

Effects of chain affiliation in the movie theater industry*

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Abstract

In this paper, I empirically study the effect of chain affiliation on product variety and price in the movie theater industry. Using a rich panel data set on theaters' weekly screening schedules and admission prices, I find that chain affiliation induces both movie variety and price to increase. The results suggest that the regulatory authorities should carefully examine the trade-off between increase in market power and efficiency gains when evaluating the implications of chain affiliation.

Keywords: organizational form, franchising, product variety

JEL Classification Numbers: K20, L22, L82

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1 Introduction

One of the most salient features in retail and service industries in the past few decades is the rapid spread of chain establishments. In the U.S., for example, the sales of chain firms (US\$1.3 trillion) were 9.2 percent of the total GDP in 2009 (Kosová and Lafontaine, 2012). As chain firms have been constantly replacing independent, stand-alone establishments, there is also a growing concern regarding the retail sector becoming more concentrated over time. For instance, the Korea Fair Trade Commission and the National Commission for Corporate Partnership imposed restrictions on the entry of new franchisees in the bakery industry in 2013.¹ Despite its importance, however, there is little empirical evidence on the implication of chain affiliation.

The goal of this paper is to examine the effect of chain affiliation on product variety as well as price. It may reduce cost through economies of scale (for instance, sharing advertising and purchasing costs). While this would lower prices, chain-affiliated retailers may offer better products with higher prices. Therefore, it is important to look at both price and non-price effects to examine the implication of chain affiliation on consumers. I use product variety as a proxy for efficiency gains due to chain affiliation.

In this paper, I consider the movie theater industry in Korea for the following reasons. First, the industry has been drastically expanding, since the first theater chain opened its first theater in 1998, and was followed by other chains. While they have aggressively opened new theaters during the 2000s, many independent theaters have become affiliated with theater chains. Second, by reducing the uncertainty on the quality of their products or services, retailers affiliated with chains can attract more (risk averse) consumers, and thus, increase their revenues. While this effect is more prominent in industries with little “repeat business” where consumers have little prior information on product quality, chain affiliation is not restricted to these industries. As a matter of fact, it is a universal trend across many retail and service industries including those that largely serve “repeat consumers” such as supermarkets and movie theaters. This paper complements previous empirical literature on this topic that mainly focuses on testing the existence of the reputation effect (Mazzeo, 2004; Hollenbeck, 2017).

Using a rich panel data set containing weekly screening schedules and admission prices of theaters in Korea from 2006 to 2008, I first examine how movie variety in an independent theater changes when it becomes chain-affiliated. Considering the weekly number of movies playing in a theater as a proxy for movie variety in the theater, I find that chain affiliation induces the weekly number of movies playing in the theater to increase by 6 percent. This result implies that the marginal cost of variety goes down when an independent theater is affiliated with a chain. Increased movie variety may in turn increase consumer welfare by satisfying diverse demand of consumers (Lancaster, 1990). Next, I study the effect of chain affiliation on admission price, and

¹Specifically, a franchisor should not open a new bakery within 500 meters of any independent bakery or its own incumbent, while the number of new bakeries in a year should not exceed 2 percent of the total number of its incumbents. In 2011, there were 4.8 thousand franchising bakeries in Korea and most of them (97 percent) were franchisee-owned.

find that price goes up by 1.5 percent after franchising. Consequently, these findings suggest that the regulatory authorities should carefully examine the trade-off between increase in market power and efficiency gains due to chain affiliation. The results are also robust to considering observations from weekdays and weekends separately, and first-run movies only.

To further address the potential endogeneity of chain affiliation and verify the robustness of the results, I consider the instrumental variables approach. For this goal I use two instruments: (i) the proportion of the number of company-owned theaters within the region (where a focal theater is located) among all regions, and (ii) an indicator of whether the theater is located in one of the seven metropolitan cities or Gyeonggi province, which constitutes the Seoul Metropolitan Area (SMA) along with the two metropolitan cities, Seoul and Incheon. As the information on the organizational form of chain theaters is available only for 2008, I perform a cross-sectional analysis and show that estimates are consistent with previous results.

The empirical findings may result not only from horizontal chain affiliation, but also from vertical integration as most theater chains are vertically integrated with distributors in Korea. To disentangle the effect of chain affiliation from that of vertical integration, I exploit the acquisition of the theater chain Megabox by Macquarie, an Australian banking group, in July 2007. Difference-in-differences estimation results suggest that the vertical disintegration may affect neither movie variety nor admission price. Consequently, increase in movie variety and admission price could be attributed to chain affiliation.

This paper is closely related to the empirical literature on chain affiliation. Despite its prevalence, only few works explored the nature of chain affiliation.² Williams (1999) shows that the greater the industry risk and the more skilled the entrepreneur, the more likely he is to franchise. Mazzeo (2004) studies the determinants of affiliation in the motel industry and shows that it is more common where uncertainty in the underlying economic environment is greater. Whereas they mainly study determinants of the franchising decision of an independent business owner, I explore the outcomes of chain affiliation. Hollenbeck (2017) quantifies the cost and revenue effects of chain affiliation in the hotel industry. He finds evidence that chain-affiliated properties gain a large chain premium by signaling quality to consumers with low information (reputation effect), whereas they have no cost advantage over independent hotels. Complementing his work, I explore the implication of chain affiliation for consumers in an industry that largely serves repeat consumers.

Recent literature on the relationship between market structure and prices also bears on this paper in that chain affiliation would lead to an increase in market concentration. Whereas Davis (2010) and Allain et al. (2017) find that prices rise after merger, Simpson and Taylor (2008) and Aguzzoni et al. (2016) conclude that merger has no impact on prices. Hosken et al. (2018) show that the price effect of merger is geographically heterogeneous.³ Similar to Genakos et al. (2018), I find evidence of efficiency gains, that is, an increase in product variety, as well as a price increase when the market becomes more concentrated.

²A related yet different literature explores differences in performance between franchised and company-operated outlets (Shelton, 1967; Blass and Carlton, 2001; Kosová et al., 2013).

³See Ashenfelter et al. (2014) for an overview.

Another strand of empirical literature that is connected to the paper is that on firms' decision on product variety. Argentesi et al. (2016) find that merging firms decrease the assortment depth in order to avoid cannibalization. Bayus and Putsis (1999) and Hong and Lee (2015) investigate whether incumbent firms strategically use product variety as an entry deterrent. Watson (2009) and Ren et al. (2011) study the effect of competition on a retailer's product variety decision. Building on the literature, I examine the effect of chain affiliation on product variety.

The remainder of the paper proceeds as follows. In the next section, I provide background information on the movie theater industry in Korea and describe the data. Section 3 is the main focus of the paper where I evaluate the effect of chain affiliation on product variety and price. I also disentangle the effect of chain affiliation from that of vertical integration, and perform robustness checks. Lastly, Section 4 concludes.

2 Background and data

Industry background

The movie theater industry in Korea has been drastically expanding since the late 1990s. The aggregate audience size had tripled from 50 million in 1998 to 147 million by 2010. The expansion of movie demand coincided with the rapid spread of chain theaters; CGV, the largest theater chain in Korea, opened its first theater in 1998, and was followed by other chains. At the same time, many independently owned theaters have exited the market or become affiliated with chains.

There were five national theater chains, CGV, Primus, Lotte, Megabox, and Cinus during the 2000s.⁴ According to industry sources, they tend to establish company-owned theaters in seven metropolitan cities and Gyeonggi province, and franchise theaters in other mid-size and small cities. Moreover, chains typically operate new theaters corporately, while replacing existing independent theaters by franchising them. Following these strategies, they have rapidly increased their market shares.⁵ Table 1 shows that chains operated 174 theaters with 1,336 screens out of 314 theaters with 1,975 screens in total in 2007.

Vertical integration between distribution and exhibition is legal in Korea. As a result, CGV (and Primus) and Lotte distributed their own movies, while Megabox, which had been vertically integrated with a distributor, was sold out to Korea Multiplex Investment Corporation led by Australian banking group Macquarie in July 2007.

The Korean movie theater industry is also characterized by a high level of per capita attendance. Koreans went to the movies 4.22 times on average in 2015, one of the highest in the world.⁶ Therefore, theaters are likely to serve repeat consumers mostly. Thanks to the rapid growth in the past two decades, the Korean movie theater industry became one of the largest in the world; it had the sixth largest market in terms of box office revenue in 2015 (US\$1.5 billion).

⁴Primus was owned by CGV.

⁵Rationalizing these strategic behaviors would be of interest.

⁶Source: MPAA Theatrical Market Statistics 2015, Korean Film Council Annual Report 2015.

Table 1: Theaters in Korea in 2007

Type	Number of theaters	Number of screens
<i>Chain</i>	174	1,336
CGV (including Primus)	95	737
Lotte	41	316
Cinus	23	160
Megabox	15	123
<i>Independent</i>	140	639

Source: Korean Film Council Annual Report 2008.

It is well known that admission price is rigid in that it is not responsive to changes in the local market structures. For example, Davis (2005) finds no evidence that movie ticket prices in the U.S. rise in response to an increase in geographic concentration, while Sorensen (2007) points out the rigidity of product price in the media industry, especially in the movie theater industry. In this paper, I examine whether the price is also not responsive to the change in a theater’s organizational form. In addition, the ticket price in a theater is more or less uniform across movies, although it may differ across times and days.⁷ Orbach and Einav (2007) list perceived fairness, demand uncertainty, and monitoring costs as possible explanations for the practice of uniform pricing, while Courty and Nasiry (2018) provide an explanation based on consumer loss aversion. While admission price is more or less similar across theaters, it is higher in Seoul compared to other regions in Korea. Table A-1 in the appendix presents the average admission price in each region, calculated from the data analyzed in this paper. On average, the price is 6 percent higher in Seoul than in other cities and provinces, potentially due to the price discrimination by theater chains.

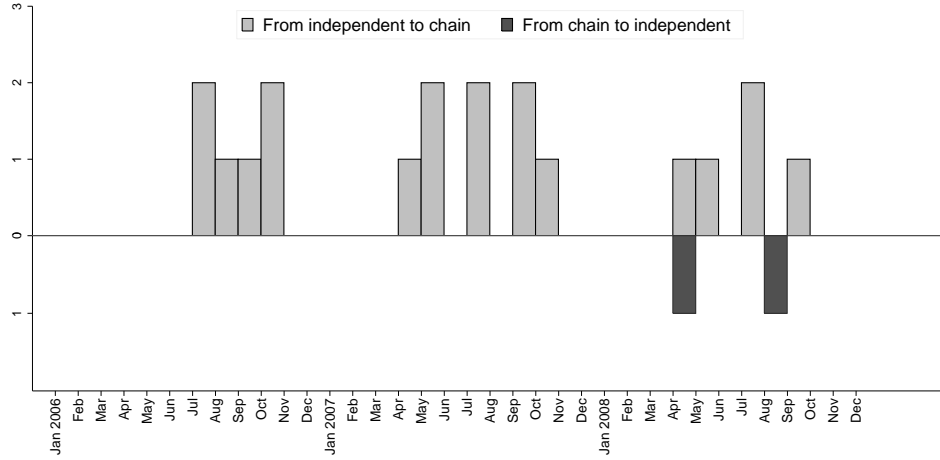
Data

The Korea Box Office Information System (KOBIS) posts screening schedules of almost the full population of theaters across all 16 regions in Korea; seven metropolitan cities and nine provinces. The data show which movie was played in each screen of a theater at each time slot during a day as well as its admission price. Using a web crawler, I downloaded this daily screening schedule information from 2006 to 2008, and calculate the weekly number of movies and average admission prices in each theater. Following previous literature on product variety (Watson, 2009; Ren et al., 2011; Argentesi et al., 2016), I consider the number of movies as the measure of movie variety. Also, art theaters specialized in showing small art-house films are excluded from the analysis.

I combine the data with theater information available at the Korean Film Council (KOFIC). KOFIC updates the list of existing theaters at the end of each year. This yearly list also contains

⁷For instance, tickets of early morning shows are cheaper than those of evening shows, whereas admission prices are higher during weekends compared to weekdays.

Figure 1: Monthly number of theaters with organizational change



The figure shows the number of theaters with organizational form change from “independent to chain” and from “chain to independent” in each month between 2006 and 2008.

theater information such as the name of the chain, location, the number of screens, opening and closing dates. In the data, there are 84 theaters that were under independent ownership during the sample period, while 175 theaters were affiliated with chains. Importantly, there are 21 cases in which organization form changes took place, and I keep track of the dates when the changes occurred. Figure 1 shows that 19 independently owned theaters became chain-affiliated, while two chain theaters were sold to independent business owners. Additionally, the information on the organizational form of chain theaters at the end of 2008, that is, whether a chain theater is franchisee-owned or company-owned or franchised, is available. Later, I will exploit this information in the instrumental variables estimation.

For the empirical analysis, I consider administrative districts as geographic markets and define 117 local markets in the data.⁸ Then, using information on theater location, opening and closing dates, I calculate the number of competitors for each theater and week. There are 26 theaters for which the screening schedule information is not available, and hence, excluded from the analysis. However, they are included when calculating the number of competitors for other theaters.

I supplement the movie theater data with consumer income data. Unfortunately, income data are not available for districts in Seoul. Instead, I collect the yearly per capita income for each of the 16 regions from the Korean Statistical Information Service.⁹

Table 2 provides summary information for the key variables. There are 32,202 weekly observations of the number of movies, admission price, as well as theater and market characteristics. On

⁸The seven metropolitan cities are subdivided into “*Gu*”s, that I call districts. For example, there are 25 districts in Seoul whose average size is 24.2 km^2 . Nine provinces have several administrative subdivisions, including a few cities, that in turn are subdivided into two or three districts. For smaller cities and towns without further subdivision into districts, I consider the city or town itself as a district.

⁹KOBIS: <http://www.kobis.or.kr/>, KOFIC: <http://www.kofic.or.kr/>, and the Korean Statistical Information Service: <http://kosis.kr/eng/>

Table 2: Descriptive statistics

Variables	Avg.			Min.	Max.
	All	Indept.	Chain		
<i>Number of movies</i>					
All movies	10.58	9.45	11.10	1	68
First-run movies	10.48	9.35	11.01	1	34
<i>Weekly admission price (KRW)</i>					
All movies	6,470	6,455	6,477	4,000	9,598
First-run movies	6,469	6,452	6,477	4,000	9,598
<i>Other variables</i>					
Number of screens	7.45	6.90	7.71	1	16
Number of competitors	1.91	2.15	1.81	0	7
Income per capita (1,000 KRW)	21,362	21,692	21,209	14,329	41,555

average, chain theaters play more movies (11 movies) than independent theaters do (9.5 movies). Also, there is a huge variation in the weekly number of movies, ranging from 1 to 68, while most of the movies on screen are first-run movies.¹⁰ The average admission price is 6.5 thousand Korean won (6 dollars) and there seems no difference between independent theaters and chain theaters. A chain theater tends to be bigger (7.7 screens) and face fewer competitors in its local market (1.8 competitors) than an independent one (6.9 screens and 2.2 competitors). In the following section, I formally examine how chain affiliation affects movie variety and admission price, controlling for theater and market characteristics.

3 Estimation

Using the panel data described above, I first examine the effect of chain affiliation on movie variety and admission price. Next, I consider an alternative way to address the potential endogeneity of chain affiliation and provide cross-sectional evidence of the effects. Finally, I aim to disentangle the effect of chain affiliation from that of vertical integration.

3.1 Movie variety, admission price, and chain affiliation

I begin by testing whether chain affiliation affects product variety after controlling for other theater and market characteristics. Specifically, I estimate the model

$$\log(Movies)_{it} = \alpha Chain_{it} + \mathbf{x}_{it}\delta + d_l + d_{rt} + u_{it}, \quad (1)$$

¹⁰The number of first-run movies available for screening in a given week ranges from 35 to 132 during the sample period.

where the dependent variable $\log(Movies)_{it}$ is the log of the number of movies playing in theater i at time (week) t . The binary variable $Chain_{it}$ is equal to one if theater i belongs to a chain and zero otherwise. The coefficient α captures the effect of chain affiliation on the number of movies.

The vector \mathbf{x}_{it} includes time varying theater and market characteristics that may affect the theater’s movie variety decision. The number of screens in the theater $Screens_{it}$ may positively affect the number of movies. $Opening\ week_{it}$ and $Closing\ week_{it}$ indicate whether theater i opened or closed permanently at time t , respectively. Similarly, a dummy variable $Renovation_{it}$ is equal to one if time t is the last week before a temporary shutdown of the theater for up to two months (due to renovation, for instance) or the first week of reopening after such an event. In these weeks, theaters may play fewer movies. The number of competitors in the local market $Competitors_{it}$ measures the degree of market competition, which may affect the movie variety decision of a theater.¹¹ Log of per capita income at region r in year y , $\log(Income)_{ry}$, is also included, as an increase in income may positively affect product variety.

Since chain affiliation is not a primitive but rather a choice variable, there is a potential endogeneity concern. I attempt to address this issue by adding location and region-time fixed effects in the model.¹² Location fixed effects d_l control for unobservable time-invariant, location specific characteristics.¹³ Region-time fixed effects d_{rt} help resolve the identification issue by allowing factors that affect both chain affiliation and outcomes to change over time within regions. Hence, estimation of model (1) would be unbiased to the extent that chain affiliation is correlated only with unobservable factors that can be controlled for with these fixed effects. Note that the effect of regional income per capita can not be separately identified when the region-time fixed effects are controlled for. Therefore, I replace them with time fixed effects, when regional per capita income is included in the model. Lastly, theater and time specific error term u_{it} contains unobservable factors affecting theater i ’s decision on movie variety.¹⁴

I estimate model (1) using observations from 21 theaters with organizational form change. To help with the estimation, I also include the data on theaters that had been under independent ownership during the sample period. The first two columns of Table 3 show the OLS estimation results of model (1), while the next two columns show the fixed effects estimators.¹⁵ Comparison of the results reveals that controlling for unobservable location-specific characteristics changes the size of the coefficients for most variables, and therefore, OLS estimation results would be biased. Estimation results indicate that movie variety in a theater increases when the theater is affiliated

¹¹While decreases in sales would motivate retailers to reduce the number of products they offer (business-stealing effect), retailers may also have an even stronger incentive to offer wider product variety in order to attract more consumers (market-expansion effect). See Anderson and de Palma (1992), Anderson and de Palma (2006), and Cachon et al. (2008) for theoretical models of product variety competition among multi-product firms.

¹²Hastings (2004) uses a similar specification, including both station-level and city-time level fixed effects, and estimates the price effect of the conversion of independent Thrifty stations into dealer-run (and also company-op) ARCO stations in 1997.

¹³Note that they are different from theater fixed effects in that two theaters can be in the same location when one replaces the other.

¹⁴I estimate the model with robust standard errors clustered by theater.

¹⁵OLS estimation of model (1) includes a dummy *Seoul* that is equal to one if the theater is located in Seoul, given the higher admission prices in Seoul shown in Table A-1.

Table 3: Movie variety and chain affiliation

Variable	OLS		Fixed Effects	
	(1)	(2)	(3)	(4)
Chain	0.120 (0.036)***	0.115 (0.043)***	0.055 (0.015)***	0.059 (0.014)***
Screens	0.136 (0.011)***	0.136 (0.011)***	0.067 (0.014)***	0.074 (0.015)***
Competitors	-0.004 (0.011)	0.007 (0.013)	0.009 (0.011)	0.012 (0.011)
log(Income)	0.133 (0.244)		0.459 (0.240)*	
Opening week	-0.265 (0.066)***	-0.293 (0.061)***	-0.308 (0.064)***	-0.304 (0.061)***
Closing week	-0.491 (0.098)***	-0.490 (0.098)***	-0.454 (0.090)***	-0.457 (0.091)***
Renovation week	-0.241 (0.079)***	-0.229 (0.085)***	-0.166 (0.045)***	-0.145 (0.044)***
Fixed effects				
Location	No	No	Yes	Yes
Time	Yes	No	Yes	No
Region \times Time	No	Yes	No	Yes
R-squared	0.691	0.757	0.866	0.892
Observations	11,671	11,671	11,671	11,671

The log of the weekly number of movies playing in a theater is the dependent variable in all specifications. Standard errors (clustered by theater) are in parentheses. The notation *** indicates significance at 1% level, ** at 5% level, * at 10% level.

with a chain. Specifically, chain affiliation induces the weekly number of movies playing in the theater to increase by 6 percent. This finding suggests that the marginal cost of product variety goes down when an independent theater becomes affiliated with a chain, resulting in increased movie variety.

Additionally, while theater capacity measured by the number of screens positively affects movie variety, there is no evidence that a theater adjust its movie variety in response to entry of new competitors.¹⁶ A 1 percent increase in income per capita leads to a 0.5 percent increase in movie variety, which is consistent with the conjecture that the demand for variety increases as income rises. Additionally, theaters play fewer movies in their first and last weeks of business as well as during weeks right before and after a temporary shutdown.

Next, I examine the effect of chain affiliation on admission price using the same specification as model (1), only replacing the dependent variable with the log of the weekly average admission price, $\log(\text{Price})_{it}$. The OLS estimates of the chain affiliation coefficient provided in the first two columns of Table 4 are not statistically significant. After controlling for unobservable location-specific characteristics, however, I find evidence that chain affiliation positively affects admission

¹⁶The results are qualitatively the same when the number of competitors' screens is used as a measure of the degree of competition instead of the number of competitors.

Table 4: Admission price and chain affiliation

Variable	OLS		Fixed Effects	
	(1)	(2)	(3)	(4)
Chain	-0.007 (0.009)	-0.002 (0.009)	0.010 (0.006)*	0.015 (0.005)***
Screens	0.001 (0.001)	0.003 (0.001)**	-0.001 (0.002)	0.001 (0.002)
Competitors	0.002 (0.002)	0.000 (0.002)	-0.006 (0.003)*	-0.002 (0.002)
log(Income)	-0.002 (0.039)		-0.100 (0.100)	
Opening week	0.003 (0.012)	0.004 (0.013)	0.007 (0.009)	0.003 (0.010)
Closing week	-0.017 (0.012)	-0.018 (0.012)	-0.007 (0.012)	-0.008 (0.012)
Renovation week	0.011 (0.008)	-0.001 (0.007)	0.004 (0.009)	0.000 (0.012)
Fixed effects				
Location	No	No	Yes	Yes
Time	Yes	No	Yes	No
Region \times Time	No	Yes	No	Yes
R-squared	0.387	0.580	0.791	0.877
Observations	11,671	11,671	11,671	11,671

The log of the weekly admission price in a theater is the dependent variable in all specifications. Standard errors (clustered by theater) are in parentheses. The notation *** indicates significance at 1% level, ** at 5% level, * at 10% level.

price; it rises by 1.5 percent when the theater is affiliated with a chain. The increase in admission price suggests that the market power of an independent theater increases when it becomes chain-affiliated.

The fixed effects estimators in Table 4 also show that, consistent with previous findings (Davis, 2005), the effect of competition on price is small in magnitude and not statistically significant. Moreover, admission price is not responsive to changes in other theater and market characteristics such as theater capacity and income. Given this rigidity of admission price, it is surprising that chain affiliation results in a price increase.

I check the robustness of these outcomes by considering observations from weekdays and weekends separately, and first-run movies only. Due to the trade-off between depth (number of seats allocated to a movie) and breadth (movie variety), an increase in movie variety may be harmful for some consumers, especially when movie demand is high. Focusing only on weekdays observations would relieve this concern, as consumers may always find a seat for their favorite movies on weekdays. In contrast, it is also of interest to analyze the effect of chain affiliation on movie variety and admission price when the demand is high and hence more consumers are affected.¹⁷ A theater

¹⁷Weekend movie demand is much higher than weekday movie demand. During 2007, for instance, the average daily audience size of all theaters in Korea on weekdays, 300,000, was nearly half of that on weekends, 570,000.

may hold special events such as film festivals, celebrating its anniversaries and playing abnormally many movies. Focusing on first-run movies would eliminate the outliers in the data. For example, Table 2 shows that the maximum value of movie variety in the data decreases from 68 to 34 when only first-run movies are considered.

Table A-2 in the appendix presents estimates of the chain affiliation coefficient. While the effect on movie variety of chain affiliation seems not to vary between weekdays and weekends, the price effect is significant only on weekends (2.5 percent increase). These results suggest that consumers on weekends may be less price sensitive, so that a theater would exert its increased market power after chain affiliation more on weekends. The results in the bottom row of the table also reveal that the previous findings are not driven by outliers.

3.2 Cross-sectional evidence

As argued before, model (1) controls for endogeneity to the extent that chain affiliation may be correlated with the persistent attractiveness of the location or time-varying, region-specific factors. Here, I further verify the robustness of the results by using the instrumental variables approach. I propose two instrumental variables based on the strategic behavior of theater chains described earlier in the previous section.

Note that chain affiliation depends not only on the independent owner's decision of whether to keep operating her theater independently or to become a franchisee, but also on the decision of a chain, that is, whether to make a franchise contract with the owner or open a new company-owned theater.¹⁸ The franchising literature (Kalnins and Lafontaine, 2004; Kosova et al., 2013) shows that corporate outlets (and franchisees) are geographically clustered. This implies that in regions where chains cluster their company-owned theaters, an independent theater owner may find it more difficult to become a franchisee. Therefore, as the first instrument for chain affiliation, I use the proportion of the number of company-owned theaters within the region (where a focal theater is located) among all regions.¹⁹ The second instrument is an indicator of whether the theater is located in one of the seven metropolitan cities or Gyeonggi province. It is expected that independent theater owners in the metropolitan cities or in SMA may be more likely to keep the business independently, given that chains tend to establish company-owned theaters in these regions and franchise theaters in other regions. To verify this point from the data, I use the information on the organizational form of chain theaters, available for 2008. Table 5 presents the organization forms of chain theaters by region. Consistent with the anecdotal evidence, 62 percent of 124 chain theaters located in the metropolitan cities or in SMA are company-owned, whereas it is only 33 percent in other provinces.

¹⁸Alternatively, the chain can take the independent theater's ownership. However, as previously described, chains in Korea typically operate new theaters corporately, while replacing existing independent theaters by franchising them. Therefore, I exclude this case from the analysis.

¹⁹For instance, there are 93 company-owned chain theaters nationwide in December 2008 and 25 of them (26.9 percent) are located in Seoul. Estimation results are similar when the proportion of company-owned theaters among all chain theaters in a region is considered as an alternative instrument.

Table 5: Organizational form of chain theaters across regions

Organizational form	Region	
	Major cities and SMA	Other provinces
Company-owned	77 (62.1%)	16 (32.7%)
Franchised	47 (37.9%)	33 (67.3%)
Total	124 (100%)	49 (100%)

I consider a cross-sectional study, analyzing the movie variety and admission price of 62 independent theaters and 80 franchisees in December 2008.²⁰ I instrument the binary chain affiliation variable with the two variables introduced above in the following cross-sectional specification

$$\log(y)_i = \beta Chain_i + \mathbf{x}_i\kappa + u_i, \quad (2)$$

in which I use the log of the number of movies and the log of admission price as the dependent variable one by one. The \mathbf{x} vector includes *Screens*, *Competitors*, $\log(Income)$, and a dummy *Seoul* that is equal to one if the theater is located in Seoul, as well as the constant term.²¹

For comparison, I report OLS results in the first two columns of Table 6. They show that chain theaters tend to play 16.5 percent more movies and charge 1.8 percent higher prices compared to independent theaters. Next, given that *Chain* is a binary variable, I use the two-step IV method: first, estimating a probit model and obtaining the fitted probabilities, \widehat{Chain} , and second, estimating model (2) by 2SLS using \widehat{Chain} as an instrument. The probit estimates presented in Table A-3 in the appendix show that chain affiliation is more correlated with the second instrument than with the first one. The IV estimates of the chain affiliation effects in the last two columns of Table 6 are larger in magnitude than the OLS estimates, but the statistical significance is smaller.²²

In addition, movie variety is positively affected by theater capacity, while admission price is 6 percent higher in Seoul potentially due to price discrimination by chains. Also, consistent with the previous findings, neither movie variety nor admission price is affected by competition.

3.3 Disentangling the effects of vertical integration and chain affiliation

One concern regarding the analysis so far is that the findings may result not only from chain affiliation, but also from vertical integration since most chain theaters are vertically integrated with distributors in Korea.

To shed light on the effect of chain affiliation per se, I exploit Macquarie’s acquisition of the theater chain Megabox in July 2007 and employ a difference-in-differences approach. Before the

²⁰They are the averages of the weekly number of movies and prices for the four weeks in that month. I do not use observations from earlier months, because the organizational form might be changed for some chain theaters.

²¹Variables *Opening week*, *Closing week*, and *Renovation* are not included in the model, as there were no such cases in December 2008.

²²I estimate and report the usual 2SLS standard errors (clustered by market) in Table 6, as they are known to be asymptotically valid (Wooldridge, 2010). Bootstrap estimates of the standard errors (100 cluster bootstrap replications) are qualitatively the same.

Table 6: Cross-sectional analysis

Variable	OLS		Two-step IV	
	Variety	Price	Variety	Price
Chain	0.165 (0.039)***	0.018 (0.007)***	0.292 (0.166)*	0.091 (0.045)**
Screens	0.130 (0.015)***	0.003 (0.001)*	0.127 (0.013)***	0.001 (0.002)
Competitors	-0.005 (0.009)	-0.002 (0.002)	-0.002 (0.010)	-0.000 (0.004)
log(Income)	0.063 (0.156)	0.006 (0.025)	0.072 (0.146)	0.011 (0.033)
Seoul	0.106 (0.075)	0.059 (0.012)***	0.112 (0.073)	0.063 (0.017)***
Constant	0.587 (1.579)	8.684 (0.244)***	0.429 (1.503)	8.593 (0.335)***
Observations	142	142	142	142

The table presents results from cross-sectional regressions. Standard errors (clustered by market) are in parentheses. In the two-step IV procedure, (i) the proportion of the number of company-owned theaters within the region (where a focal theater is located) among all regions, and (ii) an indicator of whether the theater is located in one of the seven metropolitan cities or Gyeonggi province are used as instruments for *Chain*. Bootstrap estimates of the standard errors (100 cluster bootstrap replications) in the case of the two-step procedure are qualitatively the same. The notation *** indicates significance at 1% level, ** at 5% level, * at 10% level.

acquisition, Megabox had been integrated with a distributor, Showbox. Therefore, by comparing the movie variety and admission price before and after the event, I can estimate the effect of vertical integration. For this purpose, I introduce Cinus, a non-integrated theater chain, as the control group. I argue that Cinus is more suitable as the control group than two other chains, CGV and Lotte. This is because as Table 1 shows, the number of Megabox theaters is the closest to the number of Cinus theaters, and therefore, other factors that may affect the outcomes, such as a scale effect, would be naturally controlled for. Consequently, I proceed to estimate the effect of vertical integration using the following specification

$$\log(y)_{it} = \gamma Megabox_i \times Disintegrated_t + \mathbf{x}_{it}\lambda + d_l + d_t + u_{it}, \quad (3)$$

in which y is either the number of movies or the weekly average admission price. A dummy $Megabox_i$ is equal to one if the theater belongs to the Megabox chain, while $Disintegrated$ is an indicator of whether time t occurs after the vertical disintegration. The coefficient γ measures the effect of vertical disintegration. The vector \mathbf{x}_{it} is the same as in model (1), including time varying theater and market characteristics. Location and time fixed effects d_l and d_t control for time-invariant, location-specific characteristics and time-varying factors common across all theaters such as seasonality in movie demand.

I first run the analysis for a window of six months before and after the acquisition. According to the results reported in Table 7, price increases by 1.7 percent, whereas there is no statistically

Table 7: Effect of vertical disintegration

Control group	6-month window		12-month window	
	Coeff.	Std. Err.	Coeff.	Std. Err.
<i>Dependent variable: log(Movies)</i>				
Cinus	0.029	(0.018)	0.017	(0.016)
CGV	-0.004	(0.013)	-0.020	(0.013)
Lotte	-0.016	(0.016)	-0.021	(0.013)
<i>Dependent variable: log(Price)</i>				
Cinus	0.017	(0.008)**	0.013	(0.008)
CGV	0.010	(0.009)	0.002	(0.010)
Lotte	0.004	(0.008)	-0.002	(0.010)

The table presents difference-in-differences estimates. The treatment group includes Megabox theaters, and theaters of Cinus, CGV, and Lotte are used as the control group one after another. A 6-month window denotes observations from 6 months before and 6 months after the acquisition of Megabox by Macquarie (similarly for the 12-month window). Standard errors (clustered by theater) are in parentheses. The notation *** indicates significance at 1% level, ** at 5% level, * at 10% level.

significant effect on movie variety. The price effect of vertical disintegration fades away, however, when a wider window of one year before and after the event is considered. As an additional robustness check, I use CGV and Lotte as the control group one after another and find no evidence of change in movie variety and admission price. As Gil (2015) points out, this may be due to a delay in management changes following disintegration after the vertical disintegration. He shows that ticket prices increased as a result of the vertical divestiture of theaters in the U.S. in 1948, but only after two years. In such a case, the analysis in this paper might underestimate the increase in price after chain affiliation.²³ In sum, the observed outcomes in the previous section – increase in movie variety and admission price – could be attributed to chain affiliation.

To look closely at the timing of any change in movie variety and admission price, I replace *Disintegrated* with a set of indicators for the months from January to December 2007, and interact each of them with *Megabox*. The estimated coefficients for the interactions are reported in Figure A-1 in the appendix. Comparison of price trends among theater chains reveals that movie tickets in Cinus theaters became relatively cheaper two months before the disintegration of Megabox. Therefore, the price increase reported in Table 7 when Cinus theaters are used as the control group might not be incurred by the vertical disintegration. As for movie variety, there seems to be no visible difference in the trends between the treatment and control groups either before or after the disintegration, giving credibility to the difference-in-differences estimation results.

²³This may also be due to the complex nature of the acquisition. Mediaplex sold Megabox to Macquarie for US\$156.5 million. Under the agreement, however, Mediaplex would continue to operate Megabox theaters for the next two years in return for US\$10.8 million and additional incentives. “Megabox Sold to Foreign Investors”, *The Chosunilbo*, July 19, 2007.

4 Conclusions

The growth of chains in retail and service industries in recent decades arouses a concern regarding those industries becoming more concentrated. Despite its importance, however, empirical studies on the implication of chain affiliation are rare. This paper fills the gap in the particular context of the movie theater industry. Using rich panel data on weekly screening schedules and admission prices of theaters as well as changes in their organizational form, I study the effect of chain affiliation on movie variety and admission price.

The results show that chain affiliation induces both movie variety and price to increase. Specifically, the weekly number of movies playing in the theater increases by 6 percent and admission price rises by 1.5 percent after chain affiliation. The results are robust to the potential endogeneity of chain affiliation and taking into account vertical integration between exhibition and distribution in the Korean movie theater industry.

These findings suggest that the regulatory authorities should cautiously consider the effect of chain affiliation on potential efficiency gains as well as on prices when evaluating the implication of chain affiliation. While product variety is considered as a proxy for efficiency gains in this paper, quantifying the non-price effect of chain affiliation using other measures of efficiency gains would be an interesting topic for future research.

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Appendix

Table A-1: Regional average admission prices

Region	Average Price (KRW)	Relative price (%)
<i>Metropolitan cities</i>		
Seoul	6,794	100.0
Busan	6,069	89.3
Daegu	6,332	93.2
Daejeon	6,204	91.3
Gwangju	6,379	93.9
Incheon	6,556	96.5
Ulsan	6,393	94.1
<i>Provinces</i>		
Gyeonggi	6,439	94.8
Chunbook	6,198	91.2
Chungnam	6,297	92.7
Jeju	6,762	99.5
Jeonbook	6,462	95.1
Jeonnam	6,492	95.6
Kangwon	6,502	95.7
Kyungbook	6,563	96.6
Kyungnam	6,119	90.1

Table A-2: Robustness

The analysis considers:	Variety Analysis		Price Analysis	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Weekdays	0.060	(0.014)***	0.008	(0.005)
Weekends	0.063	(0.014)***	0.025	(0.007)***
First-run movies	0.060	(0.013)***	0.015	(0.005)***

The table presents fixed effects estimates of the chain affiliation effect on movie variety and admission price, considering observations from (i) weekdays and (ii) weekends separately, and (iii) first-run movies only. Standard errors (clustered by theater) are in parentheses. The notation *** indicates significance at 1% level, ** at 5% level, * at 10% level.

Table A-3: First stage probit estimates

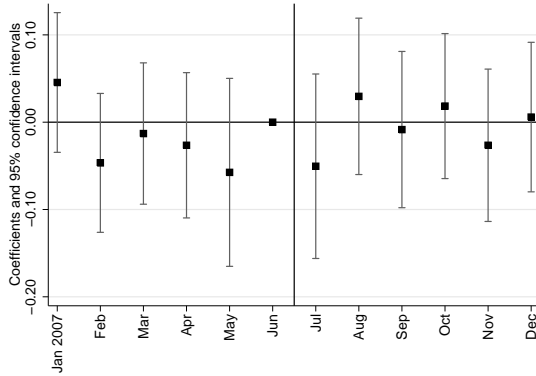
Variable	(1)	(2)	(3)
Screens	0.046 (0.044)	0.048 (0.045)	0.049 (0.045)
Competitors	-0.080 (0.075)	-0.071 (0.075)	-0.069 (0.075)
log(Income)	-0.015 (0.883)	-0.597 (0.876)	-0.673 (0.924)
Seoul	0.221 (0.513)	0.279 (0.493)	0.245 (0.510)
First instrument	-0.025 (0.014)*		0.005 (0.021)
Second instrument		-0.634 (0.254)**	-0.705 (0.382)*
Constant	0.406 (8.771)	6.289 (8.748)	7.022 (9.200)
Log likelihood	-94.493	-92.823	-92.792
Observations		142	

The table presents probit estimates of the two-step IV procedure. Standard errors (clustered by market) are in parentheses. The notation *** indicates significance at 1% level, ** at 5% level, * at 10% level.

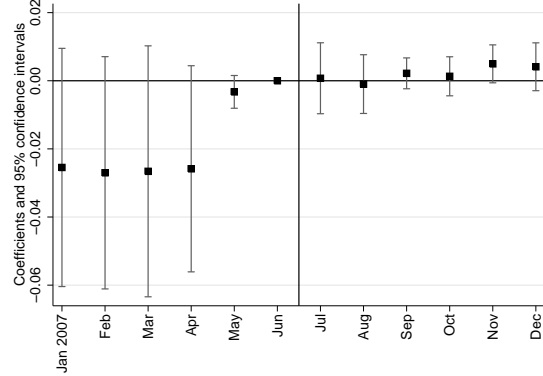
Figure A-1: Pre-treatment trends

Control group: Cinus

(i) Movie variety

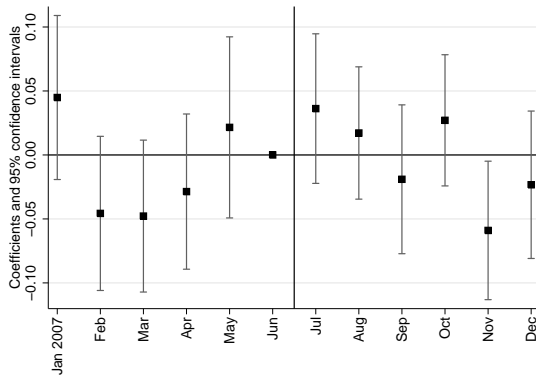


(ii) Admission price

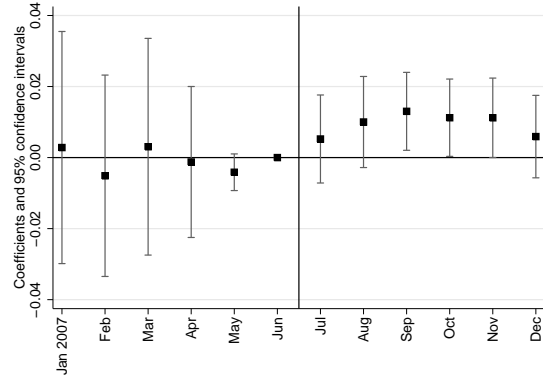


Control group: CGV

(iii) Movie variety

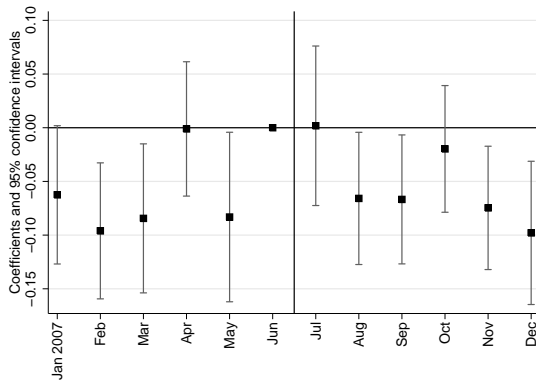


(iv) Admission price

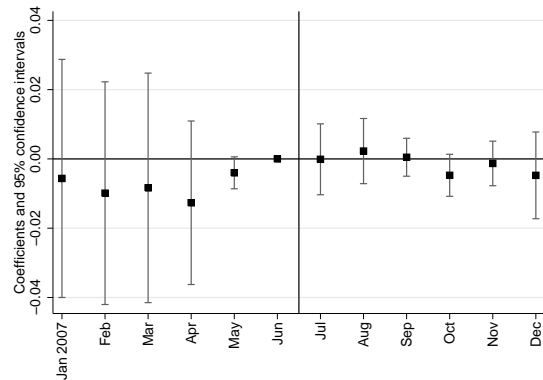


Control group: Lotte

(v) Movie variety



(vi) Admission price



The three panels of the figure present movie variety and price trends of the treatment group relative to the control group. Megabox is the treatment group while three theater chains Cinus, CGV, and Lotte are used as the control group one by one.