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Copyright protection and entry deterrence

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ABSTRACT

Illegal copying of digital products has become an increasingly debated issue. I present a previously unmentioned possible effect of piracy, namely that it may benefit an incumbent producer by making entry less profitable. In a differentiated products setting I show that when entry costs or the consumer valuation of the product are high enough or when consumer heterogeneity is sufficiently low, an incumbent monopolist will prefer less than full protection and thus allow the piracy of its own product. When the consumer valuations for the good are high, then there is no market expansion effect of illegal copying and consumers might end up worse-off because of piracy.

Introduction

The copyright enforcement of digital products has received considerable attention in the past decade, both in the academic and the business circles. Producers of digital products claim to have suffered severely from digital piracy and are somewhat the driving force behind some of the recent laws against copyright infringement. The debate over the social costs of piracy is, however, not resolved.[1] One argument in favor of stringent enforcement of intellectual property rights is that digital piracy reduces the incentives to supply these products as the returns to doing so are diminished. As a result, factors such as variety or quality of supply may be negatively affected by the presence of piracy.[2]

This paper tries to bring these aspects of the digital products industries by arguing that incumbent producers of these goods may benefit from (slightly) lower levels of copyright protection because this makes entry of rival suppliers less profitable and thus less likely. In other words, existing suppliers may choose or wish for less strict enforcement when there is a threat of entry in their markets. In the framework of a Salop circular city model I show that an incumbent supplier that faces competition from the copy of its own product and a potential entrant may choose to sacrifice its current (static) profits in order to prevent entry and earn more compared to the post-entry market structure.

My model captures many of the characteristics of digital products industries. Consumers are assumed to be heterogenous in their tastes for the products as well their valuations of the original products with respect to the copies. Production involves relatively high (sunk) fixed and negligible variable costs. An incumbent monopolist determines (or influences) the degree of copyright protection, which in turn directly affects the value of a copy. The type of copyright protection I have in mind is a public good, either a technological innovation that becomes available to all or legislation that penalizes illegal copying, in that it applies to the products of all market participants. Observing the chosen degree of protection, an entrant

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[1] Belleflamme and Peitz (2012) provide an extensive survey of the theoretical literature.

[2] This argument is naturally not only limited to digital copying but is embedded in all forms of illegal reproduction of intellectual property. See for instance Johnson (1985).

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decides whether to enter the market. In the case of entry the entrant pays the fixed costs and then the two firms compete in prices. I show that for sufficiently high fixed costs of production and/or base valuation of the product the incumbent monopolist prefers to choose less than full protection in order to deter entry. As could be expected, greater heterogeneity in consumer tastes makes the incumbent firm more willing to accommodate entry, which is in this case less threatening, and choose full protection. Overall, the model is able to provide an explanation for (the relative tolerance for) the existence of digital piracy that does not rely on network or learning effects.

The idea that illegal copying may benefit producers is not new. Starting with Conner and Rumelt (1991) a number of studies show that network effects generated by illegal copies will boost the demand for the original. Shy and Thisse (1999) formulate this idea in a duopoly framework. A similar argument is made by Peitz and Waelbroeck (2006) who show that allowing consumers to sample products leads to a better matching between the consumers and the products, and may increase the profit of a multiproduct monopolist. My paper offers another channel through which piracy may benefit an incumbent firm, namely due to its demand lowering effect. The social consequences of the mechanism are, however, starkly different from the earlier ones. Whereas network or learning effects generally lead to a higher consumer welfare, absence of competition hurts consumers twofold: through higher prices and reduced variety. Piolatto and Schuett (2012) take upon the idea that piracy may have differing effects on suppliers' profits. In their model, the cost of copying as well as the revenue from alternative sources depend on the sales of the original. As a result, more popular artists may benefit from piracy whereas less popular ones will be hurt. Similar arguments are made regarding the counterfeiting of branded products, where counterfeits prey on the business of brand owners but at the same raise brand awareness.[3] My results are somewhat analogous, although the underlying mechanism is different: although piracy has a direct negative effect on the profits of all firms, it benefits the incumbent because it makes entry less likely.

There are also a few papers that model the level of copyright protection as a policy variable. Yoon (2002) shows that less than full copyright protection may be optimal for the society when it eliminates the underutilization of the product. Bae and Choi (2006) consider the welfare effects of two types of copyright protection, a degradation of the value of the copy and an increase in the reproduction cost – the latter being also the policy variable in this paper, and show that these two may have different consequences. None of these studies consider the degree of copyright enforcement as a strategic variable that may affect the market structure. Note that my model predicts positive amount of copying only when entry is deterred, nevertheless provides a tractable way of modeling competition under the presence of illegal copying.

[3] See Staake et al. (2009) for an extensive survey of the literature.

Model

Let a unit mass of consumers be uniformly distributed over a circle of length 1. As is common in spatial differentiation models, a consumer's location represents her ideal product in the characteristics space and the distance to an available product represents the disutility from not consuming this ideal product. I assume that this disutility is quadratic in distance. Consumers have the option of buying an original product by paying its price p, or to obtain a potentially illegal copy of the product off the market at no cost. The copy, however, does not provide the same amount of utility as the original.[4] Consumers differ in the extra value they attach to the original product over its copy. Finally, since the product is copyrighted, there is a legal risk associated with obtaining a copy. This risk depends on the degree to which the producer pursues copyright protection and it lowers the utility a consumer obtains from a copy. Formally, the utility of consuming an original product that is a distance $x \in [0,1)$ away is given by

$$U^o = V - p - tx^2, \tag{1}$$

whereas the utility of consuming an off market copy of the same product becomes

$$U^c = V\alpha - z - tx^2, \tag{2}$$

where $V > 0$ is the base value of the product, $z \in \mathbb{R}$ is the degree of copyright protection, and $\alpha \sim U[0,1]$ shows how close a substitute the copy is to the original. Consumers with draws of α very close to 1 value the copy almost as much as the original, whereas consumers with low realizations of α place a much a higher value on the original product. Specifically, consumers with $\alpha < \frac{V-p+z}{V}$ will prefer the original over its copy. Naturally the comparison between the original product and its copy is independent of the location of the product since the original and the copy share the same characteristic. As a result, a fraction $\frac{V-p+z}{V}$ of all consumers will prefer a product over its copy. However, along the circle the firms are not only competing against their own copy or the original product of a rival. The comparison between an original product and the copy of another product will depend on the relative location of the two products with respect to the consumers. A formal derivation of the fraction of consumers who prefer an original over the copy of another product will be given in the next section.

On the supply side, there is an incumbent firm, I, that produces a good that is located at point 0 on the circle. For simplicity, production costs are assumed to be zero. There is a second firm, E, that considers entering the market. Firm E has access to the same zero marginal cost production technology, but it has to incur a fixed and irrecoverable entry cost of F. Before E makes its entry decision, it observes the degree of copyright protection, z, chosen by the incumbent I. I assume that there are no costs

[4] This can be because the copy is not an exact replica of the original. For example, original CD's may contain lyrics to songs and additional artwork not available on copies, or a software product purchased within the market may come with customer support, periodic updates, etc.

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