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An economic analysis of online streaming music services

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ABSTRACT

Streaming music services represent the music industry's greatest prospective source of revenue and are well established among consumers. This paper presents a theory of a streaming music business model consisting of two types of services provided by a monopolist. The first service, which offers access free of charge, is of low quality and financed by advertising. The second service charges its users and is of high quality. The analysis demonstrates that if users are highly tolerant of commercials, the monopolist benefits from advertising funding and hence charges a high price to users of the fee-based service to boost demand for the advertising supported service. The analysis addresses the welfare consequences of such a business model and shows it is an effective policy for combating digital piracy.

1. Introduction

The past decade has witnessed a sharp increase in the use of unlicensed P2P file sharing networks. As a consequence, the music industry has experienced a severe decline in revenues due to digital piracy. Therefore, opening up new sources of income from digital markets has gained tremendous importance for record companies. Their share of global revenues obtained through digital channels was approximately 29% in 2010 and grew by approximately 6% compared to 2009 (see (IFPI, 2011). In the US, the volume of digital music sales grew from \$0.2 billion to \$3.1 billion from 2004 to 2009 (see RIAA, 2010). Obviously, the music industry is in the midst of a massive transformation process.[1] Although music downloads remain the most important source of digital revenues, up-and-coming streaming music business models have gained ground. Services such as *Deezer*, *Rdio* and *Simfy* have expanded significantly over the past 2 years. Probably the most striking development is that of the digital music database *Spotify*, which was launched in Sweden in 2008. The service is used by over 10 million subscribers across Europe and is the largest digital retailer in Norway and Sweden.[2] *Spotify* has recently entered two of the most important music markets by launching its business in the US and Germany and has inaugurated a strategic partnership with the social network platform *facebook*. It concluded agreements with the four major labels and is reported to be their second most important source of digital revenues after Apple's *iTunes*. The catalog currently contains over 16 million songs.

The underlying concept of streaming services relies on inducing music consumers to listen to streaming music on demand. The most common business model offers two types of services. The first is free of charge and supported by advertising. The second (premium) service charges users a monthly flat-rate fee and provides additional benefits such as unrestricted access to the catalog, offline listening and applications for mobile devices.

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[1] A detailed survey concerning the economic aspects of music in the digital era is provided by Peitz and Waelbroeck (2005a). Liebowitz (2006) specifically emphasizes the impact of file sharing on the music industry.

[2] In a recent survey by the Swedish consultancy *Media Vision*, over 40% of surveyed broadband users reported using *Spotify* in the last 3 months (see Media Vision (2011)).

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The IFPI Digital Music Report 2011 calls this business model the 'two-tier freemium model'.

This paper presents a stylized theory of such a two-tier freemium model. It can be argued that due to the uniqueness of these new business models and jurisdictionally determined characteristics, such as the regional legal frameworks, most services are considered monopolists in the provision of music. Thus, this paper investigates a single provider's strategic decision of whether to launch two vertically differentiated services. The advertising supported service, which can be used at no cost, is of low technical quality, and the charged service is of high technical quality. Users' attitudes regarding advertising are considered an important determinant of the equilibrium outcome. This leads to an essential feature of this modeling approach that links the negative externality of advertising in a two-sided market with a vertically differentiated product space that is served by a monopolist. The analysis addresses market failures with respect to the level of commercials and the flat-rate price, which stem from the monopolist's incentive to exploit its market power over advertisers and users. In the current debate on digital piracy and copyright protection issues, streaming music services are often evaluated as legitimate alternatives to illegal P2P file sharing networks. The present analysis enriches this debate and investigates whether streaming music services are effective means of combating piracy.

A relevant implication drawn from the analysis is that advertising supported and costless music provision generates high revenues, as users are highly tolerant of commercials. If both types of services are launched, the monopolist charges a high price for the high-quality service to boost demand for the low-quality, advertising supported service. As a consequence, users' surplus decreases as advertising becomes less of a nuisance. Depending on the nuisance cost of advertising, a socially optimal outcome is derived either by providing all users free access to the high-quality service or closing the high-quality service and providing a positive level of commercials in the low-quality service. Therefore, launching a monopolistic, two-tier freemium model never leads to a socially desirable outcome. If users are highly tolerant of commercials such that only the costless, advertising supported service is launched, the monopolist tends to provide an excessive amount of advertising if there is a sufficient number of potential advertisers in the market. If users are given the opportunity to download unauthorized works from P2P networks at a cost in the form of possible detection, then endogenizing the quality of the advertising supported service shows that digital piracy could be foreclosed given a sufficient level of intellectual property rights protection.

The paper contributes to the nascent literature on the music industry's revenue strategies. One strand of research emphasizes the trend toward the exploration of revenue sources from complementary products and services. This includes ticket sales for live performances and merchandising.[3] Gayer and Shy (2006) develop such a model and show that the provision of free music, namely piracy, increases an artist's popularity and therefore bolsters demand for products and services that are complements to the artist's music. In addition to an increase in the sales of complementary goods, the costless provision of music can have a positive effect on revenues due to sampling. Peitz and Waelbroeck (2005b) develop a model where potential customers are allowed to prescreen the variety of music in which they are interested. Next, they are assumed to be willing to pay for the original material if they find a perfect match between a piece of music and their preferences. Duchêne and Waelbroeck (2006) called this strategy, where listeners expend effort to acquire information about music and then make a purchase decision, an 'information-pull technology'. In contrast, the aim of this paper is to show that providing music for free generates revenues through advertising and to examine one of the music industry's most promising attempts to raise revenues.

2. Description of the model

Consider the problem of a monopolist that attracts potential users to two vertically differentiated services, the first of which is advertising based and can be costlessly accessed by users, while the second service contains no advertising and charges users a monthly fee. In what follows, the first service is referred to as the free-of-charge service and the second service as the flat-rate service. This model setup relates this paper to the literature on monopolistic markets in a vertically differentiated product space. The seminal paper on a single manufacturer of products of the same type but differentiated quality is Mussa and Rosen (1978). The purpose of their analysis is to determine the optimal policy of a monopolist with respect to the segmentation of the market by assigning different qualities with different unit costs to different types of customers who are willing to pay different prices. Gabszewicz et al. (1986) consider a different type of consumer preferences and show that a monopolist's decision to segment the market depends on the degree of vertical differentiation between customers if unit variable costs are neglected. Deneckere and McAfee (1996) analyze a monopolist's incentive to vertically segment a market by introducing a low quality good ('damaged good') that is more costly than the high quality product. Finally, Spiegel and Yehezkel (2003) investigate a model of a vertical relationship in which a monopolistic firm distributes a product to a continuum of consumers by employing two vertically differentiated retailers. Depending on the unit cost, they show that a vertical segmentation of the market can lead to welfare improvements. This paper adapts the Mussa–Rosen and Spiegel–Yehezkel utility function, but, as in Gabszewicz et al. and consistently with the reality of digital media markets, it assumes that unit costs are zero.

To consider a realistic timing, the model is a three-stage game. In the first stage, the monopolist determines the fee that advertisers must pay to place a commercial and the price of the flat-rate service. In the second stage, advertisers determine their demand for advertising space. In the third stage, users strategically choose the option that best

[3] This development is supported by Krueger (2005), who found that from 2000 to 2003, ticket prices for live performances increased sharply relative to inflation.