

⁷² For such a claim in the context of free two-sided internet products see, e.g., Hoofnagle and Whittington, *supra* note 22, at 613; Shelanski, *supra* note 4, at 1690.

⁷³ For the problem of "deceptive framing" resulting from free goods see also David Adam Friedman, *Free Offers: A New Look*, 38 N.M. L. REV. 49, 68–69 (2008) (leading him to argue that free offers should be prohibited, except in very narrow cases such as the offer of a new product) and DAVID M. BOUSH ET AL., DECEPTION IN THE MARKETPLACE: THE PSYCHOLOGY OF DECEPTIVE PERSUASION AND CONSUMER SELF-PROTECTION 62–4 (2009) ("incomplete and biased representation of a decision problem that misleads [consumers'] perception and analysis of that problem, and thereby misleads their entire decision-making process."); Hoofnagle and Whittington, *Id.*, at 609 ("information-intensive companies misuse the term "free" to promote products and services that incur myriad hidden, nonpecuniary costs.").

⁷⁴ Newman, *supra* note 7, at 13.

market mechanism assumes the existence of a level playing field into which firms can enter and compete, and even win if they are more productively or dynamically efficient than their rivals. However, this assumption does not hold when one or more of the firms operating in the market is not seeking to maximize its profit. The basic assumption that allows a firm to profit so long as its product is better than that of its rivals and the cost difference is not larger than the benefit the consumer receives from the increased quality, no longer applies. Accordingly, it might be argued that enabling firms to provide free products in the market, once other firms have made their investments based on the assumption that all firms will also base their prices, at a minimum, on costs of production, is not fair. Furthermore, even when rival's costs of production are reduced, this does not imply that price will be significantly reduced. Rather, a new equilibrium is reached; in that equilibrium the profit-maximizing firm covers at least its costs of production. In contrast the free good is sold at a much lower price that does not even cover production costs. These fairness considerations are beyond the scope of this article.

III. Case Studies

To delve into these issues further, we analyze three real-world case studies.

A. Free Browsers

In 1998 the U.S. Department of Justice (DOJ) sued Microsoft for violating the Sherman Act. The DOJ claimed, in part, that giving away the Internet Explorer ("IE") browser for free, with a promise that the browser would be forever free, was one of a number of practices whose intent was to maintain Microsoft's monopoly on the PC-based desktop operating system.⁷⁵ IE was initially offered (at least briefly) as a separate product that was bundled with the operating system; later the browser was integrated with the operating system,

⁷⁵ The claim was similar to a later claim by the European Union that Microsoft's offer of a free media player was anticompetitive under Article 82 (now article 102) of the EU Treaty. See, Commission Decision of 24.03.2004 relating to a proceeding under Article 82 of the EC Treaty (Case COMP/C-3/37.792 Microsoft).

making a traditional bundle into a technological tie. That claim was ultimately sustained by the District of Columbia Circuit Court of Appeals.⁷⁶

At the heart of the economics underlying the claim by DOJ was the view that bundling the browser with the operating system created a two-level entry problem for any firm that wished to compete in the operating system market. The entrant would have to offer both a browser and an operating system, and to do so successfully meant that the entrant would have to offer a set of applications that would be sufficiently appealing to make the purchase of the operating system economically viable. In essence, the free browser was not really free; the complementarity between the operating system and the browser meant that the combination of the products was costly, and indeed that the opportunity cost of the free browser was the increased cost of entering the operating system market.⁷⁷

An important lesson flows from this analysis. When a product or service is free, it is essential to account for any products or services that are complementary to the free product or service. In many cases, this complementarity will simply reflect the social benefits of bundling, which are widespread. However, in some instances that complementarity will create or sustain a barrier to entry and may therefore be anticompetitive.⁷⁸

The Microsoft case raises another issue that is likely to arise in many cases in which goods are priced at zero – the intent of the zero-price competitor as a rough and preliminary indicator in the analysis of the conduct's economic effects. Was the zero pricing simply penetration pricing – a means to grow market share in a world in which the Netscape Navigator dominated? Or, was the strategy an entry barrier driven strategy as just described. While the testimony of the economic experts for both sides highlighted the underlying

⁷⁶ *U.S. v. Microsoft*, 253 F. 3d 34 (D.C Cir 2001).

⁷⁷ For a detailed description of the economics underlying the Microsoft case, see, e.g., Franklin Fisher and Daniel L. Rubinfeld, *U.S. v. Microsoft: An Economic Analysis*, THE ANTITRUST BULL. 1 (2001).

⁷⁸ See, e.g., Barry Nalebuff, *Exclusionary Bundling*, 50 ANTITRUST BULL. 321 (2005); Barry Nalebuff, *Bundling as a way to leverage monopoly* (2008), available at <http://www.yale.edu/law/leo/052005/papers/nalebuff2.pdf>; Nicholas Economides, *Tying, Bundling, and Loyalty/Requirement Rebates*, Research Handbook on the Economics of Antitrust Law (NYU Law and Economics Research Paper No. 11-02), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1730354

debate, it is likely that the District Court's opinion was driven by the documents and the testimony (either live or through deposition) of Microsoft personnel. That evidence strongly supported the view that Microsoft's intent was anticompetitive – that absent its anticompetitive goals, it would not have been profitable for Microsoft to offer a forever free browser.⁷⁹

There is another lesson that flows from this discussion. While economic experts are not psychologists who can read the minds of those making decisions, economists are in a position to make inferences as to what decision makers will do in their own (typically profit-maximizing) self-interest. In this limited sense, an inquiry into the goal or goals of firms that offer goods and services for free can be informative. This evidence may enable the trier of fact to distinguish those strategies that are likely from those that are not.

B. Free Internet Search

Google answers users' questions ("search queries") with lists of relevant web sites and other information ("organic search" results), which are accompanied by advertising. While there may be opportunity costs, organic search queries are free – they have a zero price. In recent years Google has been accused of manipulating its organic search results to favor its own services.⁸⁰ Furthermore, Google has been accused of having substantial market power, if not a dominant market position, in search, which it has abused to increase its market power.⁸¹

Does it make any sense to define a relevant search market in order to further analyze the conduct's welfare effects? Ratliff and Rubinfeld explain that the answer is no.⁸² They argue that the appropriate relevant market encompasses at a minimum the market for advertising that is driven by search

⁷⁹ *Microsoft*, 253 F. 3d.

⁸⁰ In 2013 the FTC concluded its investigation of Google's search engine practices. See "Statement of the Federal Trade Commission Regarding Google's Search Practices, In the Matter of Google, Inc.," FTC File Number 111-0163, (Jan. 3., 2013). A related investigation by the European Commission remains open at this date: Cases, COMP/C-3/39/740 *Foundem v. Google Inc.*, In accordance with Article 9 of Regulation (EC) No 1/2003, COMP/C-3/39.775 *Iplus v. Google Inc.* (EC) and COMP/C-3/39.768 *Ciao v. Google Inc.* (EC).

⁸¹ Google may have market power in another market: the market for information regarding consumer preferences. In fact, the search engine constitutes only a small part of Google's current business.

⁸² Ratliff and Rubinfeld, *supra* note 10.

or which competes with search-driven advertising. They also explain why the assertion that Internet search in isolation i.e., as distinct from and not intertwined with the sale of search advertising is a relevant market for welfare analysis, is wrong. This assertion ignores the two-sided nature of the search-advertising platform and the feedback effects that link the provision of organic-search results to consumers, on the one hand, and the sale to businesses of advertising accompanying those search results on the other.

Whether the feedback effects are sufficient to require that a relevant market encompass both sides of any particular two-sided platform is ultimately an empirical matter specific to that platform.

Some elaboration with respect to this important conclusion will be useful. In evaluating monopolizing behavior as well as mergers, courts require the specification of one or more relevant markets. Market definition is not an end in itself; it is meant to be a useful legal construct in evaluating alleged anticompetitive effects.⁸³ When firms produce multiple products and the pricing of those products is interrelated, a further step should be taken in evaluating the market definition issue: one should look at the profit-maximizing behavior of a firm that controls the pricing of all of the affected products.⁸⁴

This situation applies in the context of organic search because organic search is a product that is complementary to the sale of advertising. Indeed, Google's ability to offer organic search as a free service relies crucially on its concomitant revenue from the sale of search advertising. Were it not for the complementary search-advertising business, organic search would likely have to be offered on a paid basis or not at all, because organic search offered to consumers for free would not be a viable standalone business. With respect to

⁸³ U.S. Department of Justice and the Federal Trade Commission Horizontal Merger Guidelines (2010), §4, "Evidence of competitive effects can inform market definition, just as market definition can be informative regarding competitive effects." In a merger context, the Guidelines propose that a relevant market be one in which a profit-maximizing hypothetical monopolist would find it profitable post-merger to "impose at least a small but significant and non-transitory increase in price ('SSNIP') on at least one product in the market (§ 4.1.1).

⁸⁴ *Id.*, note 4. "[I]f the pricing incentives of the firms supplying the products in the candidate market differ substantially from those of the hypothetical monopolist, for reasons other than the latter's control over a larger group of substitutes, the Agencies may instead employ the concept of a hypothetical profit-maximizing cartel comprised of the firms (with all their products) that sell the products in the candidate market."

any investigation of Google's search business, search results must be performed on a broader terrain that includes at least Google's broader search advertising business as well as any other Google-affiliated businesses that rely significantly on their listing in Google's organic search results.

The literature on two-sided platforms strongly supports this conclusion.⁸⁵ Emch and Thompson, for example, point to the need to evaluate cost and demand on both sides of the market. Using a two-sided market analysis may increase the difficulty of market definition analysis, but such an analysis can be accomplished. For example, Emch and Thompson suggest using a SSNIP test to "the sum ... of the two prices charged to the two sides of the market."⁸⁶

Google also exemplifies another point made above: that the exclusionary effects of providing a free product at one level of the market depend, inter alia, on the size of multi-product network effects. Google's primary profit-making market is the information market, as well as the information-on-information market, which provides information on the quality of information gathered. Google competes in the second market by integrating and aggregating several sources of information. Once information gathered through one channel is worth much more in its aggregated form than the cost of the service which enables one to gather the information, it might be profitable to provide the service for free, in order to gather more information, and do so over a large number of markets. New entry into each of the markets that serve as channels for gathering and utilizing information profitably might therefore be extremely difficult.

C. Free Newspapers

The third example may be the most contentious: free newspapers. We refer to free full-fledged newspapers which include, inter alia, critical analyses of events and opinion pieces, whether printed or provided on-line. Free newspapers serve

⁸⁵ The seminar paper is Jean-Charles Rochet and Jean Tirole, *Cooperation among competitors: Some economics of payment card associations*, 33(4) RAND JOURNAL OF ECONOMICS 549 (2002).

⁸⁶ Eric Emch and T. Scott Thompson, *Market definition and Market Power in Payment Card Networks*, 5(1) REVIEW OF NETWORK ECONOMICS 45, 53-4 (2006); see also David Evans and Michael Noel, *Defining Antitrust Markets When Firms Operate Two-Sided Platforms*, 3 COLUM. BUS. L. REV. 667 (2005).

as a good example of two-sided markets, but more importantly, politically-oriented free newspapers serve as an interesting example of non-monetary free-standing goods.

The phenomenon of free newspapers can be found around the world. Free media outlets are used to gain control and power in other spheres or markets in jurisdictions such as Canada, Italy, Israel and Russia.

As noted, newspapers are two-sided markets, comprised of readers and advertisers: the larger the number of readers, the more advertisers will be willing to pay for ads. Accordingly, a free newspaper might cover its costs of production through its profits from ads. Should this be the case, the analysis would be largely similar to that of Google search. For the analysis below, we assume that such costs are not covered, at least not until the newspaper achieves a monopoly position in the market.

Free newspapers create important benefits beyond those that generally accrue from free goods. Probably most importantly, they increase the number of readers. Our basic assumption is that newspapers play a unique role in the democratic process and in guarding the rule of law.⁸⁷ One of the most important inputs of democracy is information: current, accurate and understandable information regarding the challenges of the day as well as the quality of the tools used by the current government to deal with them. Such information can create public pressure on the government to act in more welfare-increasing ways and might even bring about changes in the ruling parties.⁸⁸ Competition among newspapers often strengthens the motivation to

⁸⁷ See, e.g., Keith Roberts, *Antitrust Problems in the Newspaper Industry*, 82(2) HARVARD L. REV. 319 (1968); Maurice Stucke and Allen P. Grunes, *Antitrust and the Marketplace of Ideas*, 69(1) ANTITRUST L. J. 249 (2001); Sam Schulhofer-Wohl and Miguel Garrido, *Do Newspapers Matter? Short-run and Long-run Evidence from the Closure of The Cincinnati Post*, 26(2) JOURNAL OF MEDIA ECONOMICS 60 (2013)(showing that in areas where local newspapers closed, less people took part or voted in the local elections); Christine A. Varney, Assistant Attorney Gen., Antitrust Division U.S. Dep't of Justice, *Dynamic Competition in the Newspaper Industry*, Address Before The Newspaper Association of America, 22-3 (March 21, 2011), available at <http://www.justice.gov/atr/public/speeches/268742.pdf>; See also *Associated Press v. United States*, 326 U.S. 1, 20 (1945)(the First Amendment, which “rests on the assumption that the widest possible dissemination of information from diverse and antagonistic sources is essential to the welfare of the public, that a free press is a condition of a free society.”).

⁸⁸ An obvious question is whether newspapers still play an important role in our day and age, when blogs provide information. For questions such as the social roles of newspapers in a democratic society, given new and alternative media outlets see e.g., Yoichai Benkler, *Freedom in the Commons: Towards*

invest in investigative journalism which exposes conduct which creates significant harmful welfare effects on large parts of society.

These unique qualities of the newspaper market lead to the conclusion that the consumption of newspapers creates externalities: whatever one reads might shape his opinions and therefore affect his conduct as well as his democratic choices. Competition in the newspaper industry is thus, as the previous head of the Antitrust Department of the DOJ has stated, not the parochial concern of its participants.⁸⁹

Now add free newspapers which do not cover their costs, but rather are based on the motivation of gaining or maintaining political influence. Provision of a free newspaper requires other newspapers to increase quality significantly in order to overcome the price difference as well as the "free effect." This might not be achieved easily or at all, given high costs of production, imperfect information of consumers as well as the short-run strategic choices of consumers which might lead them to prefer a free newspaper over one for

a Political Economy of Information, 52 DUKE L.J. 1245 (2003); RonNell Andersen Jones, *Litigation, Legislation, and Democracy in a Post-Newspaper America*, 68 WASH & LEE L. REV. 557 (2011); Nick Gamse, *Legal Remedies for Saving Public Interest Journalism in America*, 105 NORTHWESTERN U.L. REV. 329 (2011). Moreover, is not the democratic process better served when different consumers read different sources over the internet? For purposes of the analysis below, we assume that print newspapers continue to play an important role, for several reasons. First, large parts of the population are still technologically-challenged or have long-ingrained preferences for reading newspapers. Second, quality newspapers invest more than any other media in news gathering. Third, the most important role of newspapers today, given that news flashes usually reach the public in real-time and do not conform to newspapers' printing and delivery schedules, is the role of investigative journalism and analysis of current events based on a high level of professionalism and knowledge that are not always available in other sources. Finally, the consumer does not necessarily know how to sort out the quality of other sources of information. Newspapers thus still play an important role in democracy, creating a basis for checks and balances in many areas of our lives, including governmental, consumer, and cultural spheres. This was recently exemplified by the role some major newspapers played in the social uprising against crony capitalism. See, e.g., "The New Age of Crony Capitalism," *The Economist*, *The New Age of Crony Capitalism* (last visited Nov. 2, 2014); "What's Gone Wrong with Democracy," *The Economist*, <http://www.economist.com/news/essays/21596796-democracy-was-most-successful-political-idea-20th-century-why-has-it-run-trouble-and-what-can-be-do> (last visited Nov. 2, 2014). This conclusion does not belittle the role that the fifth estate plays in disseminating and creating information. Rather, it emphasizes the complementarity between these two information sources. Fourth, as Horton and Lande argue, empirical studies demonstrate that the quality and variety of several specific media functions, such as investigative reporting and local reporting, are often much better in the old media. Thomas J. Horton and Robert H. Lande, *Should the Internet Exempt the Media Sector From the antitrust laws?*, 65 FLORIDA L. REV. 1(2013).

⁸⁹ Varney, *supra* note 87, at 3.

which they must pay.⁹⁰ This, in turn, might lead to the exit of other newspapers from the market, eventually leading to a highly concentrated market and to limited (or a tilted) investigative journalism and critical analysis of information. As elaborated above, even if the consumer does not wish this situation to occur in the long-run, his short-run choices would not necessarily reflect his choice, due to free riding and imperfect information. Therefore, we cannot rely on consumer choice as a reflection of his long-term interests. Accordingly, the analysis of the welfare effects of free newspapers should take into account the non-monetary effects on consumers.

IV: Implications for Antitrust Policy

Based on the analysis of the effects of free goods on competition and welfare, our next objective is to examine whether and to what extent existing antitrust doctrines and enforcement tools can be applied to free goods. It has been argued by some that free goods should not be regulated at all because they do not operate in a “market,”⁹¹ or do not create negative welfare effects. This is a problematic suggestion, because it automatically exempts free goods from antitrust scrutiny despite the fact that they can negatively affect competition and welfare. To the contrary, it is important to identify the challenges free goods pose to antitrust tools which were designed to apply to markets in which firms compete over a combination of price and quality in order to increase their economic profit.

Price theory, the foundation for many antitrust tools, may not capture all relevant effects when free goods are involved. In the discussion that follows,

⁹⁰ Masika shows that free newspapers take away market shares from traditional ones. Michal Masika, *Free Commuter Newspapers and the Market For Paid-For Daily Newspapers* (2010), available at http://www.econstor.eu/bitstream/10419/37488/1/VfS_2010_pid_795.pdf.

⁹¹ See, e.g., *KinderStart.com, LLC v. Google, Inc.*, No. 5:06-CV-02507, 2007 WL 831806 (N. D. Cal., 2007). For European cases concluding that no market exists when products are free see Miguel Sousa Ferro, *Ceci n'est pas un marché: gratuity and competition law* (2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2493236. The EU Commission has noted that “Whether an economic item is available to customers in limited or sufficient numbers does not determine the existence of a relevant market for such an item. The decisive factor is whether trade relationships based on payment exist in respect of a good or a service.” Commission Decision 94/922/EC, IV./M.469 MSG Media Service, §43 (with regard to free access TV). Sousa also reaches the conclusion that “the supply of a gratuitous product or service, in itself, does not constitute an economic activity subject to competition law,” unless it affects a paid product market, *Id* at 29-30.

we argue that a more holistic approach is required. Where antitrust does not currently possess the tools to deal with all the issues raised by free goods, we ask whether antitrust should be extended in order to deal with such issues. For example, one major question is whether antitrust can take into account the non-economic effects of the provision of some free goods on social welfare. This raises a host of related questions, such as whether and how we can quantify and balance such effects, and which institution is best fit to perform such tasks.⁹² While our emphasis is on antitrust tools, we recognize that other regulatory tools might in some situations be more appropriate or play a complementary role.⁹³

1. First step: Analysis of motivation

As a general rule, intent plays a minor role in antitrust analysis - the motivation of the parties is not important, so long as the conduct creates an anti-competitive effect. This principle does not change when applied to free goods. Yet the motivation to supply a free good plays a significant role in a different sense: it is a helpful and efficient first step when analyzing the welfare effects of free goods. As elaborated below, recognizing the source of profit that the supplier intends to receive from the free good shapes all steps of the analysis: from market definition, through market power, to welfare effects. To pick a simple example, if the free good is bundled with a non-free good, recognizing the profit-based connection of the two parts of the bundle is an important first step. Indeed, as noted above the recognition of the motivations of Microsoft to create barriers to competition in the market for operating systems

⁹² See, e.g., Christopher Townley, *Is Anything more Important than Consumer Welfare (in Article 81 EC)?*, 10 CAMBRIDGE YEARBOOK OF EUROPEAN LEGAL STUDIES 345 (2007); CHRISTOPHER TOWNLEY, ARTICLE 81 EC AND PUBLIC POLICY (2009); DANIEL CRANE, THE INSTITUTIONAL STRUCTURE OF ANTITRUST ENFORCEMENT (2011).

⁹³ One such example involves the § 251 Federal Trade Commission's Guide Concerning Use of the Word "Free" and Similar Representations, 36 Fed. Reg. 21,517 (Nov. 10, 1971), available at <http://www.gpo.gov/fdsys/granule/CFR-2011-title16-vol1/CFR-2011-title16-vol1-sec251-1/content-detail.html>, which was intended to limit misrepresentations to consumers with regard to the real price paid for a product. The FTC Guide mandates free service providers to clearly disclose that such providers seek users' personal information in exchange for those services. Yet it has not been updated to deal with many of the issues arising in the information economy.

helped shape the analysis into the free provision of its internet browser and recognize the patterns of intended and non-obvious anti-competitive effects.

2. Market Definition

Assuming that a market should be defined for antitrust analysis,⁹⁴ some obstacles are immediately apparent when the good is provided for free. The hypothetical monopoly test, which serves as a major tool for defining antitrust markets, exemplifies the difficulty. The test determines the boundaries of the market by asking whether a Small but Significant and Non-Transitory Increase in Price (SSNIP) will lead to a sufficient number of consumers switching to other goods. Generally, a price increase of 5-10% is assumed to fulfill the test. Yet a 5-10% increase of a price of zero remains zero, and thus only the first circle of competitors will be captured by the test.⁹⁵ Furthermore, this price-based approach to market definition disregards other ways of exercising market power, such as reduced quality, variety or service or diminished innovation,⁹⁶ which are often more typical of markets involving free goods.

Furthermore, the SSNIP test generally relates to a single market rather than to a business ecosystem with multiple types of non-competing products.⁹⁷ Accordingly, the SSNIP test does not capture the competitive constraints on the firm offering the free good, which often accrue in a companion market. The difficulties in defining relevant antitrust markets for free goods have led a Federal Court in *Kinderstart v. Google* to mistakenly conclude that it is not

⁹⁴ For the argument that such a definition is not a necessary step in finding an antitrust offense, at least in some cases, see Louis Kaplow, *Why (Ever) Define Markets?*, 124 HARV. L. REV. 437 (2010); Louis Kaplow, *Market Definition: Impossible and Counterproductive*, 79 ANTITRUST L.J. 361 (2013).

⁹⁵ The limitations of the SSNIP test when applied to free goods are widely recognized. See, e.g., Angela Daly, *Free software and the law: out of the frying pan and into the fire: how shaking up intellectual property suits competition just fine*, 3 JOURNAL OF PEER PRODUCTION (2013); Pamela J. Harbour and T. I. Koslov, *Section 2 in a Web 2.0 world: an expanded vision of relevant product markets*, 76 ANTITRUST L. J. 769 (2010); G. A. Manna and Joshua D. Wright, *Google and the limits of antitrust: the case against the case against Google*, 34 HARVARD JOURNAL OF LAW & PUBLIC POLICY 171 (2011); R. I. McEwin and C. Chew, *China - the Baidu decision*, 6(2) COMPETITION POLICY INTERNATIONAL 223 (2010); Polverino, *supra* note 8; Florence Thepot, *Market Power in Online Search and Social-Networking: A Matter of two-Sided Markets*, 36(2) WORLD COMPETITION 195 (2013); Spencer Weber Waller, *Antitrust and social networking*, 90 NORTH CAROLINA L. REV. 1771 (2011-2012); Sousa, *supra* note 91; Evans, *supra* note 9, at 72.

⁹⁶ The DOJ/FTC Merger Guidelines, *supra* note 83, recognize such effects in section 1.

⁹⁷ Sousa, *supra* note 92, at 18.

possible to have a relevant antitrust market for something that will always be given away for free.⁹⁸ The mistake is apparent from the fact that at least some of a market's operative mechanisms exist: consumers must still decide how much they wish to consume of the product and firms must decide how much to supply.⁹⁹ It is therefore important to identify the market which creates competitive constraints, the reason for which a market definition is used in the first place.¹⁰⁰

Accordingly, we suggest that with regard to bundled goods, the SSNIP test should be adjusted to take into account the fact that profits accrue in a companion market and that firms consider both products simultaneously in maximizing profit.¹⁰¹ Similarly, with regard to two-sided markets, cross-network effects should determine the boundaries of the market.¹⁰² While this undoubtedly complicates the analysis, since information on the reciprocal effects of price changes on demand of all product markets may be subjective and difficult to measure, it provides the necessary information with regard to the relevant elasticities of demand. We suggest using a similar method with respect to free-standing free goods; the analysis of the profits obtained from the sale of a related good, even if not bundled or two-sided, can be informative.

When this analysis is not performed, the analysis of the sources of competitive constraints is incomplete. A case involving Google's offer of an interactive geographic search engine, Google Maps, illustrates this point. Google's service, which is offered for free, allows users to locate addresses,

⁹⁸ *Kinderstart*, No. 5:06-CV-02507, 2007 WL 831806: "KinderStart has not alleged that anyone pays Google to search. Thus, the Search Market is not a "market" for purposes of antitrust law." A Chinese court reached an opposite conclusion on a similar case. See R. Ian McEwin and Corinne Chew, *China—The Baidu Decision*, 6(2) COMPETITION POL'Y INT'L (2010); Angela Huyue Zhang, *Using A Sledgehammer to Crack A Nut: Why China's Anti-Monopoly Law was Inappropriate for Renren v. Baidu*, 7(1) COMPETITION POL'Y INT'L (2011).

⁹⁹ Evans, *supra* note 9.

¹⁰⁰ For an interesting analysis of European case law and the lack of market definition clarity in markets for free products see Sousa, *supra* note 91. For example, the EU Commission has, in some cases, defined the market to include only the part in which revenues are generated. One such example is the radio industry, in which it recognized an advertising market but not a market for broadcasting.

¹⁰¹ For a similar suggestion see, e.g., Horton and Lande, *supra* note 88, at 11-9 and sources cited there, in the context of media markets.

¹⁰² See, e.g., Jean-Charles Rochet and Jean Tirole, *Defining Two-Sided Markets*, 2 (2004), available at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.191.787&rep=rep1&type=pdf>; Ratliff and Rubinfeld, *supra* note 10.

create itineraries, and scan points of interest near a given address.¹⁰³ In a 2012 opinion, the Commercial Tribunal of Paris considered whether the offer of a free geographic search was an abuse of dominance in an online mapping market that included Bottin Cartographes, a paid service.¹⁰⁴ The Tribunal concluded that since most customers switched to Google's maps, it held a dominant position in markets for online mapping. Our analysis suggests that the Tribunal erred in its market definition. The appropriate market definition would likely include geographic-search driven advertising. An evaluation of market power and potential dominance in that broader market would require an analysis of other advertising alternatives that were competing with Google.

Note that our suggestions apply both to a market in which all firms provide free goods as well as to markets in which only some firms supply free goods (as in the case of interactive online maps). In the latter case, market players potentially include both those supplying free goods as well as those providing paid goods. We note, however, that the free good often creates a discrepancy between different tests for market delineation. Often, the free and paid goods share similar functionalities and characteristics, leading to a conclusion under the functionalities test that the products compete in the same market. Yet the result under the SSNIP test, which is based on an analysis of product demand relationships, will often be different. Even if we apply the test from the paid good to the free one,¹⁰⁵ it will rarely be the case that a small but significant increase in price of the paid good will create a significant switching effect. Rather, switching to the free good will often occur even below the competitive level. In such situations the goods will not be considered in the

¹⁰³ See Maps.Google.com.

¹⁰⁴ Judgment of the 15th Chamber of the Paris Commercial Tribunal dated 31 January 2012, *Bottin Cartographes v Google Inc. & Google France*, available at http://www.legalis.net/spip.php?page=jurisprudence-decision&id_article=3327. Google appealed the decision to the Court of Appeal of Paris. Interestingly, the Court decided to suspend the proceeding and ask the French Competition Authority to deliver an opinion on whether Google's conduct had to be considered anticompetitive under EU law, emphasizing the uncertainty in applying the law of predation in two-sided markets. *Bottin Cartographes v. Google France and Google Inc. Court of Appeal of Paris*, 5th Pole, 5th Chamber, 20 November 2013, available at http://www.legalis.net/spip.php?page=jurisprudence-decision&id_article=3942.

¹⁰⁵ Sousa, *supra* note 91, at 22 (care must be taken to avoid the cellophane fallacy).

same market, unless they are bundled or involve two-sided markets, in which case our above suggestions apply.

Another method, used by the EU Commission in two-sided markets, is to focus on the market in which a profit-making trading relationship takes place.¹⁰⁶ Accordingly, the Commission has based its analysis of some mergers of firms supplying free Internet search engines on the parties' positions in the relevant advertising markets.¹⁰⁷ Yet, as Polverino argues, this approach leaves important questions open, such as what to do in cases in which a competitor offers free goods or services in order to build a customer basis, *before* conceiving a means of extracting profits from that initiative.¹⁰⁸ It appears that the approach of the Commission has been changing. In its more recent *Microsoft/Skype* merger decision the Commission defined the market as internet-based communications services, in which all firms provided free goods.¹⁰⁹

Finally, in markets in which all goods are provided for free, we suggest a variation of the SSNIP test, which evaluates the market boundaries by measuring the effects of small but significant and non-transitory changes in quality (SSNIQ), in line with the *Microsoft/Skype* analysis.¹¹⁰ Here the SSNIP test examines switching once quality is reduced (rather than when price is increased). While differences in quality are more difficult to measure and quantify than differences in price, consumers' conduct might still provide rough indicators about consumer preferences when quality changes. Note that quality measures may include both increases in dynamic efficiency as well as decreases in costs (e.g. privacy costs). Where the consumer pays for the free good in another currency, say attention or information, and such costs can be

¹⁰⁶ Polverino, *supra* note 8, at 6; Sousa, *supra* note 91.

¹⁰⁷ Case No. COMP/M.5727, Microsoft/Yahoo! Search Business (EC) No. 139/2004 Merger Procedure, at 84; Case No. COMP/M.4731 Google/Doubleclick (EC) No. 139/2004 Merger Procedure. The Commission left open the question of whether a separate market exists for internet services.

¹⁰⁸ Polverino, *supra* note 8.

¹⁰⁹ Case No. COMP/M.6281 Microsoft/Skype (EC) No 139/2004 Merger Procedure. Confirmed by the General Court, Case T-79/12, Cisco Systems Inc and Messagenet SpA v Commission (11 Decemb. 2013).

¹¹⁰ COMP/M.6281 Microsoft/Skype. Horton and Lande, *supra* note 88, at 8, 11 (this approach is already applied by some courts in markets in which quality is of high importance, such as media markets).

quantified, the test can be applied to changes in cost (SSNIC), as suggested by Newman.¹¹¹

3. Market Power Analysis

Market definition is, of course, only an intermediate step in the analysis of the competitive constraints in a market, which in turn determine the extent of market power of a given firm. A correct market power analysis has the potential to overcome some of the difficulties of determining appropriate relevant markets when one or more goods are free.

Traditional market power analysis is not designed to apply to free goods. This is because, as Evans notes, “antitrust analysis often relies on the basic finding that prices tend to equal the marginal costs of production in competitive markets, and that deviations from marginal cost prices indicate market power.”¹¹² Accordingly, market power is often viewed as the ability to raise price above the competitive level. Yet a simple cost-price difference of the free good will not provide any useful information; rather, its application might lead to the conclusion that no market power exists at all, as the price does not rise at all above cost (and even stays constantly below it). Other tools must be sought.

We offer two suggestions. First, competitive constraints from related markets, even if they involve free goods, should be taken into account when analyzing market power.¹¹³ Consider the simple case of bundled goods. Here, the analysis of market power should include the complementary good(s), sold at a positive price — because providing the free good in one market enables the seller to increase the costs and entry barriers in a related one and cover the costs involved in offering both products. Accordingly, competitive constraints from free goods over paid ones can be taken into account, even if they are not

¹¹¹ Newman, *supra* note 7, at 31.

¹¹² Evans, *supra* note 9.

¹¹³ See also *id* (“When an antitrust or merger analysis involves a product that is made available for free - or where the paid product in question has a twin product whose price is zero - there is no substitute for carefully considering the economic interrelationships between these products and the overall competition between providers of the paired products or one or the other product.”).

considered to operate in the same market due to the SSNIP test.¹¹⁴ A similar logic and analysis should be applied to free-standing free goods that are assumed to increase profits in another market (e.g., two-sided markets or premium versions) or in the same market in the long run. Put differently, the benefit to the supplier should be sought elsewhere, rather than in the market for the free good. According to the same logic, a market power analysis cannot be based on revenues from the free good alone.

Our second suggestion is that market power analysis should not focus solely on price. Rather, effects on other aspects of competition such as quality, consumer choice and information costs should not be disregarded. The radio station mergers of the 1990's, analyzed by Stucke and Grunes, illustrate the importance of this inclusive welfare analysis. The 1996 Telecommunications Act, which relaxed ownership limitations on radio station ownership, brought about massive consolidation. The DOJ, which reviewed many of these mergers that created high levels of concentration, focused its analysis on the implications of the mergers on prices for advertisers and paid relatively little attention to the effects on the content offered in the broadcasting market, because radio services were provided for free. The latter might have included lower quality of radio broadcasts (including lower investments in costly investigative journalism), higher attention costs of listeners in the form of more advertisements, and even harm to the democratic process. Stucke and Grunes argue that these costs were disregarded because of the focus on price effects, thereby leading to potential false negative errors.¹¹⁶

An interesting set of questions regarding the analysis of market power arose recently in the *Microsoft/Skype* merger.¹¹⁵ The market for internet-based

¹¹⁴ See also Sousa, *supra* note 91, at 27. For example, in its decisions regarding the exclusivity provisions included in contracts for the supply of free freezers, the EU antitrust authorities considered the effects of the free freezer on the market for frozen goods sold in such freezers. See, European Commission: IV/34.073, IV/34.395 and IV/35.436; Case T-65/98 *Van den Bergh Foods Ltd v Commission* [2003] ECR II- 4563; C-552/03 *P Unilever Bestfoods (Ireland) Ltd (formerly Van den Bergh Foods Ltd) v EC Commission* [2006] 5 CMLR 27; and Case C-344/98 *Masterfoods Ltd v HB Ice Cream Ltd* [2001] ECR I-11369.

¹¹⁶ Maurice E. Stucke and Allen P. Grunes, *Why More Antitrust Immunity for the Media Is a Bad Idea*, 105 NW. U. L. REV. 1399, 1411-2 (2011). See also Newman, *supra* note 7, at 10-9.

¹¹⁵ COMP/M.6281 *Microsoft/Skype*, *supra* note 109, Appeal dismissed: Case T-79/12 *Cisco Systems Inc.* *supra* note 109.

communications services is characterized by rapid innovation and free goods. The EU General Court found that the fact that all services are offered free of charge is a relevant factor in assessing the market power of the new entity. Any attempt to raise price would only encourage consumers to switch to firms that continue to provide goods for free.¹¹⁶ Likewise, if the new entity decided to stop innovating, it would also run the risk of reducing its attractiveness given the level of innovation in the market and given low consumer switching costs.¹¹⁷ Observe that when all firms provide free goods, the "free effect" is no longer relevant to competition among the free-providers themselves.

4. Analysis of Welfare Effects

Market definition and market power serve, of course, a wider goal: determining the welfare effects of the relevant conduct. With the exception of free goods that are not motivated by profit incentives, the welfare effects of free goods should focus on the interaction of the free good with interrelated goods in which the provider expects to generate positive profit. An analysis which focuses on the free good alone would often lead to the simplistic conclusion that the free good creates positive welfare effects, since the consumer receives the product at a price which does not even cover production and distribution costs. In our view, the analysis should be expanded to include long-term effects in the same market as well as in interdependent and affected markets.¹¹⁸ The converse is also true: should the relevant issue arise in the affected market, the effects of the free good on the affected market should be taken into account.

Take, for example, an analysis of potential exclusionary effects of free goods. To be complete, barriers to the entry of as-efficient or more efficient firms should be recognized in all affected markets. Similarly, a merger or joint venture analysis of firms with free and affected goods should include them all. If the focus is only on free goods, there may be false negatives. If the focus is only on paid goods, false positives may arise.

¹¹⁶ *Id.*, para. 75 et seq.

¹¹⁷ *Id.*, para. 73.

¹¹⁸ Evans, *supra* note 9.

The welfare analysis performed in Section II leads to the following conclusions, which can be translated into legal presumptions. First, a free good does not imply a lack of adverse welfare effects. Accordingly, we should not automatically exempt free goods from antitrust scrutiny. Second, the creation or strengthening of significant market power is an essential but not sufficient condition for negative welfare effects.

Third, the strongest case for potential negative effects can be made in cases involving a free good bundled with a product that is sold at a positive price. While bundling will often be pro-competitive, in some instances bundling can increase or sustain barriers to entry with anticompetitive consequences. Furthermore, the "free effect" can increase such effects.

Stand-alone free goods do not in themselves create an antitrust problem. They may be motivated as a penetration strategy to grow market share, and they may be supported financially by the offer of related (e.g., premium) products that are sold at a positive price. For this reason, real free goods should enjoy a presumption of legality, placing a strong onus of proof that they actually do harm competition and welfare on the one arguing so.

Yet such goods can also create negative welfare effects. For example, free goods offered in a two-sided market in which one side of the market exhibits zero pricing, while the other side has a positive price, can create exclusionary effects. While more complex than one-sided markets, the antitrust analysis of two-sided markets can and should follow the same paradigm, consisting of an evaluation of market definition, market power, and competitive effects.¹¹⁹ The same is true with regard to upgraded products that operate in the same market.

Fourth, as mentioned previously, the analysis should place less emphasis on price as indicator of welfare, and more emphasis of quality. To give an example, it might be the case that an exclusionary bundling would have no substantial effect on the price of the paid product, yet still reduce the overall quality of the products.

¹¹⁹ With the caveat that there are some instances in which competitive effects can be evaluated without the formal market definition step.

Fifth, the as-efficient competitor test, often used to differentiate use from abuse of market power,¹²⁰ does not apply in its regular form. Rather, if we compare the production costs and the quality of the free good to other products, it may be the case that more efficient producers would have to exit the market. The free good provider survives only because it is willing to lose revenue on the product (often potentially making up for it elsewhere). Therefore, the as-efficient competitor test cannot serve as a primary or sole indicator that welfare is harmed.

Sixth, our analysis is based on a wealth-maximizing objective. Should protection of the competitive process or competition on the merits be considered the overarching goal, the analysis would change.

Finally, free goods that are part of a strategy of increasing profits in another market,¹²¹ raise an important question: whether harm to one group of consumers might be justified by a larger benefit to another group of consumers, in another market. The answer to this question will determine what enters into the welfare analysis. Should the answer be negative, many strategies which involve free goods would be prohibited, despite the fact that their overall welfare effects might be strictly positive. Indeed, both the US and the EU seem to require Pareto optimality in other contexts.¹²² To our knowledge, this important issue has not been squarely dealt with in the context of free goods. We suggest adopting a rule which allows for some balancing in the case of free goods, in order to allow consumers to enjoy the benefits of the free goods.

¹²⁰ RICHARD A. POSNER, *ANTITRUST LAW* (2001), 196; John Vickers, *Abuse of Market Power*, 115 (504) *THE ECONOMIC JOURNAL* F244, F256-F258 (2005); George A. Hay and Kathryn McMahon, *The diverging approach to price squeezes in the United States and Europe*, *JOURNAL OF COMPETITION LAW AND ECONOMICS* 1, 9-10 (paper No. 12-07, 2012).

¹²¹ The case of premium goods in the same market creates an interesting case, since it affects a sub-group of the consumers who enjoy the free product.

¹²² For a discussion of this issue in other contexts see, e.g., Christopher Townley, *Inter-Generational Impacts on Competition Analysis: Remembering Those Not Yet Born*, 11 *EUROPEAN COMPETITION L. J.* 580 (2011); Jan M. Rybnicek and Joshua Wright, *Outside in or Inside Out?: Counting Merger Efficiencies Inside and Out of the Relevant Market*, in WILLIAM E. KOVACIC: *AN ANTITRUST TRIBUTE*, vol. II (2014) (efficiencies under US law only considered in the same market in which the merger takes place); Giorgio Monti, *Regulatory Holidays in Utilities Regulation and EU Competition Law: A Case Study on the Role of Efficiency Considerations in Economic Law*, 55 in *EUROPEAN COMPETITION LAW ANNUAL 2012*, (Philip Lowe and Mel Marquis eds., 2014) (arguing that in European Union law the consumers that benefit should also be the ones harmed by the conduct).

5. Predatory Pricing

One of the prohibitions that must be adjusted when applied to free goods is predatory pricing. Predatory pricing assumes a two-staged strategy. In the first stage the monopolist sets his or her price below cost in order to deter even his as-efficient rivals from entry or expansion. In the second stage, the monopolist raises its price and recoups its investment, which it can do if competition was prevented.

Under U.S. Federal law and E.U. law, the legal requirements to prove predatory pricing have a core requirement: that the monopolist price its product below an appropriate measure of cost. This requirement is easily met with regard to free goods: zero is clearly below cost. Once this condition is met, E.U. law creates a presumption of illegality and shifts the onus to the monopolist to prove that such pricing was not objectively justified.¹²³ U.S. law also requires evidence that there is a substantial likelihood of recoupment.¹²⁴ When applying such requirements to free goods without making any adjustments, both false negatives and false positives can occur.

E.U. law might create false positives; a court can unjustifiably reach a conclusion of predation if the analysis only focuses on the first stage, without verifying that the second stage (price rise) occurs.¹²⁵ Indeed, when narrowly applied, a price of zero seems to be the worst type of predation, which does not allow any monopolist, efficient or otherwise, to cover its costs. This is exemplified by the French case, *Bottin Cartographes*, noted above.¹²⁶ The case involved map applications created by Google that users could download and embed for free in their websites. A French firm which previously sold competing online mapping services brought charges, arguing that supplying the maps for free amounted to an abuse of dominance. In a much criticized decision, the

¹²³ C-68/86 *AKZO v. Commission* [1991] ECR I-3359, [1993] 5 CMLR 215. Yet see the Post Denmark case: Stefano Barazza, *Post Denmark: The CJEU Calls for an Effect-based Assessment of Pricing Policies*, 3(5) JOURNAL OF EUROPEAN COMPETITION LAW & PRACTICE 466 (2012).

¹²⁴ *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.* (92-466), 509 U.S. 209 (1993).

¹²⁵ The EU Commission has recognized the need to look at other sources of revenue in two-sided markets. Guidance on the Commission's Enforcement Priorities in Applying Article 82 EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings (2008), footnote 19.

¹²⁶ See also Miguel Rato and Nicholas Petit, *Abuse of Dominance in Technology-Enabled Markets*, 9(1) EUROPEAN COMPETITION JOURNAL 1, 50 (2003); Fleischer and Smith, *supra* note 48.

Court agreed, ordering Google to compensate its competitor. The court first defined the market as the market for on-line cartography services. It then applied the EU rule for predatory pricing,¹²⁷ according to which prices below average variable costs are presumptively unlawful. A price of zero for a license, it found, does not cover Google's variable costs.

The Court did not consider Google's arguments that consumers benefit both from low price in the map market and from integration as a valid objective justification. Based on these facts, it reached the conclusion that Google's conduct was exclusionary and illegal. By the same logic, the free provision of any free good by a monopolist operating in a two-sided market is illegal.

This decision clearly indicates the dangers of an overly simplistic and formalistic application of antitrust prohibitions. Its mistake lies in the fact that the EU disregarded the wider commercial motivations for supplying the free product: recouping investments in another, interconnected market (on-line advertising), the demand for which grows with the number of users of Google's services.¹²⁸ Disregarding the product's two-sided market, and its cross-network effects, the court possibly prevented a welfare-increasing business strategy.¹²⁹ Furthermore, observe that a formalistic application of the EU rule to "real" free goods, might also reach a conclusion of illegality, despite the fact that the negative welfare effects of such conduct rarely occur. Accordingly, the below-cost analysis of predatory pricing allegations should be based on the price charged either to indirect users in the case of multi-sided markets or on the price charged for premium products in the case of versioning.¹³⁰

¹²⁷ AKZO, *supra* note 124; C-333/94 P *Tetra Pak II* [1996] ECR I-5951; T-340/03 *France Telecom SA v. Commission of the European Communities* [2007] ECR II-107, on appeal case C-202/07 *France Telecom S.A. v. Commission* [2009] ECR I-2369. For the Commission's sacrifice test see Guidance on the Commission's Enforcement Priorities in applying article 102 TFEU to abusive exclusionary conduct by dominant undertakings, OJ [2009] C 45/7.

¹²⁸ Giacomo Luchetta, *Is the Google platform a two-sided market?* (2012), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2048683, at 1 (Google is "a retailer of eyeballs, or users' attention.")

¹²⁹ E. Glen Weyl, *supra* note 16, at 1649; Stephan Behringer and Lippo Filistrucchi, *Areeda Turner in Two Sided Markets* (Tilburg University Discussion Paper 2014-038, 2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2449989.

¹³⁰ Rato and Petit, *supra* note 127.

A requirement of potential recoupment, as required in the U.S., solves this false positive problem. Recoupment is based on the assumption that the monopolist is engaged in a two-staged strategy, in which it first lowers its price in order to prevent the entry or expansion of its more efficient rivals, and once this goal is achieved it raises its price and recoups its losses, at the expense of the consumer. In a traditional case, it is assumed that if recoupment is not possible in the same market, consumers will gain from the low price in the first stage and not be harmed by the planned (but unsuccessful) high price in the second stage. It is the failure of the monopolist to achieve its goal due to competition in the second stage that drives this outcome. Since the monopolist cannot recoup in the free product market, it will not be found to engage in predation.

Yet such a narrow application of the recoupment requirement might create another set of errors: false negatives. The existence of such errors depends on the sources of profit that will be taken into account by decision-makers when evaluating whether a firm has engaged in predatory pricing. A too-narrow basis might open up routes for firms to circumvent the prohibitions. Should recoupment be required only in the free product's market, then the firm would never be found to engage in predatory pricing, given that the good is provided free forever, unless the upgraded version is considered to operate in the same market. Accordingly, to be economically meaningful and capture the real effects in the market, recoupment should be sought not only in the market for the free product but also in other, interrelated markets, regardless of the monopolist's ability to recoup its economic costs with regard to the free product. Observe, however, that even if recoupment were to be expanded to such markets, much depends on the time-frame adopted for recoupment as well as what kinds of benefits will be included. We will return to this point below. In *Wallace vs. IBM*¹³¹ the issue was whether the provision of free software violated the antitrust laws. The plaintiff argued that it would like to compete with Linux, a FOSS software, by writing a competing operating system, but that this is impossible so long as Linux is available for free. Judge Easterbrook of the U.S.

¹³¹ *Daniel Wallace vs. IBM Inc., Red Hat Inc., and Novell Inc.* [467 F.3d 1104](#) (7th Cir. 2006).

7th Circuit Court of Appeals dismissed the claim. According to Judge Easterbrook, when recoupment is improbable even if some producers exit or do not enter the market, there is no antitrust problem. The low price reflects "efficient production and enduring benefits to consumers."¹³² Furthermore, employing antitrust law to drive prices up would turn the Sherman Act on its head. Yet, as our analysis shows, this intuitive result does not always hold true. Rather, when path dependence is created, which eventually leads to lower quality than is optimal even if goods are free, welfare can be harmed.

6. Tying

An obvious prohibition that has relevance in the case of bundled goods is tying. The prohibition of tying is based on an economic theory of exclusion: the use of market power in the tying product in order to gain or increase market power in either the tied or the tying product's market. While differences exist, the basic elements of the offense are relatively similar across jurisdictions. They include two separate products; the tying firm must possess significant market power in the tying product market; and coercion: the tying firm does not give customers a realistic choice to obtain the tying product without the tied product.¹³³ It is then assumed that the practice has exclusionary effects on competition, since it restricts the consumers' choice between competing products in the tied product market.

When applied to free goods, some interesting questions arise with regard to coercion. On the one hand, the conventional meaning of coercion does not apply, since the tied product does not cost anything to the consumer. The consumer is not deprived of his "freedom of choice."¹³⁴ On the other hand, under some market conditions the free good can increase entry barriers significantly. Furthermore, the free good creates a nudge effect that strengthens the motivation of the consumer to buy the bundle, even beyond his

¹³² *Id.*

¹³³ Case T-201/04 *Microsoft Corp v Commission* [2007] ECR II-3601, para. 955: "Customers must be deprived of the "realistic choice of buying the tying product without the tied product".

¹³⁴ Case 85/76 *Hoffmann-La Roche & Co AG v Commission* [1979] ECR 461, para. 60.

otherwise revealed preferences. From this perspective, the tying firm is exploiting consumers' behavioral biases.

The European case of Van den Bergh Foods (VB)¹³⁵ exemplifies this point. VB supplied ice-cream retailers with freezer cabinets free of charge, provided that they were used exclusively for VB ice creams. The Court found VB's exclusive cabinet distribution agreements to constitute illegal tying. Despite the fact that it was theoretically possible for retailers to sell ice-creams of other retailers, the limited space in outlets and the popularity of VB's product range would have led rational retailers bound by the agreement to sell only VB ice cream and to refrain from selling a second range of impulse ice cream.¹³⁶ The free provision of the freezers further increased entry barriers.

7. Non-monetary Costs of Free Goods

An important and difficult question is whether antitrust should endeavor to identify and quantify the non-monetary costs of free goods, such as political influence or harm to democracy. The stakes are high. Should such costs be disregarded, conduct which might significantly harm welfare will go unchecked, just because it takes a different form. Observe, that non-monetary costs might affect the efficient workings of the market, at least in the long-run, thereby affecting consumer welfare in a manner which conforms with a traditional analysis. Furthermore, should the threat of antitrust enforcement be significant, firms might try to circumvent existing rules by taking their benefits in non-monetary forms. Predatory pricing serves as an example: Where recoupment is required, should only monetary recoupment be taken into account? If so, there will be instances in which the recoupment is given in another currency which harms consumers, will not come under the rule, even if these costs may translate in the long run into monetary costs. Accordingly, looking only for monetary costs seems to resemble looking under the streetlamp.

¹³⁵ *Van den Bergh Foods Ltd*, *supra* note 114. See also Case T-7/93 *Langnese-Iglo v. E.C. Commission* [1995] ECR II-1533, [1995] 5 CMLR 602 (Upheld on appeal to the Court of Justice: Case C-279/95, *Langnese-Iglo v. Commission* [1998] ECR I-5609, [1998] 5 CMLR 933).

¹³⁶ *Id.*, para. 97.

Yet identifying and quantifying non-monetary effects poses significant institutional difficulties for an antitrust authority.¹³⁷ First, it complicates the decision-making process. A multi-valued objective function creates confusion and conflict. But more importantly, the Authority has no expertise in such tasks; what weight should it give, for example, to increased political influence or to limiting high-quality investigative journalism?¹³⁸ The economic models in the toolbox of the Authority provide no clear, concrete and certain answer. Although the ease of measurement is not a proxy for importance, the difficulty is to account for non-monetary costs in an analytical analysis capable of solving particular cases.¹³⁹ In the absence of a common denominator, balancing between various costs is ultimately subjective. This problem is especially severe where potential sanctions are also criminal, but even less severe sanctions can create a chilling effect on pro-competitive conduct if rules and methods of analysis are unsettled. In such settings an administrative alternative, which emphasizes problem-solving rather than assigning blame for norm violation might be a better solution.¹⁴⁰ Yet this is beyond the mandate of the Antitrust Authority. Second, it might be argued that the Authority does not have a democratic mandate to quantify and balance such considerations. Third, engagement in such analysis might even create negative reputational effects on the Authority, which might harm its ability to perform its traditional tasks.

For these reasons, we suggest that the Authority not stray far from clear and generally acceptable economic models. Acknowledging that in cases where non-monetary costs are significant antitrust provides only on a partial

¹³⁷ Crane, *supra* note 92.

¹³⁸ See, e.g., Townley, Article 81, *supra* note 92; Crane, *id.*

¹³⁹ These problems have been long recognized. See, e.g., First, Book review of Richard Posner, *Antitrust Law: An Economic Perspective*, 52 N.Y.U. L. REV. 947, 968 (1977); William F. Baxter, *Responding to the reaction: the draftsman's view*, 71 CAL. L. REV. 618, 621 (1983); Am. Bar Ass'n, Report on Antitrust Policy Objectives 1 (2003), available at http://www.americanbar.org/content/dam/aba/administrative/antitrust_law/report_policyobjectives.auth_checkdam.pdf, at 20 (antitrust analysis based primarily on economic criteria provides “a common language, which furthers transparency and facilitates understanding and critical appraisal; and recognized/objective criteria and modes of analysis, which can limit discretion of decision-makers and increase transparency.”).

¹⁴⁰ Crane, *supra* note 92, at 103.

analysis of social welfare, it might be appropriate to supplement antitrust with other regulatory measures. To ensure that public preferences not expressed in market choices are not disregarded, if one can identify specific markets in which non-monetary price might be high (e.g., media, telecommunications, internet), specific laws should be applied.

Yet it is important to note that even if non-monetary costs will not be taken into account in an antitrust analysis, the effects on competition and its outcomes -including quality and price- are still relevant for such an analysis. To exemplify, even if part of the costs to consumers of providing a free newspaper is increased political influence that might harm democracy and such an effect will be disregarded in the antitrust analysis, this does not imply that any effects on price and quality, which are the bread and butter of antitrust analysis, should be disregarded as well. Furthermore, competition analysis can help inform other regulations. Consumer protection law provides an interesting example. Some courts have decided that because an on-line free good in a two-sided market was provided for free, no payment took place, and consequently consumer protection laws do not apply.¹⁴¹ A market analysis would have revealed that although the consumer's payment was not monetary, the information indirectly provided about his preferences as well as his willingness to accept targeted ads are valuable assets in the market.

8. Attempted Monopolization

Finally, we highlight the increased need created by free goods to capture under competition laws situations of attempts to monopolize. Attempted monopolization captures conduct which will most likely succeed in creating a dominant position and in the course of so doing harms the competitive process. The logic behind such an expansion of the monopolization prohibition is similar to that behind merger review, which also regulates conduct ex ante, in its incipiency, recognizing that once the conduct takes place it would be very difficult to undo its effects.

¹⁴¹ The Canadian case of *St-Arnaud v Facebook Inc* [2011] QJ No 3161, 2011 QCCS 1506; the U.S. case of *In re Facebook Privacy Litigation*, 791 F Supp (2d) 705 (2001).

Free goods might increase the pace of penetration or expansion in a market, which is especially important where the market is characterized by network effects and where tipping may occur. The "free effect", when used as part of an anti-competitive exclusionary strategy, can increase the ability to relatively quickly gain a monopolistic position in the market. This implies that it is important to capture the conduct before the structure of the market changes significantly. It also implies that the regulatory response should be relatively quick and not wait until the costs of undoing the market changes are significant.

The attempted monopolization prohibition in the U.S serves to remove the gap between the limitations imposed on the unilateral conduct of dominant firms and the fact that no such limitations exist on not-yet dominant enterprises. However, most jurisdictions, including the EU, do not have such a rule, despite some calls to adopt it.¹⁴² EU law partially solves this problem by defining dominance in a much more lenient way, which might apply to firms that have even less than a 50% market share.¹⁴³

V. Conclusion

Free goods play an increasingly important role in our information-based society. This is not surprising given that the marginal cost of providing an on-line digital good might be close to zero. New technologies such as 3D printing, bio-printing and robotics will probably further expand this economy of plenty. It is therefore essential that the welfare effects of free goods be recognized and analyzed.

To do so, we first identified the motivations of firms to provide free goods, including the newly recognized "free effect". The article then analyzed the welfare effects of the provision of such goods. As has been shown, while free goods generally create positive welfare effects, in some situations even "real" free goods might carry a price tag. Such a price tag can be monetary or non-monetary, in the short or in the long run. Our exploration of the applicability of

¹⁴² Michal S. Gal, *Below-Cost Price Alignment: Meeting or Beating Competition?*, *The France Telecom case*, 28(6) EUROPEAN COMPETITION L. REV. 382 (2007).

¹⁴³ Avishalom Tor, *Unilateral, Anticompetitive Acquisitions of Dominance or Monopoly Power*, 76 ANTITRUST L. J. 847 (2010).

existing antitrust tools to free goods has led us to suggest ways in which rules should be modified in order to apply to such goods. As we explained, free goods often add a level of complexity and require analytical flexibility and awareness, since traditional tools may not otherwise deal effectively with modern-day challenges. We also showed that antitrust will not always provide the solution for regulating markets for free goods; in some case other regulatory tools can play a complementary role.

BIBLIOGRAPHY

- Allen, Roy G.D., *MATHEMATICAL ANALYSIS FOR ECONOMISTS* (1938).
- Anderson, Chris, *FREE: THE FUTURE OF A RADICAL PRICE* (2009).
- Anderson, Chris, *THE LONG TAIL* (2006).
- Ariely, Dan, *PREDICTABLY IRRATIONAL* (2008).
- Aron D.J. and D.E. Burnstein, *Regulatory Policy and the Reverse Cellophane Fallacy*, *JOURNAL OF COMPETITION LAW AND ECONOMICS* (Hyperion, 2008).
www.ssrn.com
- Arthur, Brian, *Competing Technologies, Increasing Returns, and Lock-In by Historical Events*, 99 *ECONOMIC JOURNAL* 116 (1989).
- AKZO v. Commission, [1991] ECR I-3359, [1993] 5 CMLR 215.
- Barazza, Stefano, *Post Danmark: The CJEU Calls for an Effect-Based Assessment of Pricing Policies*, 3 *JOURNAL OF EUROPEAN COMPETITION LAW & PRACTICE* 466 (2012).
- Barnett, Jonathan M., *The Host's Dilemma: Strategic Forfeiture In Platform Markets For Informational Goods* 124 *HARVARD L. REV.* 1861 (2011).
- Benkler, Yochai, *Coase's Penguin, or Linux and the Nature of the Firm*, 112 *YALE L.J.* 369 (2002).
- Benkler, Yochai, *Freedom in the Commons: Towards a Political Economy of Information*, 52 *DUKE L.J.* 1245 (2003).
- Benkler, Yochai, *THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM* (Yale University Press, 2006).
- Ben-Shahar, Danny and Assaf Jacob, *Selective Enforcement of Copyright as an Optimal Monopolistic Behavior*, 3 *CONTRIBUTIONS TO ECONOMIC ANALYSIS & POLICY* (2004).
- Bond, Heidi S., *What's so Great about Nothing? The GNU General Public License and the Zero-Price-Fixing Problem*, 103 *MICHIGAN L. REV.*, 541 (2005).
- Brooke Group Ltd v. Brown & Williamson Tobacco Corporation, 509 U.S. 209 (1993).

Boush et al., *Deception in the Marketplace: The Psychology of Deceptive Persuasion and Consumer Self Protection*, 62-4 (2009).

Busa, P., Cunningham, R., Ho, K., and McCullough, P. *Free pricing model: Can business really make money by giving away for free?* (1999) Working Paper, <http://cci.mcombs.utexas.edu/research/white/free-price.htm>.

Carver, Brian W., *Share and Share Alike: Understanding and Enforcing Open Source and Free Software Licenses*, 20 BERKELEY TECH. L.J. 443 (2005).

Case 85/76 Hoffmann-La Roche & Co AG v Commission [1979] ECR 461.

Case C-333/94 P *Tetra Pak II* [1996] ECR I-5951.

Case T-201/04 *Microsoft Corp v. Commission* [2007] ECR II-3601

Case T-340/03 *France Telecom S.A v. Commission of the European Communities* [2007] ECR II-107.

Case C-202/07 *France Telecom S.A. v. Commission* [2009] ECR I-2369.

Case COMP/M.5529 *Oracle v. Sun Microsystems* [2010].

Case T-79/12, *Cisco Systems Inc. at la. v. European Commission*, Judgment of 11.12.2013.

Cohan, Peter, *Four Reasons why Google Bought Waze* (Forbes online, 6.11.2013), <http://www.forbes.com/sites/petercohan/2013/06/11/four-reasons-for-google-to-buy-waze>.

Crane, Daniel, *THE INSTITUTIONAL STRUCTURE OF ANTITRUST ENFORCEMENT* (Oxford Univ. Press, 2011).

Cunningham, Busa P. et al., *Free Pricing Model: Can Business Really Make Money by Giving Away for free?* Working Paper, University of Texas, (1999).

Daly, Angela, *Free Software and the Law. Out of the Frying Pan and into the Fire: How Shaking up Intellectual Property Suits Competition Just Fine*, JOURNAL OF PEER PRODUCTION (2013).

David, Paul A., *CLIO and the Economics of QWERTY*, 75 AM. ECON. REV. 332 (1985).

Dengler, Sarah, *Freebie Frenzy: Experimental Evidence of the Zero Price Effect* (U. of Mary Washington, Working Paper, 2013) Available at <http://www.sarahdengler.com/wp-content/uploads/Draft-4-FINAL.pdf>.

Elkin-Koren, Niva, *What Contracts Can't Do: The Limits of Private Ordering in Facilitating a Creative Commons*, 74 *FORDHAM L. REV* 375 (2005).

Emch, Eric and T. Scott Thompson (2006), *Market definition and market power in payment card networks*, *REVIEW OF NETWORK ECONOMICS* 5(1), March, 45–60.

European Commission decision in case COMP/COMP/C-3/37.792 *Microsoft*.

European Commission decision in case COMP/M.4731, *Google/DoubleClick*.
European Commission decision in case COMP/M.5727, *Microsoft/Yahoo! Search Business*.

European Commission decision in case COMP/M.6281, *Microsoft/Skype*.

European Commission, *Commission Probes Allegations of Antitrust Violations by Google* (November 30, 2010).

Evans, David, *The Antitrust Economics of Free*, *COMPETITION POLICY INTERNATIONAL* (2011), May 17.

Evans, David, *The Online Advertising Industry: Economics, Evolution, and Privacy*, *JOURNAL OF ECONOMIC PERSPECTIVES* 37 (2009).

Evans, David S., and Richard Schmalensee, *Markets with Two-Sided Platforms*, 1 *ISSUES IN COMPETITION L. & POL'Y*, 28 (2008).

Evans, David and Michael Noel (2005), *Defining Antitrust Markets When Firms Operate Two-Sided Platforms*, *COLUMBIA BUSINESS LAW REVIEW* (3), 667–701.

Fershtman, Chaim and Neil Gandall, *Open Source Software: Motivation and Restrictive Licensing*, 4 *INTERNATIONAL ECONOMICS AND ECONOMIC POLICY* 209 (2007).

Finucane, Melissa L., Ali Alhakami, Paul Slovic and Stephen M. Johnson, *The affect Heuristic in Judgments of Risks and Benefits*, 13(1) *JOURNAL OF BEHAVIORAL DECISION MAKING* 1 (2000).

Fisher, Franklin and Daniel L. Rubinfeld, *U.S. v. Microsoft: An Economic Analysis*, *THE ANTITRUST BULLETIN*, Spring (2001), 1-69.

Fleischer, Raphael and David A. Smith, *Two-Sided Markets in the EU: An Attempted Demystification* (2012), Available at <http://home.uchicago.edu/~davidsmith/research/TSM2012.pdf>

Friedman, David Adam, *Free Offers: A New Look*, 38 *N.M. L. REV*, 49 (2008).

Gal, Michal, *Below-Cost Price Alignment: Meeting or Beating Competition?*, 28(6) EUROPEAN COMPETITION L. REV 382 (2007).

Gal, Michal S., *Viral Open Source: Competition vs. Synergy*, 8 JOURNAL OF COMPETITION LAW AND ECONOMICS 469 (2012).

Gallaugher, John M. and Yu-Ming Wang, *Infrastructure*, 9(1) ELECTRONIC MARKETS 14 (1999).

Gamse, Nick, *Legal Remedies for Saving Public Interest Journalism in America*, 105 NORTHWESTERN U.L. REV. 329 (2011).

Hann, Il H., Jeff Roberts, Sandra Slaughter & Roy Fielding, *Economic Returns to Open Source Participation: A Panel Data Analysis, Presented at WORKSHOP ON INFORMATION SYSTEMS ECONOMICS (WISE), Washington D.C., District of Columbia* (2004), available at <http://opim.wharton.upenn.edu/wise2004/sun412.pdf>

Harbour, Pamela J. and T.I. Koslov, *Section 2 in a Web 2.0 World: An Expanded Vision of Relevant Product Markets*, 76 ANTITRUST L. J. 769 (2010).

Hars, Alexander and Shaosong Ou, *Working for Free?- Motivations of Participating in Open Source Projects*, 6 INTERNATIONAL J. OF ELECTRONIC COMMERCE 25 (2002).

Hay, George A and Kahryn McMahon, *The Diverging Approach to Price Squeezes in the U.S. and Europe*, JOURNAL OF COMPETITION LAW AND ECONOMICS, 1 (PPER No. 1207, 2012).

Hertel, Guido, Sven Niedner & Stefanie Herrmann, *Motivation of Software Developers in Open Source Projects: An Internet-Based Survey of Contributors to the Linux Kernel*, 32 RESEARCH POLICY 1159 (2003).

Hoofnagle, Chris Jay and Jan Whittington, *Free: Accounting for the Costs of the Internet's Most Popular Price*, 61 UCLA L. REV. 606 (2014)

Horizontal Merger Guidelines § 4 (1997). Johnson, Howard, *Free newspapers - predatory pricing - what is the relevant market?* COMMUNICATIONS LAW 54 (2002). *LegalTrac*. Web. 11 Oct. 2011.

Horton, Thomas J. and Robert H. Lande, *Should the Internet Exempt the Media Sector from the Antitrust Laws?* 65 Florida L. Rev. 1 (2013).

Jones, Alison and Brenda Sufrin, *EU COMPETITION LAW: TEXT, CASES, AND MATERIALS* (Fifth edition, 2014).

Jones, RonNell Andersen, *Litigation, Legislation, and Democracy in a Post-Newspaper America*, 68 WASH & LEE L. REV. 557 (2011).

Kaplow, Louis, *Why (Ever) Define Markets?* 124 HARV. L. REV. 437 (2010).

Kaplow, Louis, *Market Definition: Impossible and Counterproductive*," 79 ANTITRUST L.J. 361 (2013).

KinderStart.com, LLC v. Google, Inc., 2007 WL 831806 (N. D. Cal.).

Lakhani, Karim R. and Robert G. Wolf, *Why Hackers Do What They Do: Understanding Motivation and Efforts in Free Open Source Projects*, PERSPECTIVES IN FREE AND OPEN SOURCE SOFTWARE (Joseph Feller et al. eds., 2005).

Lee, Kang Bae, Sungyeol Yu and Seong Jun Kim, *Analysis of pricing strategies for e-business companies providing information goods and services*, 51 COMPUTERS & INDUSTRIAL ENGINEERING 72 (2006).

Lemley, Mark A. and David McGowan, *Legal Implications of Network Economic Effects*, 86 CALIFORNIA L. REV. 479 (1998).

Lerner, Josh and Jean Tirole, *Some Simple Economics of Open Source*, 52 JOURNAL OF INDUSTRIAL ECONOMICS 197 (2002).

Liebowitz, Stan J. and Stephen E. Margolis, *Network Externality: An Uncommon Tragedy*, 8(2) J. ECON. PERSP. 133 (1994).

Liebowitz, Stan J. and Stephen E. Margolis, *Path Dependence, Lock-in and History*, 11 J. L. ECON. & ORG. 205 (1995)

Liebowitz, Stan J. and Stephen E. Margolis, *The Fable of the Keys*, 30(1), J. L & ECON. 1 (1990).

Liebowitz, Stan J. and Stephen E. Margolis, *The Troubled Path of the Lock-in Movement*, (1) JCLE 125 (2012).

Lowenstein, George et al., *Utility Maximization and Melioration: Internalities in Individual Choice*, 6(3) JOURNAL OF BEHAVIORAL DECISION MAKING, 149 (1993).

Luchetta, Giacomo, *Is the Google Platform a Two Sided Market*, JOURNAL OF COMPETITION LAW & ECONOMICS (September 2013). www.ssrn.com

Manna, G.A. and Joshua D. Wright, *Google and the Limits of Antitrust: The Case Against the Case Against Google*, 34 HARVARD J. OF LAW & PUB. POL'Y, 171 (2011).

Masika, Michal, *Free Consumer Newspapers and the Market For Paid-For Daily Newspapers* (Conference Paper, February 2010) Available at http://www.econstor.eu/bitstream/10419/37488/1/VfS_2010_pid_795.pdf

McEwin, Ian R. and Corinne Chew, *China-The Baidu Decision*, 6(2) COMPETITION POLICY INTERNATIONAL 223 (2010)

McGowan, David, *Legal Implications of Open-Source Software*, U. ILL. L. REV (2001).

Monti, Giorgio, *Regulatory Holidays in Utilities Regulation and EU Competition Law: A Case Study on the Role of Efficiency Considerations in Economic Law*, 55 European Competition Law, Annual, 2012

Nalebuff, Barry, *Exclusionary Bundling*, 50 ANTITRUST BULL. 321 (2005).

Nelson, Philip, *Information and Consumer Behavior*, 78(2), JOURNAL OF POLITICAL ECONOMY 311 (1970).

Newman, John M., *Copyright Freeconomics*, 66 VANDERBILT L. REV. 1409 (2013).

Nicolau, Juan L., *Battle Royal: Zero-Price Effect vs Relative Thinking*, 23(3) SPRINGER SCIENCE, 661 (2012).

Nicolau, Juan L. and Ricardo Sellers, *The Free Breakfast Effect an Experimental Approach to the Zero Price Model in Tourism*, 51(3) JOURNAL OF TRAVEL RESEARCH 243 (2012).

O'Flaherty, Brendan, *Need and Generosity: How Markets for Free Goods Equilibrate*, 54(1), J. URBAN ECONOMICS (2003), 157-172.

Palmeira, Mauricio M. and Joydeep Srivastava, *Free Offer ≠ Cheap Product: A Selective Accessibility Account on the Valuation of Free Offers*, 40(4) JCR 644 (2013).

Philipson, Thomas J. and Richard A. Posner, *Antitrust in the Not-For-Profit Sector* (U. of Chicago, NBER Research Paper No. 12132, 2006), Available at <http://www.nber.org/papers/w12132.pdf>.

Picker, Randall C., *The Razors-and-Blades Myth(s)*, 78 U. Chi. L. Rev. 225 (2011).

Polinsky, A. Mitchell and Daniel L. Rubinfeld, *A Damage-Revelation Rationale for Coupon Remedies*, JOURNAL OF LAW, ECONOMICS, AND ORGANIZATION, Vol. 23, No.3, October 2007, pp. 653-661.

Polinsky, A. Mitchell and Daniel L. Rubinfeld, *The Deadweight Loss of Coupon Remedies for Price Overcharges*, JOURNAL OF INDUSTRIAL ECONOMICS, Vol. LVI, No. 2, June 2008, pp. 402-417.

Polverino, Fabio, *Hunting the Wild Geese: Competition Analysis in a World of 'Free'*, CONCORRENZA E MERCATO 545 (2012).

Posner, Richard A., *Antitrust in the New Economy* (U. of Chicago, Working Paper No. 106 (2D Series), p.3, 2000), Available at http://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=1057&context=law_and_economics.

Ratliff, James and Daniel L. Rubinfeld (2014), *Is There a Market for Organic Search Engine Results and Can Their Manipulation Give Rise to Antitrust Liability?* JOURNAL OF COMPETITION LAW AND ECONOMICS, May (2014), 1-24.

Rato, Miguel and Nicolas Petit, *Abuse of Dominance in Technology Enabled Markets: Established Standards Reconsidered?* 9(1) EUROPEAN COMPETITION JOURNAL (2013)

Rhysman, Marc, *The Economics of Two-Sided Markets*, 23(3) JOURNAL OF ECONOMIC PERSPECTIVES 125 (2009).

Roberts, Keith, *Antitrust Problems in the Newspaper Industry*, 82(2) HARVARD L. REV. 319 (1968).

Rochet, Jean Charles and Jean Tirole (2002) *Cooperation among competitors: Some Economics of Payment Card Associations*, RAND Journal of Economics, 33(4), Winter, 549–570.

Rochet, Jean Charles and Jean Tirole, *Defining Two-Sided Markets* (January 2004) Available at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.191.787&rep=rep1&type=pdf>.

Rochet, Jean Charles and Jean Tirole, *Two-Sided Markets: A progress Report*, 37(3) JOURNAL OF ECONOMICS 645 (2006).

Rudzki, Romuald E.J. and Shaoei Li, *The Economic Paradox of the "Freebies" Phenomena: How and Why Companies Give Stuff Away for Free*, 1(4) Direct Marketing 180 (2004).

Rybnicek, Jan M. and Joshua Wright, *Outside in or Inside Out?: Counting Merger Efficiencies Inside and Out of the Relevant Market*, in WILLIAM E KOVACIC: AN ANTITRUST TRIBUTE, Vol. II (2014).

Rysman, Marc, *The Economic of Two-Sided Markets*, 23(3) JOURNAL OF ECONOMIC PERSPECTIVES 125 (2009).

Saraiva, Francisco, FREE PRODUCTS AND THEIR IMPACT ON CONSUMER BEHAVIOR (2011).

Schulhofer-Wohl, Sam and Miguel Garrido, *Do Newspapers Matter? Short-run and Long-run Evidence from the Closure of the Cincinnati Post*, 26(2) JOURNAL OF MEDIA ECONOMICS 60 (2013).

Shampanier, Kristina, Nina Mazar, and Dan Ariely, *Zero as a Special Price: The True Value of Free Products* (2007), *Marketing Science*, Vol. 26, No. 6, 742-757.

Shelanski, Howard, *Information, Innovation, and Competition Policy for the Internet*, 161 U. PA. L. REV. 1663 (2013).

Spiegel, Uriel, Uri Benzion and Tal Shavit, Free product as a Complement or Substitute for a Purchased Product-Does it Matter, 2(2) MODERN ECONOMY 124 (2011).

Stuckey, Maurice and Alan Grunes, *Why More Antitrust Immunity for the Media Is a Bad Idea*, 105 NW. U. L. REV. 1399, 1411-2 (2011)

Thaler, Richard H. and Cass R. Sunstein, NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH AND HAPPINESS (2008).

The Economist, The New Age of Crony Capitalism (March 15, 2014).

The Economist, What's Gone Wrong with Democracy (March 1, 2014).

Tirole, Jean, THE THEORY OF INDUSTRIAL ORGANIZATION (1988).

Tor, Avishalom, *Unilateral Anticompetitive Acquisitions of Dominance or Monopoly Power*, 76 ANTITRUST L. J. 847 (2010).

Townley, Christopher, ARTICLE 81 EC AND PUBLIC POLICY (Hart, 2009).

Townley, Christopher, *Inter-Generational Impacts on Competition Analysis: Remembering Those Not Yet Born*, 11 EUROPEAN COMPETITION L. REV. 580 (2011).

Townley, Christopher, *Is Anything more Important than Consumer Welfare (in Article 81 EC)?* 10 CAMBRIDGE YEARBOOK OF EUROPEAN LEGAL STUDIES 345(2007).

Tsur, Michal and Shay David, *A License to Kill (Innovation)? Open Source Licenses and Their Implications for Innovation* (2005), available at <http://ssrn.com/abstract=858104>

United States of America v. Microsoft Corporation, No. 00-5212, Appeals From The United States District Court For The District Of Columbia, June 28, 2001, Civil Action No. 98-1232

Varian, Hal R., *Versioning Information Goods*, (Harvard University, Paper prepared for Digital Information and Intellectual Property, 23-25 January 1997), Available at <http://people.ischool.berkeley.edu/~hal/Papers/version.pdf>.

Vetter, Greg R., *"Infectious" Open Source Software: Spreading Incentives or Promoting Resistance?* 36 RUTGERS L. J. 53 (2004).

Vickers, John, *Abuse of Market Power*, 115 (2005)

Wallace vs. IBM Inc., Red Hat Inc., and Novell Inc. (no. 06-2454, 7th cir., Nov. 9 2006). 467 F.3d 1104 (7th Cir. 2006).

Weber-Waller, Spencer, *Antitrust and Social Networking*, 90 NORTH CAROLINA L. REV. 1771 (2011-2012).

Weyl, Glen E., *A Price Theory of Multi-Sided Platforms*, 100(4) AMER. ECON. REV. 1642 (2010).

White, Lawrence J. (2008) "Market Power and Market Definition in Monopolization Cases: A Paradigm is Missing," in Wayne D. Collins, ed., *Issues in Competition Law and Policy*. Chicago: American Bar Association.

Zhang, Angela H., *Using a Sledgehammer to Crack A Nut: Why China Anti-Monopoly Law was Inappropriate for Renren v. Baidu*, COMPETITION POLICY INTERNATIONAL, Vol. 7, No. 1, Spring 2011.