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## Cannibalizing or Complementing? The Impact of Online Streaming Services on Music Record Sales

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### Abstract

The Internet has changed the media contents industry, and the music industry's business form has transformed from records into online digital products as the online music platform increasingly develops. Before the stabilization of the online music platform, digital music files were considered music piracy and were related to the decline of music record sales. Although research finds that increased Internet penetration led the decline of music record sales, after the stabilization of the online music platform and the introduction of online streaming services in the mid-2000s, a recognizable increase in music record sales appeared. We analyze the impact of adopting online music streaming services on the sales of music records to determine the effect of digital products on physical products by a two-stage least squares (2SLS) regression approach. Using monthly music record sales and streaming data from the official Korean Gaon Music Chart, we find that online streaming services positively impact music record sales. Furthermore, male artists sell more records than female artists as female fans, who prefer male artists, have a higher willingness-to-pay for individual services. Both the number of songs included in one album and the number of artists in one group also positively affect music record sales. Our analysis suggests that online streaming positively impacts music record sales.

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*Keywords:* online music streaming service; music record; album; digital product; physical product; 2SLS; endogeneity

### 1. Introduction

The music industry has also changed progressively as information technology has evolved. In the late 1990s, with the advent of MP3 players and the dispersion of Internet services, the digital music industry developed. However, the offline music record industry suffered from the advent of the digital music market. The music recording industry was not as profitable, as most of the audience now listened to music through digital music files. This phenomenon was studied theoretically. Elberse (2010) finds that the transition to digital music unbundled music records, such that online music downloads were not as economically profitable as previous music record sales. Moreover, according to Liebowitz (2004) and Peitz and Waelbroeck (2004), online music downloads increased illegal music file sharing through peer-to-peer (P2P) sites, such as Napster. Therefore, the digital music market had a cannibalizing effect on the offline music market.

However, the situation began to change in early 2000. Bhattacharjee et al. (2006) find that according to the online selling strategy, additional profits can be gained even with the existence of piracy. As shown in Figure 1, online music streaming services were launched in the early 2000s as a new online music selling strategy, and the streaming market was further established with the development of smart devices. In this research, we define online streaming service as a service that delivers live media content, such as music, animation, or movies, via an Internet network. Considering the Korean popular

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music industry, offline record sales have slightly increased since 2007. More recently, some albums exceed 100,000 sales. As such, the established relationship between the amount of streaming and offline record sales can be called into question. Consequently, we expect online music streaming services to positively impact offline music record sales.

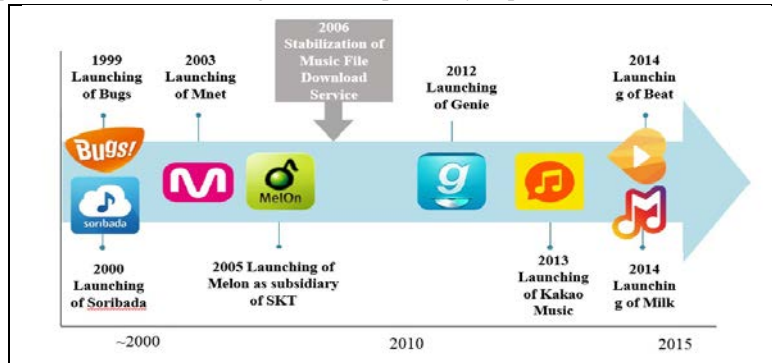


Fig. 1. History of Korean Online Music Platform

This study aims to find a causal relationship between digital products (online music streaming services) and physical products (offline music records). Using Korean music sales data from the popular Korean Gaon Music Chart, we investigate how online music streaming services can promote offline music record sales.

## 2. Literature Review

Previous studies predominantly concentrate on the piracy of digital music products, not legal music streaming services, and its effect on music record sales. Most empirical studies investigate the impact of digital piracy on the demand of legitimate media content. Liebowitz (2008) argues that the significant decrease in music record sales from 1999 to 2003 can be explained by increased Internet penetration. Petiz and Waelbroeck (2004) and Hong (2004) find that digital music piracy can explain the decline of music record sales by about 20 percent.

Other literature documents how the impact of digital piracy differs for popular and less popular artists. Rob and Waldfogel (2004) and Bhattacharjee et al. (2007) find that less popular artists confront a higher risk of piracy than popular artists. However, Blackburn (2004) describes that popular artists are more strongly impacted by digital music piracy. Thus, the degree of harm from piracy varies among academic research findings.

There is no academic research that considers the impact of legitimate online music streaming services, although somewhat similar research by Smith and Telang (2009) was conducted on movie DVDs. Smith and Telang (2009) find that increased broadband Internet penetration increased DVD sales by \$1.3 billion from 2000 to 2003. Smith and Telang (2009) also find that movie broadcasts on online networks led to a significant increase in movie DVD sales using sales rank data from Amazon.com and movie broadcasting data from over-the-air broadcasting channels and cable channels with major advertising support. Similarly, Danaher et al. (2010) find that digital DVD sales do not show cannibalizing effects on physical DVD sales. Consumers who paid for the broadcast channels watch the movies on the channels, which then stimulates the DVD purchase. This idea is previously tested by Liebowitz (1985) from the perspective of “stimulate sales,” which refers to the role of television advertising in promoting movies to consumers who otherwise would not buy the DVD.

We test this phenomenon in the context of the music industry, specifically with Korean music industry data, and consider the impact of digital products on physical products. Although the previous studies Smith and Telang (2010) and Danaher et al. (2010) use rank data, we employ real music sales data, making our study more robust and detailed. Additionally, apart from previous research only on the direct impact of digital products on physical products, this study considers the TV promotion of music products to directly impact the sales of digital products, which indirectly affects the sales of physical products.

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