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# Sales displacement and streaming music: Evidence from YouTube

R. Scott Hiller*

*Department of Economics, Fairfield University, 1073 N. Benson Rd, Fairfield, CT 06824, United States*

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ABSTRACT

In this paper I exploit the removal of Warner Music content from YouTube in January 2009, and its restoration in October 2009, as a plausible natural experiment to investigate the impact of online content availability on album sales. I find that this blackout on YouTube had both statistically and economically significant positive effects on Warner albums, which are quickly moderated as top-selling albums are dropped from the sample. Results also show that albums that have a very successful debut face more displacement from YouTube videos, while the effect on lower debuting albums may be moderated by a promotional effect.



## 1. Introduction

Determining whether free access to online music displaces album sales has been a controversial subject among academics, policymakers, and practitioners. For instance, the 1995 Digital Performance Right in Sound Recordings Act (DPRA) created a public performance right for sound recordings that are transmitted by satellite radio and, increasingly today, Internet companies. In contrast, the DPRA exempted over-the-air broadcasters from paying for their use of the sound recordings on the assumption that the broadcasts have promotional effects.[1] Hence, today's licensing negotiation between online music providers and labels often leads to disagreements because of the inconsistent treatment and lack of definitive evidence. This paper aims to examine whether and by how much digital content services displace album sales.

A number of authors have examined the effects of consumer piracy on album sales. This paper is different from these in a couple of dimensions. First, I am not investigating illegal, peer-to-peer file sharing activities but I focus on YouTube, a legal channel that pays licensing fees to record labels. According to the research firm NPD group, file sharing has in fact been declining since 2005, and music sales increased year over year in 2009 with digital sales accounting for 40% of sales.

In this period YouTube distributed a considerable amount of music through musci videos and lyric videos released in association with albums, but also through songs licensed for the purpose, likely distributing more music than any other online platform. Further, in this period streaming services such as Spotify, iTunes Radio, and Google Play Music did not yet exist or were not operating in the United States while YouTube dominated the online multimedia market. Thus, this study aims to shed light on

* Tel.: +1 203 254 4000 ext. 2795.
*E-mail address:* rhiller@fairfield.edu

[1] This exemption, however, has been criticized in light of technological developments and alternative sources of music. The U.S. executive branch has supported an equal treatment of terrestrial and online music services (Department of Commerce, 2013; Peters, 2007).

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the size of sales displacement, which can help narrow the differences in opinions between contracting parties.

I exploit the removal of Warner content from YouTube for a nine-month period (which I call a "blackout" in this paper) and find a substantial treatment effect from the blackout using a sample of Billboard top 200 albums. Specifically, using a nine-month window before and after the blackout, the removal of Warner content from YouTube is causally associated with an increase of 6591 units per week per album in the Billboard top 200 samples, 2551 units when I exclude the weekly top 10 albums, and 1717 units when I exclude the top 25 albums. Using a simple theoretical framework to interpret my results, I argue that there are likely substantial sales displacement for highly ranked albums, but these results are not inconsistent with the presence of substantial promotional effect from YouTube exposure for relatively lower ranked albums.

## 2. Related literature

Starting from the Napster case (*A&M Records, Inc. v. Napster, Inc.* ), sales displacement effects from online file-sharing services have been the subject of a number of studies. While I do not intend to survey this literature here (see, e.g., Liebowitz, 2006; Waldman, 2013 for surveys), many of the pioneering works on music piracy made use of either survey of individuals on their past consumption (e.g., Andersen and Frenz, 2010; Hong, 2013; Rob and Waldfogel, 2006; Waldfogel, 2010; Zentner, 2006) or city/country-level panel data that often make use of variation in broadband penetration (e.g., Hui and Png, 2003; Liebowitz, 2008; Peitz and Waelbroeck, 2004; Zentner, 2010). The main difference of my treatment effect study using micro-level data is that I can control for the observed and unobserved heterogeneities to make more plausible inferences.

To my knowledge, there are only a few papers using album-level, actual sales data to investigate the effects of file sharing activities (Blackburn, 2004; Hammond, 2014; Oberholzer and Strumpf, 2007). In all three papers, the authors have a measurement of albums available on file-sharing networks and use an instrumental variable approach to address the omitted variable bias. That is, Blackburn (2004) uses RIAA lawsuits against consumers; Oberholzer and Strumpf (2007) use German students on vacation; and Hammond (2014) uses pre-release file sharing activities as an instrument. Regardless of validity of these instruments, which has been criticized in Liebowitz (2010), there are reasons to suspect that the effect of file sharing and that of legal channels such as YouTube would be different, and understanding the latter is the focus of this paper.

I am by no means the first to examine the effect of legal content distribution on sales (see Waldfogel, 2009). In particular, Danaher et al. (2010) use the removal of NBC content from Apple's iTunes Store and its restoration as a natural shock to the supply of legitimate digital content and find that the removal is causally associated with a more than 10% increase in BitTorrent activity for NBC's content but no change in NBC's DVD sales (imputed from sales rank at Amazon.com). This analysis is similar in style, but the mechanisms are different because they look at whether users who are no longer able to purchase content (at the iTunes Store) would be more inclined to make another legal purchase (at Amazon), while I examine whether users who can no longer view content free (on YouTube) would be inclined to purchase (either digital or physical) albums.[2]

In an independently developed paper, Kretschmer and Peukert (2015) study similar subject matter using European data. They exploit the removal of music videos in Germany, and then the re-introduction of videos with an agreement with owners of the platform VEVO. They focus on the effects of this cross-country variation, finding that online videos complement digital sales and limited evidence of effects on physical sales.[3] In another recent paper, Aguiar and Waldfogel (2015) attempt to quantify the effect of Spotify listening on consumption of popular songs. This paper focuses on the increasingly popular subscription services that did not constitute a substantial market share during the period of this paper.

Lastly, I note here that analysis is confined to the Billboard top 200 sample and thus the results need not generalize to those outside of the top 200. That is, YouTube enables a vast array of user-generated content and may indeed bring substantial promotional benefits to emerging or independent artists. Waldfogel (2012) assembles comprehensive data on albums released between 1980 and 2010 and finds some evidence that Internet radio increases the number of albums consumers are aware of and an increasing number of albums find commercial success without substantial radio play.[4] I abstract from the supply side (or long-tail) effect of YouTube, which need to be taken into account for societal effects of free online distribution. However, licensing agreements between established labels and online services would be equally important.

## 3. Background information

YouTube was launched in November 2005 as a video sharing website. The site grew rapidly, and Reuters reported in 2006 that YouTube was the leader in Internet video content with 29% share of the U.S. multimedia market and 20 million unique viewers per month. According to data published by market research company comScore in 2010, YouTube's market share in online video content was 43.1% followed by Hulu (3.5%). Further, 84.8% of the total U.S. Internet audience viewed online video, where 144.1 million viewers watched 14.6 billion videos on YouTube (101.2 videos per viewer). At least since 2010, the web information company Alexa ranks YouTube as the

[2] Another difference is that while I focus on the impact of content removal on relatively newly released albums, Danaher et al. (2010) remove all recent television episodes because NBC did not sell then-current season content on iTunes prior to the removal.

[3] Two primary differences exist between papers, first Kretschmer and Peukert depend on cross-country variation where this paper is entirely within the United States. Second, while their paper allows for separation of digital and physical sales, their data is more limited in time frame, making observation of trends more difficult.

[4] Bourreau et al. (2013) find that the number of new releases can increase without having higher overall sales. Thus, a strong sales displacement effect at the top can be consistent with online content services having some promotional effect for lesser-known artists.