Accommodate or Fight? Responding to Entry in the Movie Theater Industry

In Kyung Kim
Nazarbayev University
Mushegh Harutyunyan
Nazarbayev University GSB

Cite as:
Kim In Kyung, Harutyunyan Mushegh (2020), Accommodate or Fight? Responding to Entry in the Movie Theater Industry. *Proceedings of the European Marketing Academy*, 49th, (62504)

Paper from the 49th Annual EMAC Conference, Budapest, May 26-29, 2020.

Accommodate or Fight?

Responding to Entry in the Movie Theater Industry

Abstract. We investigate how incumbent movie theaters respond to a competitor's entry by adjusting their admission prices, movie portfolio and seat capacity allocation across movies. The conventional wisdom suggests that a competitor's entry will induce the incumbent to reduce its price and improve its product offering in order to avoid losing too many sales to the entrant. We find that an incumbent *chain* theater's response to an entry is relatively more accommodating towards the entrant, while an incumbent *independent* theater tends to be more aggressive. Namely, after entry, the incumbent chain theater becomes less likely to include the most popular movies in its portfolio, reduces the seat share for such movies, and avoids reducing its admission prices. By contrast, an incumbent independent theater reduces its admission prices, and tends to include the most popular movies in its portfolio more frequently. Furthermore, we find that the entering theater charges lower admission prices when the incumbent is independent than when it belongs to a chain. Hence, our results show that the incumbent theater's organizational type may lead to qualitatively different competitive dynamics between the incumbent and the entrant.

Keywords: competitive strategy, entry, capacity allocation

Track: Methods, Modelling & Marketing Analytics

When a competitor enters the market, the incumbent firm may want to change its strategy to adjust to the new competitive environment. The extant literature has analyzed how a competitor's entry affects the incumbent's prices (e.g., Davis 2005), product quality (Prince and Simon 2014, Orhun, Venkataraman and Chintagunta 2015), advertising intensity (Gatignon, Anderson and Helsen 1989), etc. Interestingly, although most firms operate under limited capacity constraints, the extant empirical literature provides very few insights about a firm's capacity-related decisions in response to entry. In this paper, using a rich panel dataset, we investigate how a competitor's entry induces an incumbent firm to change its price, product portfolio, and capacity allocation across products of different popularity. Furthermore, due to a large variation in incumbent firms' organizational types, we are able to examine how the entry response of the incumbent differs based on its type.

We investigate an incumbent firm's response to entry in the context of the movie theater industry. For movie theaters, admission prices and the portfolio of screened movies are two important factors for attracting customers, and hence, one might intuit that the incumbent will respond to entry by reducing its price and improving its movie selection in order to avoid losing too many sales to the entrant. In this paper, we will show that this conventional wisdom may not hold, and that the incumbent's organizational type may lead to qualitatively different responses to entry.

Importantly, since movie theaters have limited capacity in terms of the number of screens and the number of seats corresponding to each screen, they not only decide which movies to play, but also how to allocate their limited seat capacity across movies, i.e., the theater has to decide how often to screen the movie, the number of screens to use, and whether to use screens that can accommodate a larger number of people (i.e., big rooms instead of small ones). Therefore, to better understand how an incumbent movie theater changes its product offering after a competitor's entry, it is important to analyze not only the theater's movie portfolio, but also its capacity reallocation across movies. For example, when a theater does not change its movie portfolio but reduces the capacity share of popular movies, our analysis will be able to detect a reduction in the theater's overall product "quality." While most of the existing literature studying firms' decisions related to production capacity has been theoretical (e.g., Cachon and Lariviere 1999), in this paper, due to the movie theaters' high frequency of decisions related to capacity allocation across screened movies, we are able to empirically examine their capacity allocation decisions.

INDUSTRY OVERVIEW AND DATA

Our analysis focuses on the Korean movie theater industry, which is currently the fourth largest market in the world in terms of box office revenue. Our dataset covers the period from 2005 to 2009. The biggest players in the market were the five movie theater chains (CGV, Lotte, Megabox, Cinus, and Primus) who ran about 50% of the theaters. The remaining theaters in the market were independently owned and operated—we refer to them as independent theaters. In terms of the number of screens, chain theaters owned 65% of them, and hence, an average chain theater had more screens than an average independent theater.

Consistent with the practice in other major markets, movie theaters in Korea charged uniform admission prices across movies. Furthermore, the movie distributors used a uniform revenue-sharing contract across movies and theaters: half of the after-tax box office revenue went to the theater, while the remaining half was shared among the distributor, the producer, and investors. Note that in markets that the extant literature has examined (e.g., Spain and U.S.), the revenue-sharing contracts are typically theater, movie and time specific, making the analysis of a theater's response to an entry less straightforward due to possible changes in the revenue-sharing contract after an entry.

Our dataset includes commercial movie theaters operating in Korea, which are predominantly located in large metropolitan areas. We construct the dataset using two sources: the Korean Film Council and the Korea Box Office Information System (KOBIS). The dataset contains detailed information about theaters operating in Korea, such as opening and closing dates, weekend screening schedules, number of screens, number of seats assigned to each screen, the screens assigned to each movie, etc. Finally, using information on each movie's weekday audience size, we construct the weekly ranking of movies.

Following the extant literature studying competition in relatively densely populated regions (e.g., Hastings 2004; Watson 2009; Ren et al. 2011), we examine an incumbent's response to the opening of a 'direct' competitor within its one-mile radius. This is consistent with Kim, Lee and Yoon (2015), who found that, in the Korean market, the effect of competition on a theater's revenue is no longer significant if the competitor's distance from the theater is more than a mile. Furthermore, we focus on incumbent theaters that used to be monopolists in their local markets before the entry of a competitor. Our focus on such theaters allows us to obtain clear-cut results on entry response, and to compare and contrast with a large stream of the extant literature that has studied similar changes to the market structure (e.g., Orhun, Venkataraman and Chintagunta 2015; Bresnahan and Reiss 1990; Bresnahan 1985).

The vast majority (87%) of the entering theaters belonged to a chain. Furthermore, in markets where the incumbent theater was chain-affiliated, the entrant belonged to a rival chain in 90% of cases. Because of the very small number of observations where the entrant was independently owned or belonged to the same chain as the incumbent theater, we will not include such observations in our analysis. Put differently, we will focus on the predominant situation where the entrant theater belonged to a chain and the incumbent theater either belonged to a rival chain or was independently owned. Finally, similar to Orhun, Venkataraman, and Chintagunta (2015), as a control group, we include theaters that stay as monopolists during the sample period and are located in the same province as incumbents facing a chain-affiliated entrant. Our final dataset consists of 67 theaters that did not experience entry and 23 incumbent theaters in 14 provinces that experienced an entry in their local markets. Among the incumbents that experienced entry, about 60% were chain-affiliated and the remaining 40% were independent.

ANALYSIS

Effect of entry on incumbent's price

When a competitor enters the market, one might intuit that the incumbent will reduce its price to avoid losing too many sales to the competitor. We examine the validity of this conventional wisdom in our setting by using the following log-linear specification to estimate the impact of entry on the incumbent theater t's admission prices in time (year-week) w.

$$\ln Price_{tw} = \alpha^C D_t^C W_{tw} + \alpha^I D_t^I W_{tw} + \psi_t + \psi_{cm} + \psi_{pm} + u_{tw} \qquad (1)$$

where the binary variable D_t^C (D_t^I) is one if the incumbent theater is chain-affiliated (independent) and zero if otherwise. W_{tw} is the total number of screens (in 10s) in the entering chain theater, and hence, equal to zero for periods before entry. Using the entrant's screen number instead of an entry dummy allows us to distinguish entry of a large competitor from entry of a small one. The coefficients α^C and α^I capture the effect of entry on the admission price in an incumbent chain and independent theaters, respectively. The model also includes the full set of controls ψ_t, ψ_{cm} and ψ_{pm} representing theater, chain-month and province-month fixed effects. u_{tw} is the theater-and-time specific error.

We estimate the model with robust standard errors clustered by theater and report the estimation results in Table 1 below.

Table 1 Impact of Entry on Incumbent's Admission Prices

	Dependent Variable: ln(Price)		
Effect of entry on	**(1)**	**(2)**	**(3)**
Chain incumbent	-0.011 (0.008)	-0.004 (0.007)	
Independent incumbent	-0.033** (0.016)		-0.033* (0.017)
Fixed Effects			
Theater	Yes	Yes	Yes
Chain – Month	Yes	Yes	No
Province – Month	Yes	Yes	Yes
R-squared	0.791	0.815	0.691
Observations	14,383	10,279	4,104

Estimation results reported in column (1) of Table 1 show that only independent incumbents react to entry of a chain theater by reducing their admission prices. Specifically, the admission price of an independent theater decreases by 3.3 percent after entry of a chain theater with 10 screens, and the effect is significant at the 5 percent level. We obtain similar results when observations of chain and independent incumbents are used separately in the estimation. Namely, the estimates presented in columns (2) and (3) of Table 1 show that only independent theater reduces the admission price. Intuitively, the pricing decisions of chain theaters are typically centralized in their headquarters, making admission prices less responsive to changes in the local competitive environment. By contrast, an independent theater usually has more flexibility and can easily respond to changes in its local competitive environment.

Effect of entry on incumbent's movie portfolio

A theater's movie portfolio is one of the most crucial factors for attracting customers to the theater. Naturally, screening more popular movies will attract a larger number of customers. However, popular movies are also likely to be screened by the theater's competitor, which can have a negative effect on the theater's ticket sales. So, it is not obvious how the incumbent should adjust its movie portfolio in response to a competitor's entry into the local market.

Hence, we analyze the effect of entry on a theater's decision on whether to screen a movie of a given popularity ranking. Our analysis will reveal whether a competitor's entry induced the incumbent to screen more (or less) popular movies and how the incumbent's decision differed depending on its oganizational type (i.e., chain versus independent).

We let the indicator variable $Screening_{itw}$ be equal to one if the theater t played the movie i during the time period w (year-week) and zero if otherwise. The incumbent theater's decision to screen a movie is determined by the following probit model:

$$Screening_{itw} = \begin{cases} 1 & \text{if } y_{itw} > 0 \\ 0 & \text{if } y_{itw} \leq 0 \end{cases} \quad (2)$$

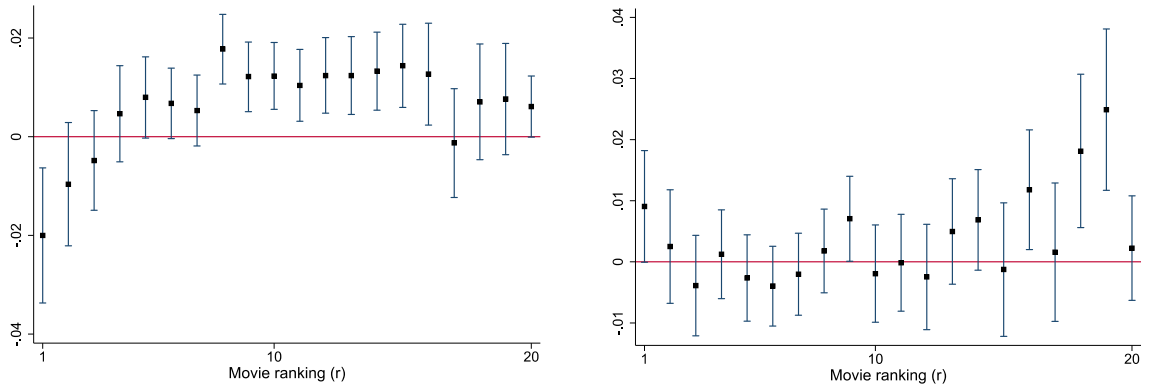
where the underlying latent variable y_{itw} is defined as follows:

$$y_{itw} = \sum_{r=1}^{20} \alpha_r I_{iw}^r W_{tw} + \mathrm{X}_{itw}\lambda + \psi_t + \psi_{cm} + \psi_{pm} + u_{itw} \quad (3)$$

The index r indicates the ranking of a movie based on its weekday audience size. I_{iw}^r is an indicator function taking the value one if the movie i had a ranking r during week w. Note that movies with a ranking 20 or below are classified together into the group with $r = 20$. W_{tw}, as before, represents the total number of screens (in 10s) in the entering chain theater. The vector X_{ftw} includes the log of movie i's weekday audience size during week w, its movie ranking (represented by indicator functions I_{iw}^r), as well as an indicator variable that shows whether the movie was released by the same company that owns the theater chain. Theater fixed effects ψ_t are included in the model along with chain-month and province-month fixed effects (ψ_{cm} and ψ_{pm}, respectively). The movie, theater and time specific error term u_{itw} has a standard normal distribution.

Figure 1 below illustrates the marginal effects (at sample means) of a competitor's entry on the incumbent's likelihood of screening a movie with ranking r, along with 95 percent confidence bands.

Figure 1 Effect of Entry on Incumbent's Portfolio of Screened Movies



a. *Incumbent chain theater* b. *Incumbent independent theater*

The left panel clearly shows that an incumbent chain theater becomes less likely to play a handful of the most popular movies in a given week after entry of a competitor. For example,

the likelihood of playing the most popular movie decreases by approximately 2 percentage points after the opening of a new chain theater with 10 screens. By contrast, as the right panel shows, after entry, the incumbent independent theater does not reduce the likelihood of playing the most popular movies. On the contrary, it seems more likely to screen the most popular movie than before.

Effect of entry on incumbent's capacity allocation

As we discussed in the Introduction section, a movie theater operates under a capacity constraint determined by its number of screens and the number of seats corresponding to each screen. So, when developing its screening schedule, a theater faces a tradeoff in the sense that increasing the capacity share for one movie means reducing the share for another movie. In this subsection, leveraging our detailed screening schedule data, we investigate how a competitor's entry affected the incumbent theater's capacity allocation across movies of different popularity (ranking). The equation (3) provides the model specification for our analysis.

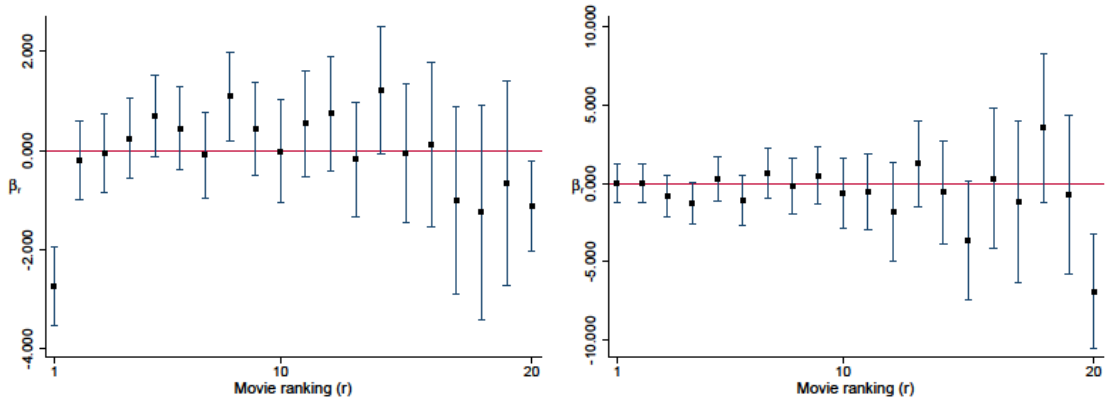
$$Seat\ Share_{itw} = \sum_{r=1}^{20} \beta_r I_{iw}^{r} W_{tw} + \mathrm{X}_{itw}\delta + \psi_t + \psi_{cm} + \psi_{pm} + \epsilon_{itw} \qquad (4)$$

The dependent variable $Seat\ Share_{itw}$ is the seat share (%) of movie i in theater t at time (year-week) w, while all the explanatory variables are the same as in specification (2). β_r measures the effect of entry on the seat share of movie i whose weekly ranking is r. The error term ϵ_{itw} is movie, theater, and time specific.

Since we only observe seat shares of movies screened in a theater, a sample selection problem may potentially arise. We handle it by using the two-step procedure from Heckman (1979); we first obtain inverse Mills ratio from the first stage estimation of the probit model (1), and use it as the selection correction term in model (3).[1] After running the model (3) using observations for incumbent chain theaters, we run the model again using the observations for incumbent independent theaters. The second stage estimates reported in Table A2 in the Appendix show that selection correction term is statistically significant.

[1] Note that since specifications (2) and (3) share the same set of regressors, the coefficients in (3) are identified through the nonlinearity of the selection correction term.

Figure 2 Effect of Entry on Incumbent's Seat Allocation across Movies



a. *Incumbent chain theater* b. *Incumbent independent theater*

Figure 2 graphically presents how a competitor's entry affected the incumbent's decision to screen a movie with ranking r by showing the estimates of β_r for $r = 1, 2, \ldots 20$ along with 95% confidence bands. We find no evidence that incumbent independent theaters adjust the seat shares for the popular movies. By contrast, our results demonstrate that after the entry of a competitor, the incumbent chain theater tends to reduce the number of seats allocated to the most popular movie; its seat share decreases by approximately 3 percentage points after the opening of a new chain theater with 10 screens. Intuitively, the incumbent chain theater may anticipate that the competitor is also likely to screen the most popular movies in the market, which will lead to a reduction in the incumbent's ticket sales for these movies. Hence, the incumbent chain theater decreases the seat capacity share of the most popular movies, reallocating them to other movies.

Entering chain theater's strategy

Our analysis in the above three subsections suggests that incumbent chain theaters' response to entry is qualitatively different from that of incumbent independent theaters. More specifically, the incumbent chain theaters tend to be more accommodating than the independent theaters. Hence, one might naturally wonder whether the entering theater adjusts its strategy based on the organizational type of the incumbent theater.

Using observations of the 23 entering chain theaters, we examine how the incumbent theater's organizational type affects the entrant's admission prices. The unconditional price difference between the two types of entrants is reported in the first row of Table 2. It shows that the entrant's admission price is lower by about 0.28 USD when the incumbent is an independent theater. After controlling for chain, province, and month fixed effects, and the number of screens in the entrant and incumbent theaters, we find that the price difference is still statistically significant (-0.35 USD). The second row of Table 2 demonstrates that before

entry, there is no significant difference between the incumbent chain and incumbent independent theaters' admission prices, and hence, the difference in the entrant's pricing decisions based on the incumbent theaters' organizational type is not due to pre-entry differences between the incumbent chain and independent theaters' prices.

Table 2 Price Comparison among Entrant and Incumbent Theaters

Price difference among	Unconditional	Conditional
Entrants	-0.279***	-0.351***
	(0.018)	(0.103)
Incumbents before entry	-0.008	0.096
	(0.018)	(0.114)

Note: Robust standard errors (clustered by theater) are in parentheses. The notation *** indicates significance at 1% level, ** at 5% level, * at 10% level.

Regarding the entrant's movie portfolio and seat capacity allocation decisions, our analysis in the Appendix shows that there is no statistically significant evidence that the entrant adjusts its movie quality or seat allocation depending on the organizational type of the incumbent.

Our findings about the incumbent theaters' and the entrants' strategies suggest that the incumbent's organizational type may have a qualitative influence on the competitive dynamics between the incumbent and the entrant. When the incumbent theater is chain-affiliated, both the incumbent and the entrant are more accommodating to each other, avoiding intense competition in terms of pricing, movie selection and capacity allocation for popular movies. There are several likely explanations for this. First, for chain theaters, many decisions (e.g., pricing) are typically made at the headquarters, making aggressive competition at the level of a local theater less likely. Second, theaters from rival chains might have extra incentives to avoid aggressive actions against each other in order to prevent competitive tension spreading to other locations in the chains, hurting the overall chain performance. Third, aggressive competitive actions against a chain-affiliated theater are unlikely to force this theater to leave the market because support from the chain can sustain the theater for a long period of time. By contrast, when the incumbent theater is independent, avoiding more aggressive competition may be difficult. For example, an independent theater has more flexibility to adjust its prices in a short time. Hence, the entrant gains an incentive to price low because it knows that high prices will allow the independent theater to undercut the entrant by reducing its prices.

Due to space constraints, we provide a more detailed overview of the literature in the working version of the paper. Our paper contributes to the extant literature in several ways.

First, we examine the effect of competition on how a firm allocates its limited capacity across products of different popularities. The extant literature has predominantly focused on the composition of a firm's product portfolio. Our analysis of the capacity share that the firm allocates to each product in its portfolio allows us to have a more comprehensive view of how the firm changes its product offering in response to entry. Second, we analyze entry response differences between incumbent chain theaters and incumbent independent theaters, and find that in terms of pricing, movie portfolio selection and seat capacity allocation, independent theaters tend to be more aggressive in their entry response than chain theaters. Third, we investigate how the entering chain theater's strategy differs depending on the organizational type of the incumbent theater (i.e., independent or rival chain). Our results reveal that the entrant tends to charge lower admission prices when the incumbent is an independent theater. Hence, our findings suggest that after a competitor's entry, incumbent chain theaters and incumbent independent theaters appear in qualitatively different competitive paradigms.

References

Bresnahan, Timothy F. (1985) Post-entry competition in the plain paper copier market. *American Economic Review* 75(2):15-19.

Cachon, Gérard P., and Martin A. Lariviere (1999) Capacity allocation using past sales: When to turn-and-earn." *Management Science* 45(5):685-703.

Davis, Peter (2005) The effect of local competition on admission prices in the US motion picture exhibition market. *The Journal of Law and Economics* 48(2):677-707.

Davis, Peter (2006) Spatial competition in retail markets: movie theaters. *The RAND Journal of Economics* 37(4):964-982.

Gatignon, Hubert, Erin Anderson, and Kristiaan Helsen (1989) Competitive reactions to market entry: Explaining interfirm differences. *Journal of Marketing Research* 26(1):44-55.

Hastings, Justine S. (2004) Vertical relationships and competition in retail gasoline markets: Empirical evidence from contract changes in Southern California. *American Economic Review* 94(1):317-328.

Heckman, James J (1979) Sample selection bias as a specification error. *Econometrica* 153-161.

Kim, In Kyung, Yoon-Jin Lee, and Young-Ro Yoon (2015) Floating population and the analysis of entry decision and competition in metro retailer market. *Working Paper*.

Orhun, A. Yeşim, Sriram Venkataraman, and Pradeep K. Chintagunta (2015) Impact of competition on product decisions: Movie choices of exhibitors. *Marketing Science* 35(1): 73-92.

Prince, Jeffrey T., and Daniel H. Simon (2014) Do incumbents improve service quality in response to entry? Evidence from airlines' on-time performance. *Management Science* 61(2):372-390.