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# An empirical analysis of the frequency and location of concerts in the digital age

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ABSTRACT

As recorded music sales have dropped, live performances have become an important revenue source for artists. In this context, we study how the geographical distribution of concerts has evolved during the digital music era. Using data on more than 33,000 concerts in the United States from 2000 to 2011, we investigate how the distribution of concert locations has evolved over time. Our analysis shows that artists performed more concerts from 2000 to 2011, and that these concerts became more geographically dispersed during this period.



## 1. Introduction

Traditional music industry business models have been altered due to advancements in information technology. One of the most notable, and for some, difficult changes is in income sources for artists. Music artists have traditionally generated income in two ways: royalties from recorded music sales and revenues from live performances.[1] In recent years, with the dramatic decline in recorded music sales, artists' income sources have significantly shifted from royalties on recorded music toward live performances (Krueger 2005). For example, the live music industry has become the largest music sector, outstripping recorded music in the United Kingdom in 2009, and increasing relative to recorded music in subsequent years (Frith 2007; Page and Carey 2009).

Fig. 1 illustrates a sharp drop in income from U.S. music sales for the industry in the United States from 2001 through 2010. During this same time period, the size of the concert market rose from $1.75 billion (2001) to $4.25 billion (2010). The marked increase in concerts may be related to concert prices and/or the number of concerts. According to annual charts from *Pollstar*, a major trade magazine for the concert tour industry, the average ticket price of concerts by the top 100 artists in North America increased by 58% (from $42.2 in 2001 to $66.59 in 2009), while the consumer price index (CPI) increased by 14% during the same period.[2] In addition to this rise in concert ticket prices, there is also a possibility that artists gave more concerts, which has been understudied in the literature (Connolly and Krueger 2006).

In this paper we study how often artists have performed concerts in the post-file sharing age, placing special emphasis on the geographic distribution of concert locations. In other words, our analysis addresses the following questions: First, did artists perform more concerts as recording sales drops, and if so, why? Second, how, if at all, did concert locations evolve over the period?

We conduct empirical analyses by using a unique data set containing information on concert locations across time and artists. Specifically, we investigate the geographic distribution of over 33,000 concerts performed by 110 well-known artists from 2000 to 2011 in the United States. Our results suggest that artists in our sample performed an increasing number of concerts over the years studied and that concert locations trend toward a long tail distribution from 2000 to 2011. In other words, the proportion of concerts in relatively small cities tends to increase over time, implying that the potential audience in these regions would have a chance to attend a greater number of concerts given by artists.

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[1] Some songwriters generate additional income from music publishing fees.

[2] Similarly, according to Connolly and Krueger (2006), "From 1996 to 2003, for example, the average concert price increased by 82%, while the CPI increased by 17%." Note that the sales figures in Figure 1, however, are defined as prices of records and concert tickets that have not been adjusted for inflation.

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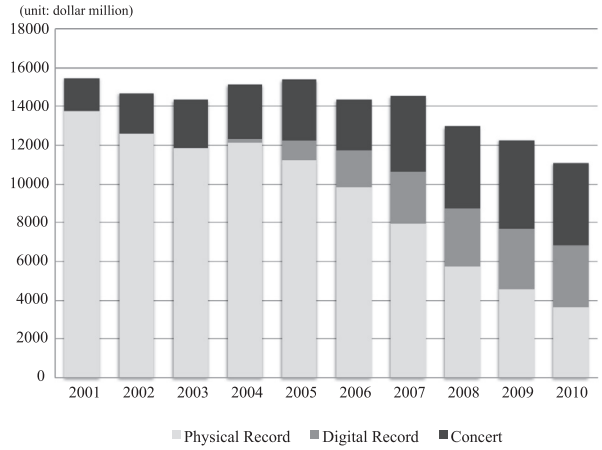


**Fig. 1.** music industry sales in the United States during 2001–2010.
*source*: recording industry association of America (RIAA), *Pollstar* magazine.

We conjecture that this distinctive feature may be associated with demand- and/or supply-side drivers as they relate to the impact of the Internet. On the supply-side, artists may need to compensate for falling recording sales resulting from widespread file sharing, so they are likely to perform a larger number of concerts. On the demand-side, enhanced online communication channels may provide useful information and convenience for artists and concert promoters to find potential concerts in previously unexplored places.

Our paper complements, from a different angle, the existing literature regarding how the Internet affects the music industry. When the impact of file sharing is considered, the majority of previous studies have focused on the impact of file sharing on recorded music – a fraction of total music revenues. This study, however, adopts a broad view of the entire music market: first, by accounting for the complementary benefits of recorded music and concerts, and second, by analyzing artists' concert behaviors in the digital age. Examining how geographic concert distributions have evolved is not only important for the academic literature, but it also provides managerial implications for those working within the music industry — artists, music labels and concert promoters, who may seek additional opportunities to generate income in the digital age.

## 2. Related literature

Our work relates to two strands of the literature: the impact of piracy on sales of copyrighted goods, and market dynamics in the concert industry.

In the context of the impact of piracy on sales, from a theoretical perspective economists have studied two competing effects of digital piracy on copyright owners (Liebowitz 1985; Liebowitz 2008): the negative substitution effect of piracy and the potentially positive sampling effect of piracy. To explore these competing effects, empirical studies have examined the impact and consequence of digital piracy in a variety of different contexts (see Danaher et al., 2014 for a review of this literature). The vast majority of studies in this literature have documented a reduction in music sales associated with piracy (see for example Peitz and Waelbroeck (2004), Zentner (2005), and Liebowitz (2008) who examined the impact of Internet adoption on music sales, Zentner (2006), Rob and Waldfogel (2006, 2007), Hong (2013), and Michel (2006) who used survey data to analyze album and movie piracy, Danaher et al. (2010) who used direct observation of P2P activities to measure the impact of digital channel usage on piracy, and DeVany and Walls (2007) who used theatrical sales data to measure the impact of music piracy.

While the majority of empirical studies have found evidence that piracy harms sales of recordings, a few theoretical studies suggested positive aspects of file sharing (Peitz and Waeldbroeck 2006). In particular, Gayer and Shy (2006) identified certain conditions under which artists may benefit from music piracy by showing that the demand for live performances can rise with the increased popularity of artists generated by consumption of both legal and illegal copies.

Several studies have examined the market dynamics of the concert industry given the rise in live music consumption and the decline of recorded music sales (Holt 2010). For example, Connolly and Krueger (2006) show that the average price of concert tickets have increased with the transition from physical records to digital music. Krueger (2005) also argues that concerts are likely to be priced as single-market monopoly products than as a complementary good to recordings. Black et al., (2007) echoes this argument by demonstrating the rapid rise of ticket price and the inelastic demand of the top 100 tours in North America from 1997 to 2005.

As the concert market has grown, researchers have also studied the secondary ticket market (Leslie and Sorensen 2014; Bennett et al., 2015). Our paper extends the prior literature by analyzing the geographic distribution and frequency of concerts, highlighting the relationship between city size and the concentration of concerts.

Another stream of research focuses on an economic perspective of music consumption from recording and concert sales. Montoro-Pons and Cuadrado-Garcia (2011) analyze institutional change in the music industry, empirically demonstrating the positive network externality from the recorded music toward live concerts using survey data in Spain. Waldfogel (2012) documents that the distribution of songs at zero marginal costs would make concerts an increasingly important business model for the industry. Mortimer et al. (2012) extends this idea by empirically showing that while file sharing has a negative impact on the sales of music recordings, it also has a positive but differential impact on the demand for live concerts. Specifically, they show that the impact of file sharing is greater for lower-ranked artists than for top-ranked artists. Our study complements their results by examining the geographic distribution of concerts performed by top-ranked artists.

By studying the geographical distribution of concerts, our study is conceptually related to the Long Tail effect, a term coined by Anderson (2006).[3] The literature on this phenomenon examined the Long Tail phenomena by identifying demand side drivers (e.g., easy search tools and useful recommender systems to access niche products) of the media industry (Brynjolfsson et al., 2006, 2010). If cities are ordered by population, well-known artists may prefer to perform concerts in large cities because they may potentially attract a large number of audience in those cities, which may result in a Pareto distribution of concert locations. However, we conjecture that artists are likely to visit smaller cities as they give more concerts. If this phenomenon indeed occurs, the geographic distribution of concerts may tend shift toward the tail of the distribution, as seen in the long tail. In this regard, we focus on the following research question: which effect – Pareto or Long Tail – will prevail for concert location distribution in the digital age?

[3] The Long Tail effect has been in dispute in recent academic research. Some researchers have found evidence that the Internet would also lead to a higher concentration of popular products in movie markets (Elberse and Oberholzer-Gee 2007), whereas Zentner et al. (2013) examined changes in video rental market sales as consumers moved from offline to online markets and suggested that consumers are more likely to rent niche titles in the online channel than in the offline channel.