

Commercial piracy and intellectual property policy

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Abstract

I discuss the competition between a copyright owner and several commercial pirates who sell copies of the same information good to consumers. I view the increased risk of a punishment that offering a pirate copy to a consumer causes as an *advertising cost* whose value is chosen by the government. The structure of the market for pirate copies is affected also by fixed costs that are caused by punishments or DRM systems. I present a systematic analysis of the effects of these policy variables and the quality of pirate copies on the market for the considered information good.

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1. Introduction

The distribution of illegal *pirate copies* of information goods might have a variety of motives. Such copies are distributed on the one hand by the members of *peer-to-peer networks*, who deliver digital goods on the Internet without monetary compensation and who are motivated by, for example, a feeling of identification with the other network members, and on the other hand by commercial pirates who are, more conventionally from the perspective of the economist, motivated by the revenue that results from their activities. Somewhat less obviously, the consumers of an information good might also form a club, which buys a single copy of an information good, produces copies of it, and distributes one of them to each club member.¹

Given that both commercial and non-commercial forms of piracy are illegal, there is no obvious way of estimating the extent to which pirate copies of information goods are sold rather than distributed for free or the effects of commercial piracy on the profits of copyright owners. Nevertheless, the International Federation of the Phonographic Industry (IFPI) has estimated that approximately 37% of all the [music] CDs that were purchased in 2005 globally were pirate copies.²

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¹ For the producer of the first copy of the information good, this practice resembles a situation in which the club members buy a single copy of an information good and use it successively. The latter practice is legal when the considered product is, for example, a book, a journal, or a video tape, and in both cases, the producer of the first copy might be able to appropriate indirectly a part of the value that the good has for its consumers. See Varian (2000).

² International Federation of the Phonographic Industry (IFPI), *The Recording Industry 2006 Piracy report*, p. 4. Available at <http://www.ifpi.org/site-content/library/piracy-report2006.pdf>, accessed on 29 October 2006.

However, in the case of the *software industry*, it is more difficult to find estimates of the prevalence of commercial piracy.

The Business Software Alliance (BSA) publishes yearly a piracy study that contains estimates for the piracy rate (i.e. the ratio of the number of pirated software units to the total number of installed software units) for different countries of the world, as well as for different regions of the world. For example, according to the BSA the worldwide piracy rate was 35% in 2005.³ However, such estimates do not make a distinction between commercial and non-commercial forms of piracy.⁴ Nevertheless, the other surveys of the BSA suggest that both the commercial and non-commercial forms of software piracy are of considerable economic significance.⁵

There is a relatively large economic literature on *end-user copying*.⁶ Banerjee (2003, 2006a,b) has recently put forward several closely related models of the competition between a monopolist (i.e., the copyright owner) and a single commercial pirate, but it nevertheless seems that until now economists have given much less attention to *commercial piracy* than to end-user copying.⁷ Below I shall put forward a model of the competition between the copyright owner and several commercial pirates, to whom I shall refer as *bootleggers*.

The production costs of pirate copies are low, and in the case of the pirate copies that are distributed in an electric form via the Internet they are almost zero. Accordingly, if intellectual property rights are not enforced, the prices of pirate copies can be expected to fall to zero via Bertrand competition. However, when bootleggers are in danger of being punished for their activities, it may be costly for them to inform potential consumers of their products, since this may increase the risk of being caught and receiving a punishment. For example, if an illegally operating Internet site that offers pirate copies of software products for sale informs its potential customers by sending e-mail messages to randomly chosen addresses, the risk of a punishment is increased by each message. In this case the expected cost from a punishment is analogous to an *advertising cost*, which explains the positive price of pirated information goods.

Information goods can be protected not only by copyright and other intellectual property rights but also by *digital rights management* (DRM) systems. Digital rights management tools can, broadly speaking, be divided into *cryptology* (i.e. the distribution of information goods in an enciphered format) and *watermarking* (i.e. embedding information into a digital product in such a way that each copy of the good becomes different).⁸ Watermarks can be used to track down the person who has originally bought the legitimate copy of an information good from which the pirate copies on the market have been produced, which makes it easier penalize commercial pirates.⁹ Clearly, a cryptographic device causes a *fixed cost* for a commercial pirate, but the costs of watermarking can be either fixed or variable: if a bootlegger removes the watermark, its removal causes a fixed cost, but if she sells watermarked information goods, the risk caused by the watermark increases with the number of the copies that she sells.

Below I shall analyze the effects of DRM systems and the policy instruments of the government on the profits of the bootleggers and the copyright owner. In the model the “*advertising costs*” that are caused by an increased risk of legal

³ *Third Annual BSA and IDC Global Software Piracy Study*, p. 13. Available at <http://www.bsa.org/globalstudy/upload/2005%20Piracy%20Study%20-%20Official%20Version.pdf>, accessed on 13 April 2007.

⁴ This is because the estimates of the BSA have been calculated from an estimate of the total number of installed software units, which is based on the number of the sold hardware units and surveys concerning their average software load, and an estimate of the number of the sold software units, which is based on information concerning the market revenues of software vendors and software pricing. See *Third Annual BSA and IDC Global Software Piracy Study*, p. 14.

⁵ In one of such surveys, the BSA has investigated the attitudes of the online consumers from six different countries towards *spam*, commercial emails that they have received without requesting or signing up for them (BSA, *Consumer Attitudes Toward Spam in Six Countries*, 2004, available at <http://www.bsa.org/usa/events/loader.cfm?url=/commonspot/security/getfile.cfm&pageid=20654>, accessed on 13 April 2007). In each country, more than 80% of the respondents stated that they had received spam that was concerned with computer software (*Consumer Attitudes Toward Spam in Six Countries*, p. 6), and 27% reported that, in the product category “computer software”, they had “purchased an item or taken advantage of an offer” that was suggested to them in spam (*Consumer Attitudes Toward Spam in Six Countries*, p. 12). Only 31% of the respondents stated that they agreed with the statement that they would “never buy commercial software using this method because it is most likely unlicensed and illegal” (*Consumer Attitudes Toward Spam in Six Countries*, p. 16).

⁶ For a survey, see Peitz and Waelbroeck (2006a).

⁷ See, however, Yao (2005), which discusses counterfeiting on a more general level, without restricting attention to counterfeited information goods.

⁸ For a survey, see Eskicioglu and Delp (2001).

⁹ Since a large-scale commercial pirate can be expected to be able to break down a cryptographic system, watermarking seems to be the more relevant DRM tool in the context of large-scale commercial piracy (cf. Eskicioglu and Delp (2001), pp. 683–684). See also Park and Scotchmer (2005), which contains an analysis of DRM and of the different effects of the use of *shared* and *independent* DRM systems on end-user piracy.

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