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Strategic decision-making in Hollywood release gaps☆

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ABSTRACT

Hollywood blockbusters are usually released in the U.S. before other foreign markets. The release gaps have declined significantly over time and varied greatly across countries. While movie piracy has been suggested as an important determinant for the release gap decision of distributors, theory and evidence suggest that there are other important determinants. In this paper, we use a discrete choice release gap decision game model to disentangle the impacts of the i) release gap effect, which includes factors that provide incentives for a distributor to shorten the release gap; ii) word-of-mouth effect, which provides incentives for a distributor to lengthen the release gap; and iii) competition effect, which accounts for the incentives blockbusters have to avoid each other. We obtain box office and release gap data from the private industry source Boxofficemojo.com. We provide results on the economically significant impact of these three factors on distributors' release gap decisions and box office revenue.

1. Introduction

Movie executives fear the collapse of Hollywood exports in the face of rising worldwide piracy rates. Yet box office sales growth remains stable. According to the Motion Picture Association of America (MPAA), U.S./Canadian and international box office sales grew 12% and 32% between 2008 and 2012.[1]

One characteristic of the movie industry often mentioned in connection with piracy is the release gap between when a movie appears in the U.S. and a foreign market. Hollywood studios try to preempt piracy by releasing movies as quickly as possible. Industry observers often note the decline in movie release gaps worldwide, a point made by Eliashberg et al. (2006). Looking at the years 1980, 1990, 2000, and 2010, for example, we observe this trend when comparing the average release gap for those top ten box office hits from the U.S. which were also released in Hong Kong. The average release gap declines from 168 days in 1980, a year which saw the hits *Star Wars: Episode V — The Empire Strikes Back* and *The Blues Brothers*, to 149 days in 1990 to 43 days in 2000 to 20 days in 2010. Out of the top ten movies in 2010, two were released first in Hong Kong, one was released on the same day in both the U.S. and Hong Kong, and one was released less than a week later in Hong Kong.[2] McCalman (2005) provides evidence that the release gap has a non-linear relation to the level of intellectual property rights in a country: either very weak or very strong protection of intellectual property rights is associated with a longer release gap.

Although piracy affects release gaps, it is only one of many possible factors contributing to the release gap decisions made by Hollywood studios. Studios are notoriously tight-lipped about what determines their release schedules. A recent article exploring the topic ends without a clear answer: "Why did the studios select those dates? After much to-ing, fro-ing and dithering about whether to comment on the record, neither studio would say.".[3] In addition to factors such as seasonality and the movie decay pattern, we categorize the factors contributing to release gap variation observed in the

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[1] We use the MPAA's *Theatrical Market Statistics 2012* for various statistics throughout the paper. This report currently resides at http://www.mpaa.org/policy/industry.

[2] The numbers for this example were constructed from information accessed from Boxofficemojo.com and IMDb.com.

[3] Buckley, 2015. "Why This Movie Now? Planning Release Dates, From 'Straight Outta Compton' to 'Meru'." August 11. http://www.nytimes.com/2015/08/12/movies/why-this-movie-now-planning-release-dates-from-straight-outta-compton-to-meru.html.

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data into three main effects: the release gap effect, word-of-mouth effect, and competition effect.

The release gap effect refers to factors that provide incentives for a distributor to shorten the release gap. These include i) the prevalence of digital cinema, which can significantly reduce the duplication and delivery cost of a movie, estimated to be approximately 3.5% of the total cost to create and distribute a movie (Husak, 2004), and ii) movie piracy, which has become more important after the spread of Peer-to-Peer (P2P) file sharing technology.

The word-of-mouth effect refers to the effect of longer release gaps on box office performance. In particular, a longer release gap allows a movie more time to accumulate (both positive and negative) reviews on the Internet and, thus, more (both positive and negative) word-of-mouth in the foreign market. Moul (2007) shows that word-of-mouth has a positive impact on domestic box office performance. Elberse and Eliashberg (2003) argue that U.S. releases act as a filter which selects the more successful movies to be released abroad.

The competition effect refers to the interactions among Hollywood distributors. Distributors want to release movies on popular movie-going weekends, like the Fourth of July in the U.S., but also want to avoid competition from other blockbusters. Krider and Weinberg (1998) cite, for example, a Vice President of Warner Brothers:

> …all studios, including Warner Brothers, are constantly moving their opening dates, and we shift the pictures around the calendar in an effort to find the ideal release date for each picture on our schedule. Because the opening weekend is so critical, it is even more critical that we find exactly the right date for each movie.

This same Vice President cites the primary concern about the release date as being competition from other movies with a similar target audience. Krider and Weinberg (1998) relate an example of a studio adjusting its release date in the face of competition during the Christmas season of 1992. Columbia Pictures moved its release date of *A Few Good Men* from December 18 to December 11, which coincided with the release date of Twentieth Century Fox's *Hoffa*. Both movies star the actor Jack Nicholson. Twentieth Century Fox feared losing ticket sales and moved the release of *Hoffa* to December 25. Strategy regarding release dates may also apply to foreign markets.

In this paper, we develop and estimate a model of discrete games, which allows us to disentangle the three effects when analyzing the release gap decision. Our theoretical modeling takes two steps. First, we model demand for movies as a function of movie quality, movie demand decay pattern, and seasonality underlying demand for a movie, as in Einav (2010). Second, we build on Einav (2010) to construct a private information sequential-move game on the release gap decision. In the model, we take the movie decay pattern and seasonality as given and re-parameterize the movie's quality as a function of the length of release gap and the number of positive and negative reviews on International Movie Database (IMDb) to account for the release gap effect and word-of-mouth effect. We then take the season in which a movie is released as given and focus on the strategic decision of the release gap within the season.

We estimate the model using data on box office performance and release dates from the U.S. and 18 other countries between 2008 and 2014. For computational concerns, we choose four annual release seasons (Presidents' Day, Memorial Day, Fourth of July, and Thanksgiving), all at around a dominant U.S. release date, to test our empirical model. We also only consider the strategic interaction between the top three Hollywood movies in each season. Our results suggest three things. First, less competition, through an imposition of an import quota, would only slightly decrease the release gap (approximately 1%), but would more significantly increase the box office revenue of movies that obtain the quota (6.7%). Second, word-of-mouth has a positive impact on the length of the release gap. In particular, we conduct a counterfactual in which a movie would receive no effects from word-of-mouth. Our counterfactual results suggest that the release gap and box office revenue would indeed decrease by 3.6% and 4.6% on average across the 18 countries. Third, the release gap effect has a negative impact on the length of the release gap. When the release gap effect disappears, the average release gap and box office revenue across 18 countries would increase by 18.3% and 60.9%.

The remaining sections of our paper are organized as follows: Section 2 reviews the extensive and growing literature on box office revenues, piracy, and international trade in movies. Section 3 briefly discusses the movie industry in general and in the context of movie piracy and release gap trends. Section 4 describes our model of the release gap decision. Section 5 describes our data set we use in our analysis, while Sections 6 and 7 present our estimates and counterfactuals. Section 8 concludes.

2. Literature review

There is a large literature on the determinants of box office revenues. Einav (2007) uses a long panel of movies' weekly box office revenue to separately identify the effect of seasonality, movie decay pattern, and movies' quality on movies' box office revenue. Dellarocas et al. (2007), Duan et al. (2008), and Moul (2007) evaluate the effects of user reviews and word-of-mouth on box office revenues. Lastly, a few papers have analyzed other factors affecting box office revenues, such as a movie's script (Eliashberg et al., 2007), advertising (Rennhoff and Wilbur, 2011), and the presence of big stars (Elberse, 2007).

On top of these factors, there is a growing literature that attempts to evaluate the impact of piracy on box office revenues. Rob and Waldfogel (2007) collect survey data from 500 students from the University of Pennsylvania and find the displacement effect to be approximately 0.2. Zentner (2010) uses a panel of country-level data on movie consumption and broadband penetration to evaluate the effect of P2P file sharing on retail purchases as well as on box office revenue. He finds that P2P file sharing has a large and negative impact on retail purchases but no statistically significant impact on box office revenue. DeVany and Walls (2007) find that a single widely-released movie lost $40 million in revenue due to pre-release and contemporaneous Internet downloads of the movie. Ma et al. (2013) use U.S. box office data together with unique Internet file-sharing data and find that pre-release piracy can lead to a 20% decrease in box office revenue compared to piracy that occurs post-release. Danaher and Waldfogel (2012) make use of the variation in international release gaps and box office performances in 17 countries, together with time breaks for the adoption of BitTorrent, to identify the effect of release gaps on box office performances. Their results indicate that international box office returns were at least 7% lower than they would have been in the absence of pre-release piracy. Danaher et al. (2014) provide a review of the recent literature.

Our paper contributes to the literature by extending Einav (2007)'s framework to structurally analyze the determinants (seasonality, movie decay pattern, and movie quality) of box office revenues in the U.S. and 18 foreign countries. Also, we extend the framework to analyze two additional determinants — piracy and word-of-mouth.

A few papers also attempt to analyze the release timing decision of movies. Several papers focus on the U.S. market. Krider and Weinberg (1998) characterize the equilibrium of a model in which two movies compete by choosing the release dates. They test the predictions of the model using the data from the 1990 summer season in the U.S. Einav (2010) builds on Einav (2007) to structurally estimate a release date timing game in the U.S. market. He finds that release dates of movies are too clustered on holiday weekends and distributors could increase box office revenues by shifting holiday release by one or two weeks. Several papers focus on the release