Vertical Integration and Market Foreclosure in Media Markets: Evidence from the Chinese Motion Picture Industry

Ricard Gil[1] Chun-Yu Ho[2] Li Xu[3] Yaying Zhou[4]

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Abstract This paper examines the impacts of vertical integration on market outcomes in the context of media markets. Using movie-theater-day level data from movie theaters in China, we find that integrated theaters charge lower prices, enjoy a higher attendance, allocate more screens to and run longer lengths for their own movies than independent movies. Further, among integrated theaters, while we find the box office of continued own movies is higher than that of discountinued independent movies, their ratio is significantly larger than that of sharing terms across integrated and independent movies. These findings suggests integrated theaters implement efficient screening decisions, and are set against vertical foreclosure motives. Finally, we estimate a discrete choice model of movie demand, which shows that integrated theaters deliver a higher utility from integrated movies than independent movies by arranging more screen and providing benefit to consumers.

Keywords: Vertical integration, market foreclosure, movies, China.

[1] J.R. Smith School of Business, Queen's University, Canada. Email: ricard.gil@queensu.ca
[2] Department of Economics, University at Albany, SUNY, USA. Email: cho@albany.edu.
[3] Antai College of Economics and Management, Shanghai Jiao Tong University, China. Email:shirleyxu@sjtu.edu.cn
[4] Kelley School of Business, Indiana University, USA. Email:yayizhou@iu.edu

1. **Introduction**

The seminal work of Coase (1937) served as a starting to point to the study of make-or-buy decisions. Defining a firm's boundaries and scope has become a critical and essential strategic decision for firm survival as well as determining market outcomes and their welfare implications. In fact, firms that bring the wrong business activities or fail to bring the right business within their boundaries risk losing their competitive advantag. By now, it has been established that firms vertically integrate when transactions costs and incentive misalignment are pervasive in arm's length contracting.

As a result, parallel literatures in organizational economics and industrial organization have investigated the role and consequences of vertical integration in markets. The existing literature has found that vertical integration is associated with positive market outcomes such as lower prices due to double-marginalization (Gil, 2015; Hortacsu and Syverson, 2007), higher quality (Forbes and Lederman, 2010; Hansman et al., 2018), better coordination when timely adaptation is crucial (Forbes and Lederman, 2009), or more investment and innovation (Pisano, 1990; Acemoglu et al, 2004; Guedj, 2005). Yet, while vertical integration seems to be positively associated across the board with good market outcomes, the question remains whether integration drives societies, industries and firms closer to their most efficient allocation of resources.

In contrast to this view, vertical integration may also be a source of inefficiency if it facilitates anticompetitive behavior. In that case, vertical integration may be potentially associated with negative market outcomes such as market foreclosure, higher prices, lower quality or less innovation (Chipty, 2001). This aspect of vertical integration is controversial, and has spurred as much antitrust debate as academic discussion in the past (Paramount, Microsoft) and present days (Google, Amazon). Because it is challenging to empirically separate optimal and anticompetitive firm behavior, it has become necessary for policy recommendations and implementation to minimize the incidence of false positives and false negatives.

Our paper here precisely aims to study how vertical integration affects market outcomes, and test for market foreclosure in the context of the Chinese movie industry. To do so, we employ a large data set containing box office information of 98 movies showed in 3,075 theaters located in 1,382 districts across

all Chinese provinces over the period of February and March in 2013. We complement these data by manually collecting information of shareholders for distributors of each movie and shareholders for each theater chain in our sample. Therefore, we are able to distinguish in our data two sources of variation in vertical arrangements, whether a movie is owned by distributor who also own theater chains, and whether a theater is owned by a distributor who also owns movies in our sample. The combination of these two sources of information allows us to characterize the vertical relationship between the distributor of each movie and the theater where it is showing. Our data contains four distinct cases, a movie showing in a theater owned by its distributor, an independent movie in an integrated theater, an integrated movie in an independent theater, and an independent movie in an independent theater.

We use the rich variation in vertical relationships in our data to study how vertical integration is associated with market outcomes, and whether market foreclosure exists in our empirical context. We divide our empirical strategy in three well-differentiated parts. First, we estimate cross-sectional differences in pricing, attendance, screens, and run length between movies playing in theaters owned by their own distributor and independent movies. Our specifications will control for unobservable differences in movie demand, theater and week with movie, week since release and theater-day fixed effects. With these fixed effects, differences in outcomes between integrated and independent movies are identified using within theater and day variation in outcomes.

Second, we test for vertical foreclosure. The test infers an integrated theater forecloses independent movies if it discontinues independent movies even though they provide higher revenue than their owned movies. To implement this test is not enough with comparing box office revenues but comparing theater revenues net of taxes and distributor rental fees. Because revenue sharing terms in Chinese movie exhibition contracts are fixed across movies and weeks, our test will consist on whether the ratio of revenues of continuing integrated movies to revenues of discontinued independent movies is smaller than the ratio of their corresponding revenue sharing terms.

Third and last, we estimate a discrete-choice demand model to quantify the effects of vertical integration in demand. Particularly, we allow the pricing and screening decisions to be endogenously determined according to unobserved movie attributes. We also allow vertical integration directly affect consumer

utility from watching a movie. Since vertical integration affects several movie characteristics, our demand model provides a summary measure of how and disentangle the channels through which vertical integration affect consumers.

Our empirical findings are as follows. First, we find that integrated theaters charge lower prices for their own movies than independent movies. We also find that integrated movies playing in theaters owned by their distributors have higher attendance, are shown in more screens, and have longer run lengths. While our results on lower prices associated with integrated movies may suggest welfare-enhancing effects of vertical integration, our findings on higher attendance, more screens and longer run lengths may suggest preferential treatment for own movies and foreclosure of independent movies.

For this reason, we implement our test of vertical foreclosure, but do not find strong evidence for it. For the sample of domestic movies, we find that the box office of continued own movies is 56.8% higher than that of discontinued independent movies, which is substantially higher than the typical revenue sharing between distributor and exhibitor for independent movies. It provides counter-evidences of vertical foreclosure for domestic movies. Simialrly, we do not find evidence of vertical foreclosure for foreign movies.

Our final set of results suggests that vertical integration affect demand in three channels, namely price, screen and direct channels. We show that consumers enjoy a higher utility from integrated movies than independent movies when they watch movies in integreated theaters. The higher utility comes from a more screen arranged and other benefit for integrated theaters showing its own movies.

Our findings contribute to a strand of literature that provides evidence in favor of efficiency improvement brought by vertical integration through a decrease in prices (Hortacsu and Syverson, 2007; Gayle 2013) and increase in quality (Forbes and Lederman, 2010; Hansman et al., 2018). Closest to our work are studies investigating the effect of vertical integration in media markets and, in particular, the movie industry. Gil (2007) finds that movies renegotiated ex-post more often tend to be distributed ex-ante by integrated distributors, and are more likely to be played in distributor-owned theaters. He argues these findings suggest that vertical integration reduces monitoring and renegotiation costs. Gil (2009) finds that

a movie's run length is shorter in independent theaters than when playing in theater owned by the movie's distributor. He argues the observed difference in run length is due to the revenue sharing contract between distributors and exhibitors. Gil (2015) provides evidence that vertically integrated theaters charged lower prices than non-vertically integrated theaters before disintegration caused by Supreme Court ruling regarding the Paramount case, and argues such difference is due to the elimination of double marginalization.

However, there are also studies showing welfare-decreasing effects of vertical integration. Hastings and Gilbert (2005) show that vertical integration increases the wholesale price of gasoline in California gas station markets, and argue that the increase in prices respond to an intent of raising rival's costs of vertically integrated firms. Chipty (2001) studies the impact of vertical integration in the cable television industry, and shows that integrated operators are more likely to exclude channels from competitors. Suzuki (2009) examines the merger between Turner Broadcasting and Time Warner, and finds that rival non-integrated channels were excluded post-merger.

Vertical integration in the movie industry is no stranger to concerns regarding market foreclosure and anti-competitive behavior (Gil, 2010). Conant (1960) argues that prior to the Paramount decrees, integrated theaters favored movies of their parent distributors. Fu (2009) studies theater decisions on the run duration of movies supplied by non-integrated distributors and finds that movies released by distributors that do not own theaters are exhibited for shorter periods in distributor-owned theaters than in independently owned theaters due to market foreclosure motives. In contrast, Agostini and Saavedra (2011) find that an integrated distributor releases fewer copies per movie than non-integrated distributors, and argue that vertical integration increases the opportunity cost of releasing more copies to theaters. In the end, whether vertical integration increases or decreases efficiency in an industry depends on the context, and it is ultimately an empirical question. Hart and Tirole (1990) go to great lengths to show that vertical integration may facilitate market foreclosure in a subset of cases but not others.

Our work shows that Chinese movie theaters show movies from their parent distributor companies in more screens and longer than independent movies. Because we find that tickets for integrated movies are sold at lower prices and attract larger audiences, we ask whether such preference is driven by pecuniary

motives or foreclosure strategic motives. Our results show that behavior of integrated theaters is consistent with pecuniary motives and far from foreclosure strategic motive. Despite the lack of evident anticompetitive behavior, our structural demand estimation shows that vertical integration increases consumer welfare by direct impact and increasing screen arranged for own movies shown in integrated theaters. These findings highlight the fact that while vertical integration may be associated with higher total welfare amid increasing private firm profits. This conclusion calls for careful regulation of industry structure beyond antitrust practice.

Finally, our paper here also contributes to the empirical literature on demand estimation for movies. Davis (2006) estimates the effect of spatial location of theater on movie demand. Einav (2007) estimates the seasonality of movie demand. Moul (2007) estimates the effect of word-of-mouth on movie demand. Moul (2008) estimates the conduct of distributor on rental pricing and advertising. De Roos and McKenzie (2014) estimate the price elasticity of movie demand by exploiting the ticket discount offered by Australian theaters on Tuesday. Our work differs from those studies in estimating a demand system to evaluate the effects of vertical integration on movie demand through unobserved attributes that are correlated with vertical integration as Gil and Warzynski (2015) in the context of the US video game industry.

The remaining parts of this paper are organized as follows. Section 2 discusses the industry background. Section 3 describes our data and presents summary statistics. Section 4 describes our reduced form empirical strategy, and results from both our cross-sectional exploration and our test for market foreclosure. Section 5 presents our structural model and results from our strucutal estimation. Section 6 concludes.

2. **Industry Background**

Our empirical setting is the motion picture industry in China. The industry has been growing in recent years, with annual box office accelerating at faster than 25% during the past decade in comparison to less than 10% in North America, the largest global movie market (see Figure A1). In 2015, the total movie attendance in China was 1.26 billion, approaching 1.33 billion in North America. Though there was a slow-down in 2016 at a mild growth of 3.73%, China remains world's second largest film market with

the largest number of theater screens.

2.1. Vertical Integration and Revenue-Sharing Contracts

As anywhere else in the world, the Chinese movie industry mainly consists of three sectors: production, distribution and exhibition. Producers produce movies. Distributors supply movies to exhibitors, and promote movies through advertising. Exhibitors sell tickets to audience and collect box office revenue, which is then shared by the three parties.

An important difference of movie industry between China and the U.S. is that vertical integration between distributors and theaters is prevalent in China. Since the ruling of the 1948 Paramount Case,[5] the US Department of Justice has been wary of large U.S. studios acquiring interests in the exhibition business due to antitrust concerns. On the other hand, the prevalence of vertical integration in the Chinese movie industry is a legacy of the state-owned economy. Until 1993, the *China Film Corporation* was the only distributor in China, which purchased movies produced by 16 state-owned movie studios, distributed them through a multi-layered state-owned distribution system from province to county and the movies in the theaters beloinging to the system. In order to break the monopoly, over the period of 1993-2002, the Chinese government allowed the studio to distribute their movies and allowed private firms entering into the movie industry as a theater chain, which integrates distribution and exhibition. As a result, movies can be distributed and shown in theater chains, but not foreclosed by *China Film Corporation* and the state-owned distribution and exhibition system. Gradually, theater chains with state and private ownerships have become the major players in the Chinese movie industry.

In sharp contrast to the US context, there is no antitrust concern for vertical integration between distributors and theaters in China. According to *China Theatrical Market Report 2012-2013*, there are six theater chains that realized over RMB 1 billion box office in 2012, which are related to or founded by distributors (see Table 1).[6] However, a recent debate on whether vertical integration facilitates anticompetitive behavior is growing. Namely, the central point of discussion is around market foreclosure,

[5] The top five Hollywood studios were accused of raising their movie prices for independent theaters to screen their movies and bundle blockbusters with low-quality movies. As a result, they were forced to divest from their exhibition divisions.

[6] Most recently on November 29th 2015, *Lead Eastern*, a Chinese listed movie producer and distributor, purchased 30% shares of *CRTV International Digital Cinemaline* to integrate production, distribution and exhibition businesses.

and whether integrated theaters use more screening for their own movies at the expense of movies of others. Anecdotally, a famous Chinese director named *Xiaogang Feng* recently blamed the largest integrated theater chain *Wanda Cinemas* for curbing screen allocation for his film (distributed by *Huayi Film*, an integrated competitor of *Wanda*).[7]

[Insert Table 1 about here]

In the absence of vertical integration, producers, distributors and exhibitors split movie receipts following revenue sharing contracts. The sharing of box office is prevalent in China, as in the case of other countries, such as the U.S. or European countries such as France or Spain. Interestingly, there are two differences between revenue sharing contracts in China and the U.S. First, the proportions of revenue sharing among various parties are fixed over time. This means that screening decisions of exhibitors are not affected over time by an increasing sharing term for exhibitors as described in Gil and Lafontaine (2011) for Spanish movie exhibition contracts.

Further, the revenue sharing scheme for domestic and foreign movies are different. For domestic movies, about 9% of box office contribute to tax, about 52% of box office go to the exhibitor, and about 39% of box office go to distributor and producer, in which the distributor and producer retain about 13% and 26%, respectively. The proportion going to the exhibitor may increase if distributor and producer want to increase the screen space for their movie. Further, the distributor may retain a higher proportion of box office relative to the producer if it pays for advertising and a part of production cost.

For foreign movies, about 9% of box office contribute to tax, about 44% of box office go to the theater chain, about 15% of box office go to the distributor, and about 32% of box office go to the producer. Usually, the theater chain keeps a lower proportion of box office from foreign movies than domestic movies.

2.3. Movie Ticket Prices

Despite the rapid development, China has one of the least affordable movie ticket prices across the world.

[7] http://www.chinadaily.com.cn/life/2016-11/21/content_27436479.htm

Table A1 in the Appendix displays box office and average ticket price for the 10 largest movie markets in 2012. The last column reports the ratio of GDP per capita to average movie ticket price, which measures the affordability of movie tickets. Although China possesses its second place in the global movie market ranked by box office, Chinese consumers are paying for the least affordable movie tickets in the top ten. Among other reasons, high ticket prices in China are caused by high rents paid by theaters in the midst of China's housing market bubble. In this paper, we highlight the role, if any, of vertical structure of the Chinese movie industry on its ticket prices.

A very interesting difference between the Chinese movie theater industry and those of other countries is that there is ticket price variation at the movie level beyond third-degree price discrimination (discounts for students and seniors) or lower prices for matinees and late-night shows.

Figure 1 illustrates that prices are different across movies showing within the same hour interval. Figure 3 shows the pricing and schedule in a theater in China. There are six screens in such theater, in which Screen 1 and 2 show the same movies. More importantly, prices range between RMB 40 and RMB 50 for different movies showing in the afternoon. Prices range between RMB 60 and RMB 100 for the same set of movies showing in the evening.

[Insert Figure 1 about here]

Our analysis investigates whether this price variation is consistent with market foreclosure or double marginalization, while understanding that theaters set prices according to weekly movie demand.

3. Data and Descriptive Statistics

Our empirical analysis is based on a proprietary data set from a major consulting firm in China that contains information on daily box office information, theater characteristics and movie characteristics. We complement these data with manually collected information on vertical relationship between theaters and distributors. The source of daily box office is the National File Ticketing Integrated Information Management System. All theaters in China are required to install such system and upload the box office of each movie on each day into the system. Let us next detail the idiosyncrasies about our data.

Our data detail box office and attendance for each movie in each theater on each day during our sample period. We compute average daily price by dividing box office by the number of tickets sold. Therefore, a unique feature of our data is that we observe variation in the average price at movie-theater-day level. As we hinted above, this average price variation comes from two different sources. On the one hand, different movies are priced differently. On the other hand, in any given a movie sells different amount of discounted tickets in different shows with potentially different prices.

[Insert Table 2 about here]

Table 2 gives a visual account to the price variation in our data. We provide a snapshot of raw data of two different movies, Die Hard 5 and The Iron Lady, in two theaters located in Beijing and Dongguan, a second-tier city in Guangdong province in southern part of China. There are several interesting observations. First, average ticket prices are different across theatres. They are higher for the theater located in Beijing than the theater in Dongguan and, more generally, other second tier cities. Furthermore, average ticket prices decrease slightly over time, especially in the last few days of the run.[8] Second, movie run lengths differ across movies and across theaters. Most often, movies with longer runs are associated with higher box office. Third, the runs of a same movie may start at different dates in different theaters. Some theatres may start showing a movie 1-2 days after it's first released.

In our empirical analysis, we filter the original data for certain irregular features. First, we drop observations with average ticket prices below RMB 1 because abnormally cheap tickets may not be sold for commercial purposes. This criterion also allows us to drop the observations with zero average price driven by zero box office or attendance. Second, we drop observations with average ticket prices over RMB 150 because the highest ticket price from the three major cities in China (namely Beijing, Shanghai and Guangzhou), is RMB 150. Observations with averages prices higher than RMB 150 may likely come from luxurious theaters or private functions with extra services involved other than regular movie

[8] Figure A2 in the appendix shows results of estimating the effect of movie age (in days) on the average movie ticket price. In particular, we run specification $Price_{jct}$ = Age-Specific Fixed Effects + Movie-Theatre Fixed Effects + ε_{jct}. Figure A2 plots the estimates of age dummies. The age dummies drop from 30.8 at Age = 0 (the first day of showing) to 25.2 at Age = 30. The average price of a movie in a theater drops by about 18% a month after its release.

exhibition operations. Third, we drop data of more than 60 screens per day for a movie to exclude group watching by institutions.

Table 3 reports the descriptive statisitcs of variables used in our empirical analysis. The final data set contains daily box office accounts for 98 movies playing in 3,075 theaters located in 1,382 districts of 325 cities across all Chinese provinces during February and March of 2013. These add up to 947,108 observations at the theater-movie-day level. For each observation, our data details information on box office revenues, attendance, average ticket price and the number of screens in which a movie is shown in a theater on a specific day. We are able to compute *Run Length* as the number of days between the first date and the last date a movie plays in a theater, and compute *Age* as the number of days since its first date of release in each theater in any given day. Therefore, the variable *Age* varies at the theater-movie-day level. In our final data, the average ticket price is RMB 32 and a movie is shown in 4 screens of a theater, and watched by 104 consumers. The average box office revene of a movie for a day is RMB 3,756. The average run length of our sample movies is about 9 days.

[Insert Table 3 about here]

The data also contains information on theater characteristics. *Capacity* is the total number of screens in a theater. *Area* is the physical area of a theater (in thousands of square meters). *Mall* is a dummy variable of whether the theater is located in a mall. Table 3 reports that the average theater in our sample has about 5 screens, an average area of 3,630 square meters, and that 42% of the theaters in our sample are located in a mall. Another theater characteristic in our data set is local competition. We compute *HHI* to measure competition across districts over time. The *HHI* ranges from 0.05 to 1 with the average value at 0.57. This range in *HHI* values suggests the market structure of the movie theater industry in our sample at the district level varies from very competitive to monopoly.

A final set of theater characteristics relates to their ownership structure. The 3,075 theaters in our sample belong to 46 theater chains. We collect information on theater and chain ownership by examining the official website of each theater chain. As a result, we define three theater ownership dummies. First, we define a dummy variable *Private=1* for privately-owned theater chains, and zero otherwise. Second, we

define a dummy variable *Local* = 1 if a theater chain is held by a local government, and zero otherwise. Third, we define a dummy variable *Central* = 1 if a theater chain is owned by the central government, i.e. *State Administration of Press, Publication, Radio, Film and Television of the People's Republic of China (SARFT)*, and zero otherwise. Finally, *China Film* is an enterprise owned by the central government that controls many of the largest theater chains and enjoys privileges to distribute foreign films. Based on the detailed ownership data from each theater chain's IPO prospectus, we create the variable *CF*, which is the equity share of a theater chain owned by *China Film*.

[Insert Table 4 about here]

There are several ownership types for our sample theater chains as shown in Table 4 above. For example, *Wanda Cinema* is privately-owned while *Shanghai Union Cinemas* is owned by local government. *New Film Association* is owned by both central and local governments, but *China Film* is not the major shareholder. *China Film South Cinema Circuit* is owned by central and local governments, with *China Film* being a control shareholder. *China Film Digital Cinema* is owned solely by *China Film*. These examples indicate that the ownership variables are not mutually exclusive. Table 3 reports that, among the 46 theater chains in our sample, 30% are central-owned and 54% is local-owned. *China Film* owns 8% of the equity share of the average theater chain.

Our final data set also contains information about the characteristics of the 98 movies playing in the theaters in our sample. We construct nine variables on movie characteristics based on the website *Douban* (*http://movie.douban.com)*, which is the most popular website on movie information in China. We define dummy variables *Comedy, Action, Foreign*, *3D* and *Sequel* for whether a movie is comedy, action, foreign, three-dimensional, or sequel to a prior movie, respectively. The variable *Budget* takes 1 if a film's budget exceeds RMB 80 million, and zero otherwise. For Chinese movies, we obtain this information from news on movie press conferences and *http://baike.baidu.com,* while for foreign movies, we obtain the estimated budget from *www.imdb.com,* and then convert to RMB using the average exchange rate in 2013. In our sample of 98 movies, 31% are comedy, 27% action, 19% foreign, 10% 3D, 19% sequels, and 31% of movies have a budget larger than RMB 80 million.

We define *Rater* as the number of online raters (in thousands) for each movie as a measure of popularity. Although this measure includes feedback after the release of movies, this measure is mostly determined during the movies' run. We construct two additional variables to proxy for movie quality, namely *Director* and *Star*. *Director* is the average rating of a director's top three movies, and *Star* is the average rating of the top three movies casted by the movie's top four leading actors and actresses.[9] The number of raters across movies in our sample varies from 0 to 376,058. The variable *Director* ranges between 0 and 8.97, and *Star* varies between 0 and 8.59.

We measure the degree of movie competition during its release week with variables *#SGenre* and *#OGenre*. These variables account for the number of rival movies in the same genre and in other genres, respectively, with a release date within five days of the focal movie. The average movie in our sample faces 5 rival movies within five days of its release, among which one of them belongs to its same genre.

Finally, we must measure vertical relationships between distributors of movies and theaters in our sample. For this purpose, we manually search for the distributors of each movie online.[10] Then, we check whether those distributors are the shareholders of any theater chain in our sample based on the information in the official websites and annual reports of each theater chain. In our sample, 68% (23%) of the 98 movies are distributed by a vertically integrated distributor that owns interests on a theater chain (and a production studio), and 32% of the 98 movies are independent movies. Similarly, 49% of theaters in our sample belong to a vertically integrated theater chain.

Given this information, we create our explanatory variable of interest measuring vertical integreation between distributor and theater, i.e. $1\{Integrated\ Theater,\ Own\ Movie\}_{jc}$. For each theater-movie dyad observed in our data, we define our variable $1\{Integrated\ Theater,\ Own\ Movie\}_{jc} = 1$ if at least one of the distributors of the movie is a shareholder of the theater chain that the theater belongs to. Table 3 reports that 17% and 6% of our sample movie-theater pairs are vertically integrated in distribution and exhibition, and are vertically integrated in production, distribution and exhibition, respectively.

[9] For movies with rookie directors and cast, both *Director* and *Star* are 0. For animation films, *Star* is 0.
[10] The major websites related to movies released in China include *http://www.cbooo.cn/, http://movie.mtime.com,* and *http://www.1905.com.*

Because our interest in this paper is determining the impact of vertical integration on movie ticket prices, admissions, number of screens and run duration, Table 5 reports differences in these four variables for independent theaters, integrated theaters and integrated movies in integrated theaters. Independent theaters have the lowest attendance, ticket prices and number of screenings (Column 1), while own movies screened in integrated theaters have the highest prices, attendance, number of screenings, and run duration (Column 3). The difference between own movies and other movies in integrated theaters (difference between columns (3) and (2)) shows that own movies in integrated theaters sell for higher movie ticket prices, enjoy higher attendance, use more screens, and run longer than movies of other distributors. If anything, these preliminary findings provide anectodal evidence that cross-sectional differences in outcomes exist among alternative vertical structures.

[Insert Table 5 about here]

4. Reduced Form Models and Results

This section first discusses empirical models to identify the effects of vertical integration between distributors and theaters on pricing, attendance, screenings, and run length. Then, we develop a test for vertical foreclosure. Finally, we show results of both empirical strategies. In the following section, we discuss a structural demand model of movie choice.

4.1 Reduced Form Models

In this section, we want to identify differences in outcomes between movies playing in theaters owned by their own distributors and other movies within a same theater. To do so, we employ the within-theater variations that we depict in Figure 2A, which considers two integrated movies D_1 and D_2 playing in independent theater E_0 and integrated theater E_1. Because those two movies do not afilitate with the independent theater, the expected conditional difference in outcome between those two movies in theater E_0 is informative of their quality difference. Then, the expected conditional difference in outcome between these movies in integrated theater E_1 will combine the effect of differences in quality plus the effect of integration (because D_1 is affiliated with theater E_1). It is easy to see then that the difference in differences of outcomes of those two movies in those two theaters will result in the net impact of vertical integration on the movie outcomes.

[Insert Figures 2 about here]

To identify the vertical integration effect as represented above, we use difference-in-differences estimator on movie outcomes (prices, attendance, and number of screens), and specify the following regression equation:

$$\ln(y_{jcmt}) = \gamma_1 1\{\text{Integrated Movie}\}_j + \gamma_2 1\{\text{ Integrated Theater}\}_c \text{ x } 1\{\text{ Integrated Movie}\}_j + \\ +\gamma_3 1\{\text{ Integrated Theater, Own Movie}\}_{jc} + x_j\beta + \tau_a + \tau_c \text{ x } \tau_{\text{week}} + \tau_{\text{day of the week}} + e_{jcmt} \qquad (1)$$

where the outcome variables y_{jcmt} are prices, attendance, and screen of movie *j* in theater *c* located in market *m* in day *t*. We include three variables on vertical structure with interactions, namely *1{Integrated Movie}*$_j$, *1{Integrated Theater}*$_c$ and *1{Integrated Theater, Own movie}*$_{jc}$. The variable *1{Integrated Movie}*$_j$ equals 1 if a movie is distributed by a distributor owning a theater (herafter, integrated movie), and zero otherwise. The variable *1{Integrated Theater}*$_c$ equals 1 if a theater sharing at least one common shareholder with a distributor (herafter, integrated theater), and zero otherwise. The variable *1{Integrated Theater, Own movie}*$_{jc}$ equals to 1 if a movie is playing in a theater owned by its distributor, and zero otherwise.

Note regression equation (1) includes a number of additional control variables and fixed effects. These can be movie charactersitics or movie-specific fixed effects (x_j), movie age fixed effects (τ_a), theater fixed effects (τ_c), week fixed effects (τ_{week}) and day of the week fixed effects ($\tau_{day\ of\ the\ week}$) to capture the unobserved demand shocks across theaters and over time. We complement this specification with more stringent fixed effects such as theater-day fixed effects ($\tau_c \text{ x } \tau_{day}$), which are more flexible in capturing the unobserved demand shocks across theaters and over time. The usual iid assumption of error term e_{jcmt} applies.

Further, we estimate Cox proportional hazard estimator where the failure event is run length termination, and therefore, the de facto dependent variable is run length. The hazard model assesses the hazard of run length stop in a given day while accounting for our three main time-invariant explanatory variables. The

hazard rate for each movie *j* playing at a theater *c* is:

$$h(t,\cdot) = h_0(t)\exp(\gamma_1 1\{\text{Integrated Movie}\}_j + \gamma_2 1\{\text{Integrated Theater}\}_c \times 1\{\text{Integrated Movie}\}_j + \\ + \gamma_3 1\{\text{Integrated Theater, Own Movie}\}_{jc} + x_{jcmt}\beta + e_{jcmt}) \quad (2)$$

The $h_0(t)$ is the baseline hazard function, which determines the shape of the hazard function with respect to time. We use the Weibull distribution, widely used in the literature, for the baseline hazard function. Specfically, $h_0(t) = \gamma\alpha t^{\alpha-1}$, where *t* is day, $\gamma > 0$ is a constant and α is the parameter for duration dependence. When $\alpha > 1$ ($\alpha < 1$), the conditional probability of run length stop increases (decreases) with time, i.e. positive (negative) duration dependence. Further, we estimate Equation (2) three times with different sets of control variables and fixed effects as in Equation (1). We also specify $\tau_c \times \tau_{week}$ or $\tau_c \times \tau_{day}$ as random effects instead of fixed effects.

4.2 A Test for Vertical Foreclosure

To test for vertical foreclosure, we focus on our subsample of integrated theaters. Because an integrated theater keeps a larger share of every dollar in box office revenue from its own movies than movies of others, we aim to compare whether integrated theaters drop independent movies when it would appear to be suboptimal to do so.

To make this inference, it must be true that the net revenue from a continuing own movie (OWN) is smaller than the net revenue from a dropped independent movie (IND). This condition derives into the following inequality:

$$s(\text{OWN})\text{x}\text{BOR}(\text{OWN}, \text{Continued}) < s(\text{IND})\text{x}\text{BOR}(\text{IND}, \text{Dropped})$$
$$\Rightarrow \frac{\text{BOR(OWN,Continued)}}{\text{BOR(IND,Dropped)}} < \frac{s(\text{IND})}{s(\text{OWN})} \quad (3)$$

An integrated theater forecloses independent movies if it drops independent movies even though they provide higher revenue than their owned movies continuing their run. In orther words, we test whether the ratio of BOR(OWN, Continued) to BOR(IND, Dropped) is smaller than the ratio of s(IND) to s(OWN).

[Insert Table 6 about here]

We take advantage about the fact that s(IND) and s(OWN) are fixed over time in the Chinese movie industry. Table 6 reports that the ratio s(IND)/s(OWN) is 0.57 when the vertical integration is among theater, distribution and production, and is 0.8 when the vertical integration is between theater and distribution for domestic movies. The ratio s(IND)/s(OWN) is 0.48 when the vertical integration is among theater, distribution and production, and is 0.75 when the vertical integration is between theater and distribution for foreign movies. Therefore, the most conservative test will take 0.8 and 0.75 as reference points, and will take integrated theaters behaving as only owned by distribution companies and not studios. A liberal test will take 0.48 and 0.57 as reference points, and will take integrated theaters behavior as fully integrated with distributors and studios.

The final step of our test implies running the following regression equation,

$$\ln BOR_{jcmt} = \gamma_1 1\{Drop\}_{jcmt} + \gamma_2 1\{IND\ Movie\}_{jc} + \gamma_3 1\{Drop\}_{jcmt} \times 1\{IND\ Movie\}_{jc} + x_{jcmt}\beta + \tau_a + \tau_c \times \tau_{week} + \tau_{day\ of\ the\ week} + \xi_{jcmt} \quad (4)$$

where BOR_{jcmt} is the box office revenue for movie j in theater c market m and day t, the binary variable $1\{Drop\}_{jcmt}$ takes value 1 if theater c drops movie j in day t+1, and zero otherwise, and the variable $1\{IND\ Movie\}_j$ takes value 1 if movie is distributed by distributor who does not own theater c. We also include a number of additional control variables and fixed effects as in Equation (1).

Note then that in expectation $E(\ln[BOR(OWN,Continued)/BOR(IND,Drop)]) = -(\gamma_1+\gamma_2+\gamma_3)$. We infer that vertical foreclosure is present in our sample if the BOR ratio < ln(0.57) for domestic movies and < ln(0.48) for foreign movies based on one-sided test in the most liberal test, and below ln(0.8) and ln(0.75) in the most conservative case.

4.3. Empirical Results

4.3.1. Reduced Form Equations

Column 1-9 of Table 7 reports the empirical results of regression equation (1) on price, attendance, screen and run length, respectively. For pricing, columns (1) and (2) show that integrated movies playing in integrated theaters are actually priced higher than independent movies while holding constant movie characteristics. Interestingly, column (3) introduces movie fixed effects and shows that the coefficient on $1\{Integrated\ Theater,\ Own\ Movie\}_{jc}$ is negative and significant, which suggests that integrated theaters charges a lower ticket price for its own movies than movies distributed by the other. Further, the fact that the coefficient flips sign when introducing movie fixed effects suggest that unobserved movie attributes are important determinants of price.

[Insert Table 7 about here]

When investigating attendance, columns (4)-(6) show the coefficients on $1\{Integrated\ Theater,\ Own\ Movie\}_{jc}$ are positive and significant. These results suggest that integrated movies have more attendance than independent movies in their own theaters. Further, for screening, columns (7)-(9) show a positive and significant coefficient on $1\{Integrated\ Theater,\ Own\ Movie\}_{jc}$. This suggests that integrated theaters dedicate more screens to their own movies than movies distributed by others.

Finally, we show results of our duration analysis from equation (2) in columns (10)-(12). The coefficients on $1\{Integrated\ Theater,\ Own\ Movie\}_{jc}$ are negative and significant under alternative sets of control variables and fixed effects. These results suggest that integrated movies have lower hazard rate than independent movies, which means the run length of integrated movies in its owned theater is longer than independent movies. The Weibull coefficient p is larger than 1, which indicates that the conditional probability of run length stop increases with time, i.e. positive duration dependence. The random effects (σ_u^2) show there is significant heterogeneity in run length across theater-movie combinations.

In summary, these results show that there are differences in price, attendance, screening and run length between integrated movies and independent movies. In particular, we find that integrated movies playing in theaters owned by their distributors sold at lower ticket prices, had higher attendance, showed in more screens, and run for longer number of days.

While more screen space and longer runs holding demand constant may seem findings consistent with market foreclosure, we may argue that causality is difficult to establish precisely because vertical integration in our empirics is also associated with lower prices and higher admissions sales. For this reason, our next section pays attention to differences in revenue sharing contracts across integrated and independent movies as well as domestic and foreign movies.

4.3.2. Vertical Foreclosure

Table 8 follows the logic in inequality (3), and reports the empirical results of regression equation (4). We separate our sample into all, domestic and foreign movies, and focus our discussion on results of columns (3), (6) and (9) given the use of movie, age and theater-day fixed effects.

[Insert Table 8 about here]

Column (6) shows results for domestic movies and shows three results. First, revenues of dropped movies are 43% lower than revenues of continuing movies. Second, independent movies in integrated theaters on average collect 12.4% lower revenues. Third and finally, independent movies when dropped collect 3% further lower revenues. Combining all three results, we find that integrated movies continuing collect revenues 71% more than that of discontinued independent movies. This number is higher than ln(0.57), threshold value of our lower bound test of vertical foreclosure for domestic movies. We can then reject vertical foreclosure of vertically integrated theaters for domestic movies.

When examining our results in column (9), dropped foreign movies collect 42% lower revenues than continued foreign movies. Whether the movies are independent does not have a statistically significant effect but bring a 2.6% lower revenues for independent movies and extra 2.6% when independent movies are dropped. Combining all three results, we find that integrated foreign movies continuing collect revenues 47.3% more than that of discontinued independent foreign movies. This number is higher than ln(0.48), threshold value of our lower bound test of vertical foreclosure for foreign movies. We can then reject vertical foreclosure of vertically integrated theaters for foreign movies.

4.3.3. Robustness Checks

In this sub-section, we perform several robustness checks and report the results in Table 9:

[Insert Table 9 about here]

Alternative Sample: In this sample, we re-estimate equation (1) with the use of movie, age and theater-day fixed effects for observations, where ticket price > 10. Second, we re-estimate equation (2) with the run length, where we adjust the end of run to the day after the last but one day if the last day is at least two days later than the previous day.[11] Columns (1)-(4) of Table 9 reports the results and find consistent results with Table 7.

District-Day Fixed Effects: The results in Section 4.3.1 are identified by the differences in outcomes between integrated and independent movies within theater and day. Here, we show the importance of using that variation for identification. In doing so, we employ district-day fixed effects instead of theater-day fixed effects in our specification, where cross-theater comparison is incorporated. Figure 2B illustrtates that there are two integrated theaters E_1 and E_2, and compare the performance of an independent movie D_0 and an integrated movie D_1. The expected difference in outcomes of movie D_0 observed in E_1 and E_2 informs about theater differences. When we repeat the exercise with movie D_1, the expected difference in outcome of that movie observed in E_1 and E_2 is a combination of theater differences and the vertical integration effect. Once again, the difference in performance differences of both movies across theaters is the net effect of vertical integration on movies outcomes.

We report the results of that specification in columns (5)-(8) of Table 9. Comparing to the corresponding results in Table 7, the coefficients on $1\{Integrated\ Theater\}_c$ x $1\{Integrated\ Movie\}_j$ are more positive and significant, and the coefficients on $1\{Integrated\ Theater,\ Own\ Movie\}_{jc}$ are more negative and significant. The resuls suggest that, comparing the same integrated movies across integrated and independent theaters, own integrated theaters sell at lower ticket prices, have lower attendance, arrange fewer screens and show for longer duration than in independent theaters. These results suggest that unobserved heterogeneities acorss theaters and days are important for identification, thus it supports Table 7 as our baseline results

[11] If a movie was shown in a theater from Feb 1 to Feb 8 and then Feb 11. We set the run duration from Feb 1 to Feb 9.

for the reduced form equations.

Theater-Distribution-Production Integration: We extend equations (1) and (2) to include the indicator $1\{Integrated\ Theater\text{-}Studio,\ Own\ Movie\}_{jc}$. The coefficient of that indicator suggests the addition impact of theater-distribution-production integration relative to theater-distribution integration. Columns (9)-(12) of Table 9 report that the coefficients of $1\{Integrated\ Theater\text{-}Studio,\ Own\ Movie\}_{jc}$ are significantly positive in column (9) and significantly negative in column (12). It suggests that theater-distribution-production integration partially offsets the price discount of integrated movies shown in their own theater relative to movies distributed by the other. Further, theater-distribution-production integration lengthens the run-length of movies shown in their own theater relative to theater-distribution integration only.

[Insert Table 10 about here]

However, Columns (1)-(2) of Table 10 does not find significant evidence showing that theater-distribution-production integration creates a stronger or weaker motive of vertical foreclosure than distribution-production integration.

Level Equation for Vertical Foreclosure Test: Columns (3)-(5) of Table 10 repeats the estimation with movie, age, theater-day fixed effects in Table 7 and Columns (1)-(2) of Table 10 using levels of box office revenues instead of logarithm.

Our results suggest that the ratios of revenues of continued owned movie to dropped independent movies come up to be 56.8% for domestic movies (see Column 4), which is statistically not different from 57%, threshold value of our lower bound test of vertical foreclosure for domestic movies. Column (7) suggests that the ratio of box office revenues are about 45% and 74% for theater-distribution integration and theater-distribution-production integration, respectively. The null hypothesis of no vertical foreclosure is rejected for theater-distribution-production integration (57%), but not for theater-distribution integration (80%).

For the foreign movies, the ratio of revenues of continued owned movies to dropped independent movies

is about 75%, which is not significantly different from the threshold value of vertical foreclosure for theater-distribution integration (75%).

In summary, while we observe differences in treatment between own and independent movies in integrated theaters, theses differences seem to align with differences in net revenues across movies. Therefore, we cannot reject the null hypothesis that there is no vertical foreclosure, except for a case of domestic movies with theater-distribution integration. Further, our results of reduced form equations and vertical foreclosure are robustness to alternative sample selections and specifications. In the following section, given there is no strong evidence of vertical foreclosure, we structurally estimate demand and evaluate whether consumers are better off with differential treatment when vertical integration does not respond to anticompetitive behavior.

5. Structural Demand Estimation

To evaluate the effect of vertical integration on consumer surplus, we proceed with structural estimation of movie demand. The specification and estimation of the demand system follow Bresnahan et al. (1997) by using a principles of differentiation generalized extreme value model (PD-GEV hereafter). The PD-GEV model is used in Moul (2007) to estimate movie demand, which adapts the nested logit models used in Einav (2007) and Moul (2008) as a special case.[12]

In our model, consumers choose between watching a movie (inside good, $j = 1, \ldots, n$) or consuming an outside good, $j = 0$. We expect consumers to watch movies in nearby area, thus our definition of local market is a district. A district is the smallest geographical unit that our data can analyze. Because we use theater-specific fixed effects in our specifications, the choice of market size usually becomes irrelevant as long as the market size only varies at the district level. The outside good implies not watching any movie. The mean utility of the outside good is normalized to zero, but is allowed to vary over time. Consumers maximize indirect utility by deciding whether to watch a movie or not, and then which movie to watch.

[12] This model allows for symmetric product segmentation instead of the hierarchical structure of the nested logit model.

Following Moul (2007, 2008), we employ two popular genres, namely comedy and action movies, for our empirical analysis. Figure 3 depicts the decicion process of each consumers. There are three groups, namely, comedy, action and the outside option. The probability of choosing a movie belong comedy and action ($j \epsilon C \cap A$) is then determined by the following expression,

$$s_{jcmt} = \frac{a_C \, e^{\delta_j/\rho_C} (\sum_{k \in C} e^{\delta_k/\rho_C})^{\rho_C - 1} + a_A \, e^{\delta_j/\rho_A} (\sum_{k \in A} e^{\delta_k/\rho_A})^{\rho_A - 1}}{a_C \left[(\sum_{k \in C} e^{\delta_k/\rho_C})^{\rho_C} + (\sum_{k \in NC} e^{\delta_k/\rho_C})^{\rho_C} \right] + a_A \, e^{\delta_j/\rho_A} \left[(\sum_{k \in A} e^{\delta_k/\rho_A})^{\rho_A} + (\sum_{k \in NA} e^{\delta_k/\rho_A})^{\rho_A} \right] + e^{\delta_0}} \tag{5}$$

where C is the set of comedy movies, A is the set of action movies, and the complements of each of these two sets are NC and NA, respectively. The heterogeneity parameters ρ_C and ρ_A represent the degree of dissimilarity of movies belonging to the comedy and action group, respectively. For these parameters, a value equal to zero represents perfect insulation from competition.

We measure the portion of an alternative allocated to comedy and action groups as parameters a_C and a_A such that,

$$a_C = \frac{1 - \rho_C}{2 - \rho_C - \rho_A}, \; a_A = 1 - a_C \tag{6}$$

These parameters a_C and a_A measure how much of the choice of j is driven by unobserved attributes common to comedy and non-comedy, and how much depends instead on unobserved attributes common to action and non-action. The PD-GEV model can be viewed as a weighted sum of nested logit model.[13] We derive the mean utility as:[14]

$$\delta_j = ln s_{jcmt} - \ln s_{0cmt} - \ln(a_C s_{jcmt|C}^{1-\rho_C} + a_A s_{jcmt|A}^{1-\rho_A}), \tag{7}$$

[13] If $\rho_C = 1$ ($\rho_A = 1$), the PD-GEV model degenerates to a nested logit model with action (comedy) as the nest. If $\rho_C = \rho_A = 1$, the PD-GEV model degenerates to a logit model.

[14] Instead of solving the fixed point of mean utility as in Bresnahan et al. (1997), we derive the closed form soluation of mean utility following Razzolini (2009).

and specify the mean utility as follows:

$$\delta_{jcmt} = \gamma_1 1\{\text{Integrated Theater}\}_c \times 1\{\text{Integrated Movie}\}_j + \gamma_2 1\{\text{Integrated Theater, Own Movie}\}_{jc} + \alpha_1 p_{jcmt} + \alpha_2 \text{Screen}_{jcmt} + x_j\beta + \tau_a + \tau_c \times \tau_{day} + \xi_{jcmt} \quad (8)$$

According to expression (8), the mean utility depends on a K-dimensional row vector of observed movie characteristics, ticket price and number of screen of movie *j* shown in theater *c* in day *t*. We also control for age, theater-day fixed effects. Further, we include the vertical relationships into mean utility directly. In particular, the dummy interaction variable $1\{Integrated\ Theater,\ Own\ Movie\}_{jc}$ represents features related to a movie showing in its own theater that affects consumer utility but not captured by movie characteristics (x_j), price or screen. The K+5 dimensional vector $\{\alpha_1, \alpha_2, \gamma_1, \gamma_2, \gamma_3, \beta\}$ represents the parameters to be estimated.

5.1. Estimation, Identification and Instruments

We exploit the linear specification of mean utility function above to estimate the parameters in several steps. First, according to equation (7), we compute mean utility that matches predicted market shares to observed ones for initial values of heterogeneity parameters ρ_C and ρ_A. Second, we estimate equation (8) with instrumental variables. Third, we construct a GMM objective function to update the parameters ρ_C and ρ_A. Finally, we repeat the previous steps until the the parameters ρ_C and ρ_A converge.

We discuss now the instrumental variables used in demand estimation. Since the unobservable product characteristics might be correlated with price, screen and within-group market share in the PD-GEV model, we address these potential sources of endogeneity using two sets of instrumental variables.

The first set of instruments (*IV-Set 1* hereafter) is the average values of rival movies' attributes shown in the same theater on the same day of the focal movie. Therefore, we construct nine potentical instrumental variables as we take averages on each of the following nine variables, namely *Comedy, Action, Foreign, 3D, Budget, Sequel, Rater, Director* and *Star*, over movies in the set of rival movies shown in the same theater. This set of instruments captures the competition from concurrent movies of same genre in the

same theater, which may affect the pricing and screenings of the focal movie. Nonetheless, since their attributes are set prior to their release, they are uncorrelated with unobserved product characteristics of the focal movie. This set of instruments varies at the movie-theater-day level and takes the form below:

$$\text{IV1}_{jcmt} = Mean_{k \neq j, k \in g}(x_{kcmt})$$

The second set of intruments (*IV-Set 2* hereafter) is the average movie attributes shown in other theaters belonging to the same theater chain in the same city. This set of instruments varies at the movie-theater-day level, and takes the following form below:

$$\text{IV2}_{jcmt} = Mean_{kh \neq jc, h \in City}(x_{khmt})$$

The set of instruments *IV-Set 2* are useful to identify the heterogeneity parameters. This set of instruments captures the competition from theaters with similar quality showing similar movies, which may attract consumers switching from the focal theaters to those theaters, and thus affect the without group market shares. More specifically, we compute the average movie attributes belonging to movies in the same genres shown in other theaters in the same market. This means that *IV-Set 2* is composed of all ten potential instruments.

In practice, we do not use all potential instrumental variables because not all of them pass the over-idenfication test. On the one hand, we employ the subset of *IV-Set 1* with *Action, Budget* and *Rater* to identify the parameters of price and screen. On the other hand, we employ the subset of *IV-Set 2* with *3D, Action, Sequel, Rater* and *Director* to identify the heterogeneity parameters.

5.2. Demand Estimation

Table 11 reports the results for demand estimation with the PD-GEV model in column (1). The heterogeneity parameters are positive and significant, which suggests that movies in the same genre are more substitutable than movies between genres. The coefficients of price and screen are about -0.175 and 0.137, respectively. Movies selling at lower prices and allocated with more screen sell more tickets. The price elasticity is estimated to be about 15, with a majority of price elasticities estimated to be larger than

1 (99.99%). This suggests that the prices are set according to the principle of profit maximization.

[Insert Table 11 about here]

Conditional on price and screen, the coefficient on $1\{Integrated\ Theater,\ Own\ Movie\}_{jc}$ is insignificant from zero. It suggests that vertical integration does not only affects demand directly after controlling for price, screen, age fixed effects and movie fixed effects. Nontheless, Column 2 exlcudes *Screen* and *Price* from the mean utility to allow the coefficient on $1\{Integrated\ Theater,\ Own\ Movie\}_{jc}$ incorporating the use of screen and price by integrated theater to affect movie demand. The coefficient increases to 0.05, which suggests that integrated theaters increases the demand of its owm movies in its theater (by about 5%) through increasing their screens and decreasing their prices.

Column 3 exlcudes only *Screen* from the mean utility to allow the coefficient on $1\{Integrated\ Theater,\ Own\ Movie\}_{jc}$ incorporating the use of screen by integrated theater to affect movie demand. The coefficient increases to 0.06, which suggests that integrated theaters increases the demand of its owm movies in its theater through increasing their screens. Additionally, a large scale of screening may relate to a larger effort of integrated theater to promote their own movies, for example, putting up billboards and posters, writing positive film reviews, inviting directors and stars to promotional fan club meeting, oral persuasion and so on. For instance, Moul (2008) shows that advertising is a complement of movie consumption, and thus a direct effect may be the result of marketing campaign of an integrated movie.

Column 4 excludes *Price* from the mean utility to allow the coefficient on $1\{Integrated\ Theater,\ Own\ Movie\}_{jc}$ incorporating the use of price by integrated theater to affect movie demand. The coefficient increases to 0.04, which suggests that integrated theaters increases the demand of its owm movies in its theater through decreasing their prices. It supports the role of eliminating double marginalization in boosting demand.

6. Conclusion

This paper examines the impacts of vertical integration on attendance, pricing, screening and run length in the motion picture industry. We exploit a proprietary box office dataset at movie-theater-day level from

China supplemented with movie and theatre attributes and information on vertical structre between distributors and theaters.

Our results indicate that movies playing in theaters owned by their distributors charge lower movie ticket prices, enjoy higher attendance, show in more screens, and run longer lengths than independent movies playing in the same theaters. While the observed behavior may be consistent with vertical foreclosure, we provide evidence that continuation decisions follow optimal behavior. Finally, we estimate a discrete choice model of movie demand, which shows vertical integration affects movie demand through direct, price and screen channels. In particular, consumers enjoy a higher utility from integrated movies than independent movies when they watch movies in integreated theaters.

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Figure 1: A snapshot of movie ticket prices of a theater (Date: 12/29/2011)

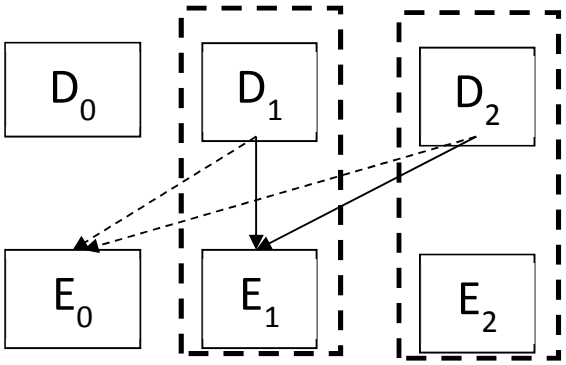

Figure 2A: Vertical Relationships.

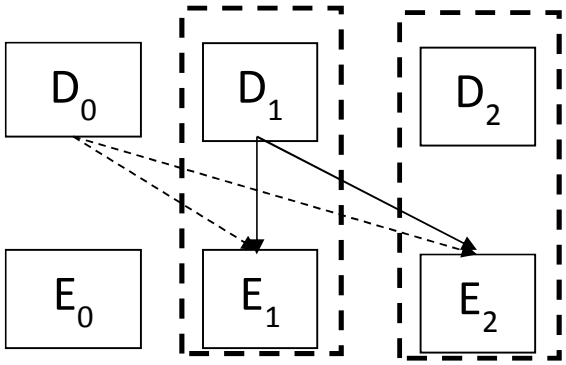

Figure 2B: Vertical Relationships.

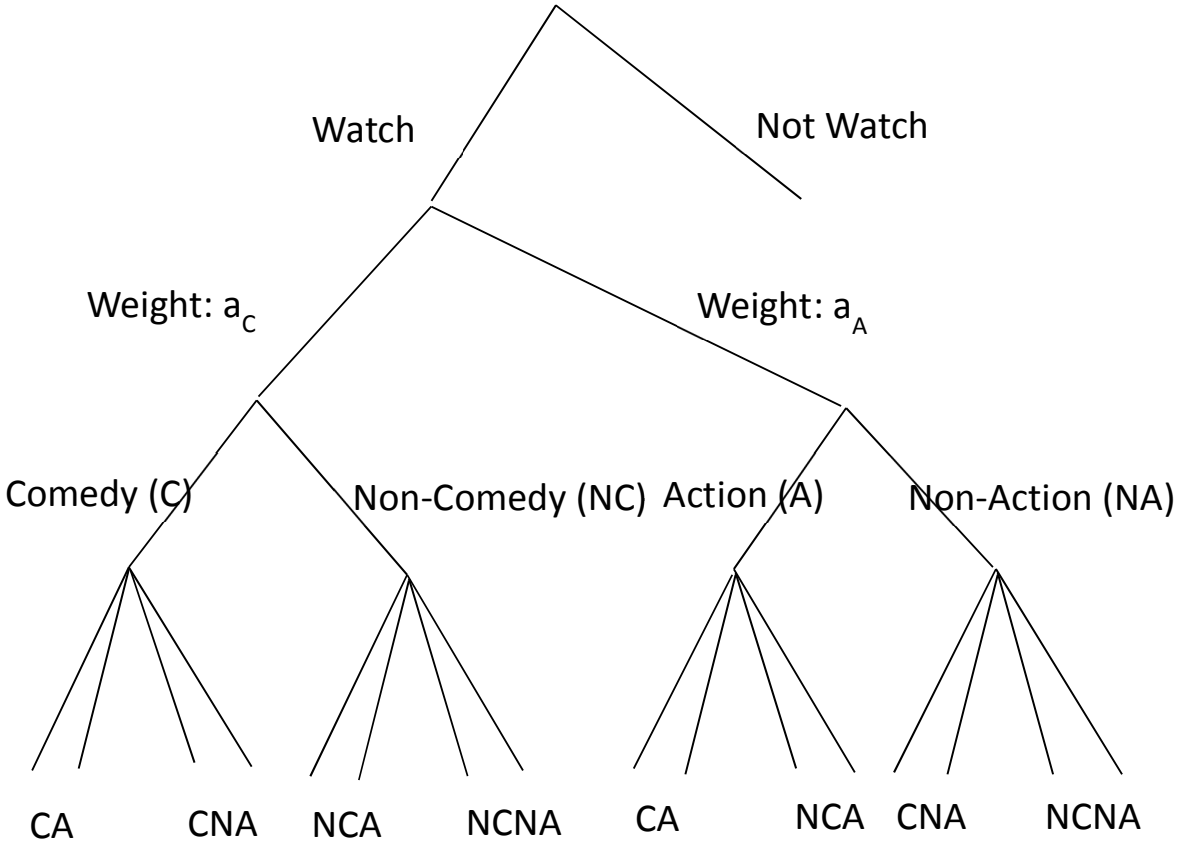

Figure 3: PD-GEV model

Note: CA, CNA, NCA and NCNA denote that a consumer chooses to watch a movie belong to the category of comedy and action, comedy and non-action, non-comedy and action, and non-comedy and non-action, respectively.

Table 1. Examples of Vertically Integrated Chains

Rank	Exhibitor	Distributor	Market Share	Concentration
1	Wanda Cinema Line	Wanda Pictures	14.4%	14.40%
2	Shanghai Union Cinemas	Shanghai Film	9.7%	24.10%
3	China Film Stellar Theater chain	China Film, Stellar Mega Media	9.5%	33.60%
4	China Film South Cinema Circuit	China Film, Zhujiang Film	7.8%	41.40%
5	G.Z. Jinyizhujiang Movie Circuit	Jinyi Cinemas	6.9%	48.30%
6	Dadi Cinemas	Dadi Media	6.5%	54.80%
7	New Film Association	Beijing Film, China Film	4.8%	59.60%
8	Zhejiang Shidai Cinema Line	Donghai Film	4.2%	63.80%
9	Pacific Cinema	Emei Film, China Film	3.5%	67.30%
10	Hengdian Cinemas	HG Entertainment	3.3%	70.60%

Note. Rank collected from *China Theatrical Market Report 2012-2013*, ownership collected from official websites.

Table 2. Snapshot of Raw Data for Two Movies and Two Theaters

Panel A: Die Hard 5

Show Date	Location	Theatre	Box Office	Attendance	Price	Location	Theatre	Box Office	Attendance	Price
2013/3/14	Bejing	1	14194	434	32.71	Dongguan	2	7199	222	32.43
2013/3/15	Bejing	1	19746	617	32	Dongguan	2	6874	220	31.25
2013/3/16	Bejing	1	26310	839	31.36	Dongguan	2	16433	507	32.41
2013/3/17	Bejing	1	18547	598	31.02	Dongguan	2	9414	287	32.8
2013/3/18	Bejing	1	7157	223	32.09	Dongguan	2	3820	122	31.31
2013/3/19	Bejing	1	8013	264	30.35	Dongguan	2	4930	158	31.2
2013/3/20	Bejing	1	7218	226	31.94	Dongguan	2	9120	281	32.46
2013/3/21	Bejing	1	5237	165	31.74	Dongguan	2	2781	91	30.56
2013/3/22	Bejing	1	6357	204	31.16	Dongguan	2	3283	111	29.58
2013/3/23	Bejing	1	13567	428	31.7	Dongguan	2	8302	275	30.19
2013/3/24	Bejing	1	10623	354	30.01	Dongguan	2	5155	169	30.5
2013/3/25	Bejing	1	1381	40	34.53	Dongguan	2	1787	61	29.3
2013/3/26	Bejing	1	3445	100	34.45	Dongguan	2	1458	45	32.4
2013/3/27	Bejing	1	2287	74	30.91	Dongguan	2	1482	50	29.64
2013/3/28	Bejing	1	1462	54	27.07	Dongguan	2	795	24	33.13
2013/3/28	Bejing					Dongguan	2	795	24	33.13
2013/3/29	Bejing					Dongguan	2	964	32	30.13
2013/3/30	Bejing					Dongguan	2	2386	73	32.68
2013/3/31	Bejing					Dongguan	2	1388	45	30.84

Panel B: The Iron Lady

Show Date	Location	Theatre	Box Office	Attendance	Price	Location	Theatre	Box Office	Attendance	Price
2013/3/7	Bejing	1	880	25	35.2	Dongguan	2	186	6	31
2013/3/8	Bejing	1	11813	352	33.56	Dongguan	2	662	21	31.52
2013/3/9	Bejing	1	3015	90	33.5	Dongguan	2	1484	43	34.51
2013/3/10	Bejing	1	3366	99	34	Dongguan	2	778	23	33.83
2013/3/11	Bejing	1	1381	40	34.53	Dongguan	2	120	4	30
2013/3/12	Bejing	1	1607	49	32.8	Dongguan	2	100	3	33.33
2013/3/13	Bejing	1	900	24	37.5	Dongguan	2	0	0	0
2013/3/14	Bejing	1	0	0	0					
2013/3/15	Bejing	1	120	3	40					
2013/3/16	Bejing	1	120	4	30					

Note: Box Office and Price are in RMB.

Table 3. Summary Statistics

Category	Variable	Obs	Mean	Std.Dev.	Min	Max
Movie-Theater-Day	Price	947108	32.10	10.44	1	150
	Attendance	947108	104.04	244.20	1	8908
	Screen	947108	4.42	4.19	1	60
	Box Office	947108	3,756	10,407	1	423,611
	MarketShare	947108	2.11E-04	5.95E-04	1.35E-07	4.64E-02
	Age	947108	8.83	7.88	1	59
	NewRelease	947108	0.44	0.50	0	1
Movie-Theater	Run Length	90155	9.38	8.55	1	58
	1{Integrated Theater, Own Movie}	90155	0.17	0.38	0	1
	1{Integrated Theater – Studio, Own Movie}	90155	0.06	0.24	0	1
Theater Chain	Central	46	0.30	0.47	0	1
	Local	46	0.54	0.50	0	1
	CF	46	0.08	0.21	0	1
Theater	1{Integrated Theater}	3075	0.49	0.50	0	1
	Capacity	3075	5.01	2.71	1	29
	Area	3075	3.63	2.47	0.12	84.0
	Mall	3075	0.42	0.49	0	1
Movie	1{Integrated Movie}	98	0.66	0.48	0	1
	Comedy	98	0.31	0.46	0	1
	Action	98	0.27	0.44	0	1
	Foreign	98	0.19	0.40	0	1
	3D	98	0.10	0.30	0	1
	Sequel	98	0.19	0.40	0	1
	Budget	98	0.31	0.46	0	1
	Rater	98	40.2	74.2	0	376
	Director	98	4.81	3.39	0	8.97
	Star	98	5.36	2.85	0	8.59
	#SGenre	98	1.28	1.70	0	8
	#OGenre	98	3.86	4.08	0	16
District-Day	HHI	169346	0.57	0.33	0.05	1.00

Table 4. Examples of Chain Ownership

Chain	Private	Local	Central	CF
Wanda Cinemas	1	0	0	0
Shanghai Union Cinemas	0	1	0	0
CRTV International Digital Cinemaline	0	0	1	0
New Film Association	0	1	1	29.29%
China Film South Cinema Circuit	0	1	1	56%
China Film Digital Cinema	0	0	1	100%

Table 5 Summary Statistics by Integration Form

Vertical Relationship	(1)	(2)	(3)	(2)-(1)	(3)-(1)	(3)-(2)
1{Integrated Theater}	0	1	1			
1{Integrated Theater, OWN movie}	0	0	1			
Outcome variables						
Price	31.2	32.5	33.6	1.31***	2.40***	1.16***
Attendance	85.6	114	131	28.2***	45.4***	17.4***
Screen	4.10	4.51	5.03	0.45***	0.93***	0.52***
Run Length	8.81	8.66	10.9	0.15**	2.09***	2.26***

Table 6: Share of Box Offie under alternative Vertical Structures

	Share of Box Office: s(IND) and s(OWN)	
Vertical Structure	Domestic	Foreign
IND: Independent Theater	0.52	0.44
OWN: Distribution – Theater	0.52+0.13 = 0.65	0.44+0.15 = 0.59
OWN: Production – Distribution – Theater	0.52+0.13+0.26 = 0.91	0.44+0.15+0.32 = 0.91
Benchmark Ratio for Vertical Foreclosure		
S(IND)/S(OWN)	0.80	0.75
S(IND)/S(OWN-Studio)	0.57	0.48

Table 7 Cross-sectional Differences

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	lnPrice	lnPrice	lnPrice	lnAttend	lnAttend	lnAttend
1{Integrated Movie}	-0.0290***	-0.0270***		-0.0807***	-0.112***	
	[0.00209]	[0.00221]		[0.0158]	[0.0169]	
1{Integ. Theater} x 1{Integ. Movie}	-0.00371	-0.00396	-0.00667**	-0.0468**	-0.0405*	-0.000562
	[0.00364]	[0.00379]	[0.00294]	[0.0207]	[0.0217]	[0.0212]
1{Integrated Theater, OWN Movie}	0.00495**	0.00438*	-0.00705***	0.143***	0.152***	0.0984***
	[0.00241]	[0.00249]	[0.00231]	[0.0133]	[0.0138]	[0.0140]
R-squared	0.256	0.278	0.322	0.351	0.367	0.518

	(7)	(8)	(9)	(10)	(11)	(12)
VARIABLES	lnScreen	lnScreen	lnScreen	Duration	Duration	Duration
1{Integrated Movie}	-0.0518***	-0.0660***		0.0273	0.00237	
	[0.00820]	[0.00873]		[0.0204]	[0.0209]	
1{Integ. Theater} x 1{Integ. Movie}	0.00516	0.00682	0.0234*	-0.0864***	-0.145***	-0.0503**
	[0.0121]	[0.0126]	[0.0129]	[0.0191]	[0.0212]	[0.0218]
1{Integrated Theater, OWN Movie}	0.0586***	0.0605***	0.0351***	-0.0858***	-0.00761	-0.117***
	[0.00865]	[0.0894]	[0.00918]	[0.0194]	[0.0204]	[0.0214]
$\ln(\alpha)$				0.395***	0.474***	0.544***
				[0.00521]	[0.00615]	[0.00652]
σ_u^2				1.072***	1.407***	0.393***
				[0.0214]	[0.0295]	[0.0178]
Movie Characteristics	Yes	Yes	No	Yes	Yes	No
Movie FE	No	No	Yes	No	No	Yes
Age FE	Yes	Yes	Yes	No	No	No
Day of the Week FE	Yes	No	No	Yes	No	No
Theater-Week FE	Yes	No	No	Yes	No	No
Theater-Day FE	No	Yes	Yes	No	Yes	Yes
Observations	947,108	947,108	947,108	90,155	90,155	90,155
R-squared	0.291	0.305	0.441			

Note: The standard errors are in parentheses. The standard error are clustered at theater level, which allows the residuals correlated over time within a theater and across movies within a theater. *** Significant at the 1% level; ** Significant at the 5% level; * significant at the 10% level.

Table 8: Box Office Regression for Vertical Foreclosure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		All			Domestic			Foreign	
	lnBOR	lnBOR	lnBOR	lnBOR	lnBOR	lnBOR	lnBOR	lnBOR	lnBOR
1{Drop} (γ_1)	-0.608***	-0.656***	-0.445***	-0.560***	-0.640***	-0.432***	-0.436***	-0.480***	-0.421***
	[0.0127]	[0.0134]	[0.0121]	[0.0148]	[0.0164]	[0.0157]	[0.0136]	[0.0152]	[0.0151]
1{Integrated Theater, IND Movie} (γ_2)	-0.0802***	-0.0903***	-0.0885***	-0.0846***	-0.0892***	-0.124***	-0.122***	-0.156***	-0.0263
	[0.00898]	[0.00936]	[0.0109]	[0.0126]	[0.0132]	[0.0141]	[0.0138]	[0.0153]	[0.0165]
1{Drop} x 1{Integrated Theater, IND Movie} (γ_3)	-0.0443***	-0.00689	-0.0239*	-0.0479***	0.0119	-0.0304*	-0.0759***	-0.0734***	-0.0263
	[0.0127]	[0.0134]	[0.0131]	[0.0144]	[0.0161]	[0.0161]	[0.0173]	[0.0199]	[0.0196]
ln(BOR Ratio)			0.586***			0.710***			0.473***
			[0.017]			[0.019]			[0.020]
R-squared	0.652	0.677	0.714	0.669	0.700	0.731	0.619	0.661	0.688
Movie Characteristics	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Movie FE	No	No	Yes	No	No	Yes	No	No	Yes
Age FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day of the Week FE	Yes	No	No	Yes	No	No	Yes	No	No
Theater-Week FE	Yes	No	No	Yes	No	No	Yes	No	No
Theater-Day FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	507,061	507,061	507,061	310,401	310,401	310,401	196,660	196,660	196,660

Note: ln(BOR Ratio) ≈ ln[E(BOR|OWN,Continued)/E(BOR| IND,Drop)] = -(γ_1+γ_2+γ_3). We infer that vertical foreclosure presents in our sample if ln(BOR Ratio) < ln(0.8) ≈ -0.22 for domestic movies and < ln(0.75) ≈ -0.29 for foreign movies based on one-sided test. The standard errors are in parentheses. The stamdard error are clustered at theater level, which allows the residuals correlated over time within a theater and across movies within a theater. *** Significant at the 1% level; ** Significant at the 5% level; * significant at the 10% level.

Table 9: Robustness Checks for Cross-sectional Differences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Alternative Sample				District FE				Studio			
VARIABLES	lnPrice	lnAttend	lnScreen	Duration	lnPrice	lnAttend	lnScreen	Duration	lnPrice	lnAttend	lnScreen	Duration
1{Integrated Theater}												
x 1{Integrated Movie}	-0.00647**	-5.82e-05	0.0241*	-0.106***	0.0318***	0.262***	0.0932***	-0.0125	-0.00643**	-0.000630	0.0229*	-0.0507**
	[0.00272]	[0.0212]	[0.0129]	[0.0244]	[0.00796]	[0.0376]	[0.0148]	[0.0227]	[0.00292]	[0.0211]	[0.0129]	[0.0218]
1{Integrated Theater,												
OWN Movie}	-0.00652***	0.0978***	0.0346***	-0.118***	-0.0255***	-0.0707**	-0.0277**	-0.131***	-0.00886***	0.0989***	0.0385***	-0.0952***
	[0.00225]	[0.0140]	[0.00916]	[0.0234]	[0.00652]	[0.0307]	[0.0130]	[0.0240]	[0.00273]	[0.0170]	[0.0114]	[0.0233]
1{Integrated Theater –												
Studio , OWN Movie}									0.00735*	-0.00213	-0.0138	-0.0610**
									[0.00383]	[0.0249]	[0.0144]	[0.0278]
ln(α)				0.584***				0.851***				0.544***
				[0.00627]				[0.00681]				[0.00653]
σ_u^2				0.519***				0.470***				0.393***
				[0.0212]				[0.0188]				[0.0178]
Movie FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Theater-Day FE	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes
District-Day FE	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No
Observations	946,844	946,844	946,844	90,155	947,108	947,108	947,108	90,155	947,108	947,108	947,108	90,155
R-squared	0.315	0.518	0.441		0.209	0.379	0.369		0.323	0.518	0.441	

Note: Alternative sample selects a sample with price > 10 for Columns 5-8 and adjusts the end of run to a day after the last but one day if the last day is at least two days later than the previous day for Column 8. The standard errors are in parentheses. The standard error are clustered at theater level, which allows the residuals correlated over time within a theater and across movies within a theater. The excpetion is Column 8, in which the estimated standard errors are clustered at district level because non-nested clustering (observations in a panel do not stay in the same cluster) is not allowed for duration model. *** Significant at the 1% level; ** Significant at the 5% level; * significant at the 10% level.

Table 10: Robustness Checks for Box Office Regression for Vertical Foreclosure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Studio		Level				
	All lnBOR	Domestic lnBOR	All BOR	Domestic BOR	Foreign BOR	All BOR	Domestic BOR
1{Drop} (γ_1)	-0.451***	-0.369***	2,508***	3,043***	1,514***	2,244***	2,129***
	[0.0130]	[0.0210]	[133.0]	[166.9]	[110.8]	[140.5]	[199.1]
1{Integrated Theater, IND Movie} (γ_2)	-0.0859***	-0.124***	484.1***	655.2***	-59.55	782.7***	1,378***
	[0.0121]	[0.0167]	[155.2]	[195.3]	[121.4]	[222.7]	[358.2]
1{Drop} x 1{Integrated Theater, IND Movie} (γ_3)	-0.0175	-0.0931***	-481.8***	-800.9***	-74.36	-153.4	229.1
	[0.0142]	[0.0214]	[140.6]	[171.4]	[128.7]	[143.9]	[203.3]
1{Integrated Theater-Studio, OWN Movie} (γ_4)	0.0116	-0.00120				1,306***	1,995***
	[0.0209]	[0.0241]				[324.8]	[481.5]
1{Drop} x 1{Integrated Theater-Studio, OWN Movie} (γ_5)	0.0132	-0.0989***				424.2***	1,048***
	[0.0209]	[0.0267]				[145.9]	[220.8]
ln(BOR Ratio) for Col. 1-2; BOR Ratio for Col. 3-7	0.554	0.586***	0.607	0.568***	0.750	0.575	0.449***
	[0.014]	[0.019]	[0.024]	[0.029]	[0.024]	[0.033]	[0.054]
ln(BOR Ratio-Studio) for Col. 1-2; BOR Ratio-Studio for Col. 6-7	0.566	0.584***				0.768	0.743***
	[0.021]	[0.023]				[0.026]	[0.030]
R-squared	0.714	0.731	0.529	0.564	0.493	0.529	0.565
Movie FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Theater-Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	507,061	310,401	507,061	310,401	196,660	507,061	310,401

Note: ln(BOR Rati)o ≈ ln[E(BOR|OWN,Continued)/E(BOR|IND,Drop)] = -(γ_1+γ_2+γ_3). We infer that vertical foreclosure presents in our sample if ln(BOR Ratio) < ln(0.8) ≈ -0.22 for domestic movies and < ln(0.75) ≈ -0.29 for foreign movies based on one-sided test, and ln(BOR Ratio-Studio) < ln(0.57) ≈ -0.56 for domestic movies based on one-sided test. BOR Ratio = E(BOR|OWN,Continued)/E(BOR|IND,Drop) = 1-(γ_1+γ_2+γ_3)/E(BOR|IND,Drop). We compute the standard error of BOR Ratio by using the delta method with the assumption that E(BOR|IND,Drop) is a constant at its mean. We infer that vertical foreclosure presents in our sample if BOR Ratio < 0.8 for domestic movies and < 0.75 for foreign movies based on one-sided test, and BOR Ratio-Studio < 0.57 for domestic movies based on one-sided test. The standard errors are in parentheses. The stamdard error are clustered at theater level, which allows the residuals correlated over time within a theater and across movies within a theater. *** Significant at the 1% level; ** Significant at the 5% level; * significant at the 10% level.

Table 11 Demand Estimation (Theater-Day FE + Movie FE)

		Decomposition of Mean Utility		
	Demand	All Channels	Direct+Screen Channels	Direct+Price Channels
	(1)	(2)	(3)	(4)
1{Integ Theater}x 1{Integ Movie}	-0.0478***	-0.0005	-0.0030	-0.0260***
	[0.0086]	[0.0053]	[0.0057]	[0.0046]
1{Integrated Theater, OWN Movie}	-0.0078	0.0534***	0.0620***	0.0447***
	[0.0085]	[0.0035]	[0.0055]	[0.0032]
Price	-0.175***		0.0286***	
	[0.0208]		[0.0137]	
Screen	0.137***			0.134***
	[0.0022]			[0.0013]
Nesting Parameters				
ComedyShare	0.244***			
	[0.834]			
ActionShare	0.679***			
	[0.241]			
Movie FE	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes
Day of the Week FE	No	No	No	No
Theater-Day FE	Yes	Yes	Yes	Yes
Observations	935,804	935,810	935,804	935,804
Non-linear part				
P-value (Hansen J)	0.776			
Linear part				
Weak IV at 5%	Reject	N/A	Reject	Reject
P-value (Hansen J)	0.243	N/A	0.000	0.000
Price Elasticity	14.65			
% Price Elasticity>1	99.99%			

Note: The standard errors are in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * significant at the 10% level.

SKIP: Table 11. Demand Estimation (Theater-Week FE + No Movie FE)

		Decomposition of Mean Utility		
	Demand	All Channels	Direct+Screen Channels	Direct+Price Channels
	(1)	(2)	(3)	(4)
1{Integ Theater}x 1{Integ Movie}	-0.128***	-0.0329***	-0.156***	-0.0634***
	[0.0218]	[0.0051]	[0.0151]	[0.0057]
1{Integrated Theater, OWN Movie}	0.0494***	0.0875***	0.112***	0.0012
	[0.0156]	[0.0145]	[0.0063]	[0.0044]
Price	-0.466***		-0.156***	
	[0.0403]		[0.0151]	
Screen	0.472***			0.3681***
	[0.0241]			[0.0065]
Nesting Parameters				
ComedyShare	0.762***			
	[0.0699]			
ActionShare	0.483***			
	[0.113]			
Movie Characteristics	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes
Day of the Week FE	Yes	Yes	Yes	Yes
Theater-Week FE	Yes	Yes	Yes	Yes
Observations	946,721	946,721	946,721	946,721
Non-linear part				
P-value (Hansen J)	0.774			
Linear part				
Weak IV at 5%	Reject	N/A	Reject	Reject
P-value (Hansen J)	0.264	N/A	0.000	0.000
Price Elasticity	23.59			
% Price Elasticity>1	99.99%			

Note: The standard errors are in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * significant at the 10% level.

SKIP Table 11: Demand Estimation (Theater-Day FE + No Movie FE)

		Decomposition of Mean Utility		
	Demand	All Channels	Direct+Screen Channels	Direct+Price Channels
	(1)	(4)	(2)	(3)
1{Integ Theater}x 1{Integ Movie}	-0.231***	-0.0772***	0.747***	-0.0435***
	[0.0343]	[0.0052]	[0.0876]	[0.0039]
1{Integrated Theater, OWN Movie}	0.108***	0.133***	0.0188	0.0879***
	[0.0079]	[0.0039]	[0.0313]	[0.0044]
Price	-0.245***		1.055***	
	[0.0434]		[0.0999]	
Screen	0.224***			0.196***
	[0.0063]			[0.0016]
Nesting Parameters				
ComedyShare	0.782***			
	[0.0909]			
ActionShare	0.964***			
	[0.125]			
Movie Characteristics	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes
Theater-Day FE	Yes	Yes	Yes	Yes
Observations	935,810	935,810	935,810	935,810
Non-linear part				
P-value (Hansen J)	0.318			
Linear part				
Weak IV at 5%	Reject	N/A	Reject	Reject
P-value (Hansen J)	0.000	N/A	0.000	0.000
Price Elasticity	8.687			
% Price Elasticity>1	99.99%			

Note: The standard errors are in parentheses. *** Significant at the 1% level; ** Significant at the 5% level; * significant at the 10% level.

APPENDIX A

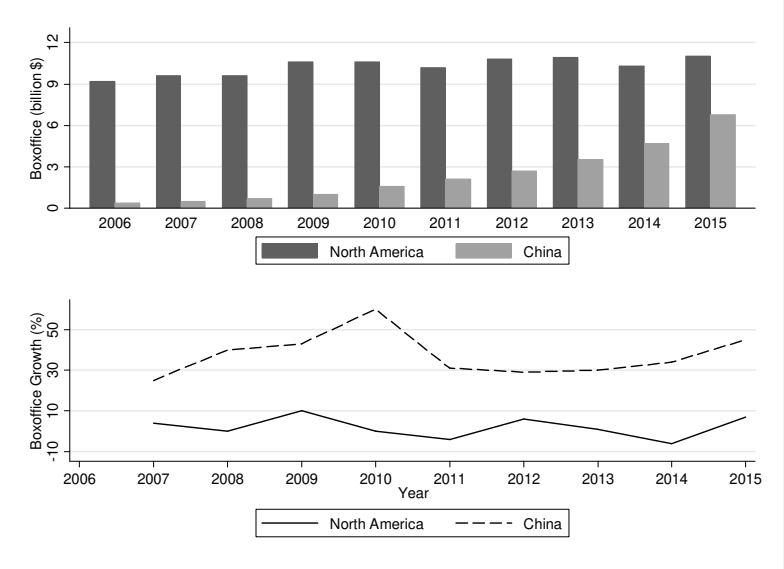

Figure A1. Box Office in North America and China
Data Source: 2015-2016 China Film Industry Report

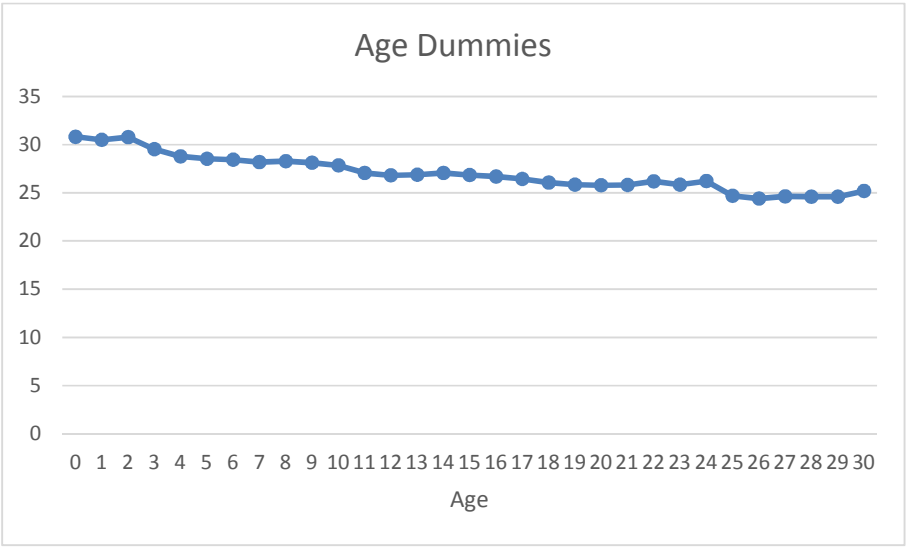

Figure A2: Price - Age Dummies

These dummies are the result of estimating average movie ticket price on th-day elapsed since its first day of showing. In particular, we specify $Price_{jct}$ = Age-Specific Fixed Effects + Movie-Theatre Fixed Effects + ε_{jct}.

Table A1. Top Ten Markets by Box Office, 2012 (in USD)

Rank	Country	Box Office	Average Ticket Price	GDP Per Capita	GDP Per Capita/ Average Ticket Price
1	United States	10.8	7.96	51749	6501
	Canada		8.36	52219	6246
2	China	2.7	5.75	6091	1059
3	Japan	2.4	15.77	46720	2963
4	United Kingdom	1.7	10.83	39093	3610
5	France	1.7	8.24	39772	4827
6	India	1.4	0.6	1489	2482
7	Germany	1.3	9.89	41863	4233
8	Korea	1.3	6.63	22590	3407
9	Russia	1.2	7.59	14037	1849
10	Australia	1.2	13.57	67556	4978

Source: UNESCO Institute for Statistics