



The Effects of Vertical Integration in the Korea Movie Industry: Efficiency Versus Exclusion

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Abstract

This paper tries to verify empirically whether vertical integration results in efficiency or exclusion in the Korea movie industry. We gathered a large panel data set—260 movies in 584 theaters—from recent movie screenings and vertical integration between the years 2013 and 2018, and tested whether exhibitors exclude non-affiliate competitors' movies, or whether exhibitors screen more movies that take advantage of vertical integration in terms of enjoying information advantages, aligning incentives, or reducing transaction costs. The effects on screening frequency of production-and-distribution-integrated movies that are not affiliated with exhibitors play a critical role in determining the identification criterion in our test. Our results may be better explained by the efficiency effects of vertical integration rather than exclusionary effects in the Korea movie industry.

Keywords Vertical integration · Efficiency · Exclusion · Korea movie industry

JEL Classification L14 · L22 · L82

1 Introduction

It has been a traditionally important issue in industrial economics whether vertical integration may enhance efficiency or induce exclusion. There are many reasons for the efficiency of vertical integration: e.g., simple technical advantages; the elimination of externalities, such as double marginalization; economies in various types

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of transaction costs that are related to information, incentives, or bargaining; etc.¹ On the other hand, the mechanism of vertical exclusion or foreclosure is mostly explained in terms of raising rivals' costs in various ways.² Since theories abound, it is a challenging task to identify the effects of vertical integration in a specific industry.³

The issue has shown to have practical consequences in the movie industry in Korea and elsewhere. In the landmark Paramount decision, the U.S. Supreme Court forced the vertical divestiture of movie theater chains, purporting to mitigate exclusionary concerns with respect to the old Hollywood integrated studio system.⁴ Recently, the Korea Fair Trade Commission (KFTC) issued cease-and-desist orders in unfair practice cases of vertical foreclosure, such as exhibitors' favorable treatments of affiliated distributors' movies in terms of allocating screening frequency and spaces, and marketing activities.⁵

In this paper, we try to verify empirically whether vertical integration results in efficiency or exclusion in the Korea movie industry, using Korea Box-office Information System (KOBIS) data from 2013 to 2018. The main contribution of this paper is to differentiate between the effects of vertical integration on efficiency or exclusion in the Korea movie industry by considering the production stage in the vertical chain as well as distribution and exhibition. Since many firms are involved in the vertical chain of a movie, we can consider various types of vertical integrations such as production–distribution–exhibition (PDE), distribution–exhibition (DE), and production–distribution (PD) on the level of movies.

In our empirical framework, the effect of PD integration on the screening decision of an exhibitor plays the discriminant role in identification: An exhibitor's screening of its own DE or PDE integrated movies more than independent ones may be interpreted as the result of either efficiency or exclusion, while an exhibitor's screening of non-affiliated PD movies rather than others should be reasonably interpreted as the result of efficiency rather than exclusion.

This paper finds evidence that vertical integration increases efficiency in terms of screening allocation. All types of vertical integration of movies as well as the reduced number of participating firms have positive effects on daily screening frequency.⁶ These results suggest that the efficiency of allocating movies is enhanced as the integration is tightened. In particular, the positive effect is strengthened during

¹ The selected references are Coase (1937), Williamson (1971), Klein et al. (1978), and Holmstrom (1999).

² In the US cable television industry, Chipty (2001) found that the vertical integration between premium services and cable operators decreased the rival program services, but the exclusionary effect was offset by efficiency gains. Chen and Waterman (2007) also found the strategic behavior of integrated firms that placed rival networks in the program tier having more limited subscriber access.

³ See Lafontaine and Slade (2007) for a comprehensive survey of the empirical studies on vertical integration.

⁴ *United States v. Paramount Pictures, Inc.*, 334 U.S. 131 (1948).

⁵ KFTC (2015a, 2015b) Decision No. 2015–070 and No. 2015–125.

⁶ This study focuses on theaters' decisions as to daily screening frequencies rather than distributors' decisions as to film release. This is because the latter does not matter since most movies are distributed to three multiplex chains of theaters in Korea. In fact, there is no evidence that vertical integration has significant positive effects on film releases in our sample.

the weekend in the case of PD movies. This finding supports that theaters favor vertically integrated movies due to efficiency rather than for exclusionary purposes.

The remainder of the paper is organized as follows: Section 2 describes the motion picture industry and related studies. Section 3 explains the data and our empirical strategy. Section 4 provides the main empirical findings and discusses the implications of the results. Section 5 concludes.

2 Industry Background and Related Literature

Several features of the Korea movie industry are relevant to this study: First, vertical integration among three contiguous stages of production, distribution, and exhibition is significant, as is horizontal concentration in each stage. Currently, the dominant firms are two large conglomerates: *CJ* and *Lotte Shopping*.⁷ Their audience market shares in 2018 were around 49.3% and 28.9%, respectively in exhibition, and 13.3% and 17.1%, respectively in the distribution, according to the Korean Film Council (KOFIC, 2019).⁸ Even though there are numerous small producers, the two conglomerates also take a significant part in production and investment – especially in Korean “blockbusters”.

Second, many firms are involved at each stage, and different combinations of firms take part in each movie. For example, a movie may be produced by multiple firms, distributed jointly by several agencies, and then exhibited in vertically integrated theaters as well as in independent theaters. Hence, it is more appropriate to consider vertical integration at the level of movies rather than of firms.

Third, contracts are on an individual movie basis rather than “block booking”. After a distributor holds a preview conference of its movie for exhibitors, the distributor signs a screening contract for the film with any interested exhibitor. There is no bidding process for the contract. The exhibitor—which has bargaining power vis-a-vis the distributor—decides on the daily screening frequencies of the movies at all of its nationwide theaters. Thus it is called a “free booking” contract. Since an integrated movie may be shown in non-affiliated theaters as well as in integrated theaters, we observe various combinations of vertical integration for a movie at the same time.

⁷ *CJ* has the largest multiplex theater chain – *CGV* – and a top distributor: *CJ E&M*; *Lotte Shopping* has the second-largest theater chain – *Lotte Cinema* – and a distributor: *Lotte Entertainment*. *Orion* was another major entity that had vertical chains within the movie industry until July 2007. But it subsequently sold its theater chain (*Megabox*), and kept only a distributor (*Showbox*); and *Megabox* was merged with a minor integrated distributor in 2011. *CineQ* – the integrated theater chain that is owned by a distributor (*NEW*) – entered the exhibition market in 2017.

⁸ A multiplex theater chain – *Megabox* – has the largest remaining share in exhibition; and five companies – including *CJ* and *Lotte* – together have about a 63% share of distribution. The high concentration at the exhibition (theater) stage enables us to test whether integrated theaters intend to extend their market power into the relatively competitive upstream stages.

Fourth, ticket prices are uniform for all movies even though there exists some price discrimination that depends on time-of-day and the age of the customer. Also, the ratio of sharing revenue for a movie is fixed at around half and half between the distributor and the exhibitor,⁹ and then distributors share their half with investors and producers at a fixed rate.¹⁰ Since the exhibitor's revenue share is fixed at half regardless of the number of participating firms in the movie, if theaters increase the screening allocation of a movie as the number of participating firms in the vertical structure decreases, there may be some efficiency implications in terms of bargaining or incentives.

We take advantage of these features in the Korea movie industry in identifying the effects of vertical integration. Due to the (arguably) exogenously given structure of uniform price and fixed sharing ratio, we can evaluate the effect of vertical integration on supply-side decision variables that are time- or quantity-related, such as: release (Corts, 2001); run length (Chisholm & Norman, 2006; Fu, 2009; Gil, 2009); screening frequency (Chung et al., 2018); and theater space (Gil, 2007).

There are some writings on the efficiency motives and effects of vertical integration. Gil (2007, 2009) found empirical evidence that vertical integration can internalize contractual distortion between up- and downstream firms in the Spanish motion picture industry. Corts (2001) used data from the US movie industry and explored the effects of common vertical partners on competition, as measured by release-date scheduling; he ultimately concluded that films that share common producers and distributors could internalize the negative externalities. Although that study investigated the vertical structure including the production stage that had been neglected in previous studies, its focus was on competition rather than on vertical integration itself. Chisholm and Norman (2006) was in a similar vein.

Chung et al. (2018) and Choi et al. (2019) found positive effects from DE integration on screening in the Korea movie industry: The former regarded it as evidence of efficiency enhancement, while the latter regarded it exclusion. This disparity arises because raising rivals' cost occurs in a way that limits output using the integrated theaters.¹¹ These works share with ours the dependent variable of screening frequency of movies and the data source from KOBIS. But there does not exist the discriminant factor of PD integration in their empirical models. And the contrary explanation of exclusion is not out of the question in the former, and vice versa. Furthermore, we differentiate the degree of integration by computing the number of participating firms in the vertical structure, while those studies consider only whether the distributor of a movie is integrated with the exhibitor or not.

⁹ By comparison, the ratio for exhibitors decreases with the run length of a movie in many other countries: e.g., in the U.S., see De Vany and Walls (1997).

¹⁰ The revenue-sharing ratio between distributor and exhibitor may vary slightly according to the nationality of a movie, the identity of the theater chain, and the region, etc. Distributors appropriate a 10% commission from their share, and then allot the remainder to investors, which share with producers residual profits at a 60:40 split after paying total production costs according to contract specifications.

¹¹ If integrated theaters show non-affiliated films or rival films less frequently than they show their affiliated films, it reduces the output and revenues of competing upstream firms. It is related to the idea of customer foreclosure (Riordan & Salop, 1995).

3 Data and Empirical Framework

We constructed a panel set of daily screening data that cover 260 Korean movies in 584 theaters nationwide that were screened between the years 2013 and 2018.¹² The data are obtained from the Korea Box-office Information System (KOBIS), movie web pages, and online articles, and cover the information on movies such as producer, distributor, production cost, genre, and other characteristics. The data set is only for Korean movies in order to take into account the implications of vertical integration into the production stage.

We consider only the screening decision that is made in the first week of release. After the opening week, exhibitors may adjust screening decisions in accordance with the revealed preferences in the market. And the effects of vertical structure on screening may become diluted as time goes on. Hence, by focusing on the first-week screening data, we can analyze the effects of vertical integration more clearly.

The number of firms involved that are in a movie measures the degree of integration at either the horizontal or the vertical level. A set of firms in production (P), distribution (D), and exhibition (E) cooperate for a movie to be screened in a theater. The number of firms varies for two reasons: First, multiple firms may join each stage of production and distribution. Co-producers or co-distributors can share the burden of financing or divide the roles.¹³ Second, the number of firms also depends on vertical integration. For example, full vertical integration reduces the number to 1.¹⁴ A smaller number of firms that are involved in a movie may induce greater daily screening frequency because of either efficiency or exclusion that is consistent with the greater degree of integration.

We define the type of vertical integration at the level of a movie rather than at the level of firms: PDE, DE, PD, and PE.¹⁵ Table 1 shows the basic statistics of our data. Daily screening frequencies are about 10 on average, with the max value of 77 that must have been shown in a multiplex theater. The observations of some form of vertical integration account for 28 percent of the total.¹⁶ A smaller number of firms participate in those cases of integration than when the movie is shown by an independent theater; and this is especially so when a movie is affiliated (PDE or DE) with a theater. PDE has the smallest number of firms, but it is still larger than two on average because even a PDE movie is often produced by several firms.

¹² We considered only commercial movies that attracted audiences of more than 300,000.

¹³ In our sample, the number of producers per movies is 1.5 on average; the maximum is four. The number of distributors is either one or two.

¹⁴ For example, if a movie that is produced and distributed only by CJ E&M is shown at a CGV theater, then the number of firms is one. However, if it plays at an independent theater or other chains, the number of firms is two.

¹⁵ In our sample, there exists only one movie that was produced and exhibited (PE) by affiliated firms. This eccentric film was not included in our analysis. It seems that efficiency gains may be insignificant in the case of integration between remote stages.

¹⁶ In terms of the number of films, production–distribution integrated films from theater owners account for 7.3%, films not integrated with production and distribution stages, but distributed from theater owners account for 50.8%, and production–distribution integrated films from companies who have no theaters account for 5.8%.

One of the important issues in estimating the effects of vertical integration is how to control for the quality of films appropriately. Theaters will more often screen high-quality movies that are expected to succeed in the box-office. And the extent of integration in a movie may be positively correlated with the quality of a movie. Hence, we should control for the expected quality of a movie before the release date to reduce the endogeneity problem. We use word-of-mouth, production cost, and other movie characteristics as control variables. Word-of-mouth is measured as the star rating and the number of people who reviewed a film, which was collected before the release date to measure the ex-ante quality.¹⁷

Equation 1 is the empirical model of daily screening frequency:

$$\begin{aligned}
 Y_{ijt} = & \alpha + \beta_1 PDE_{ij} + \beta_2 DE_{ij} + \beta_3 PD_{ij} + \gamma_1 PDE_{ij} \times firm_{ij} + \gamma_2 DE_{ij} \times firm_{ij} + \gamma_3 PD_{ij} \times firm_{ij} \\
 & + \delta_1 PDE_{ij} \times wknd_t + \delta_2 DE_{ij} \times wknd_t + \delta_3 PD_{ij} \times wknd_t \\
 & + \lambda firms_{ij} + X_i \rho + c_j + \tau_t + \theta_{it} + \varepsilon_{ijt}
 \end{aligned}
 \tag{1}$$

Dependent variable Y_{ijt} is the daily screening frequency of movie i in theater j on the day of the first week t . The three vertical integration indicators are as follows: PDE_{ij} is a dummy variable for PDE vertical integration, which is 1 if movie i is produced, distributed, and exhibited by vertically affiliated firms that are all affiliated with theater j ; DE_{ij} is 1 if movie i is produced by a firm that is not affiliated to theater j , and then is distributed and exhibited by firms that are affiliated to theater j ; and PD_{ij} is 1 if movie i is produced and distributed by affiliated firms, but that are not affiliated with theater j . All of these vertical integration dummy variables are zero otherwise.

$firm_{ij}$ is the number of independent firms that participate in various stages of movie i exhibited at theater j ; the smaller it is for a given type of vertical integration, the stronger is the same type of vertical integration.¹⁸ The product of $firm_{ij}$ with the vertical integration dummy variables are included in Eq. 1 in order to differentiate the effects of the same type of vertical integration depending on how many firms are involved. $wknd_t$ is the dummy variable for the weekend. Its products with the vertical integration dummy variables are included to examine whether vertically integrated exhibitors favor their own movies more on weekends when the box-office revenue increases. X_i includes production costs, word of mouth, and other movie characteristic variables. We also use various fixed effect variables such as theater (c_j), duration (θ_{it}), and time dummy variables (τ_t).¹⁹

¹⁷ Distributors may manipulate strategically the star-rating and reviews. This measurement issue is resolved in Sect. 4.2 by controlling for the movie fixed effect.

¹⁸ E.g., $PDE_{ij}=1$ with $firm_{ij}=1$ implies stronger vertical integration than for $PDE_{ij}=1$ with $firm_{ij}=6$, since five non-affiliated independent firms participate either in production or in distribution in the latter case.

¹⁹ Duration is a variable that indicates how many days have elapsed from a movie's release date in the theater, which has a value between zero and six because the data cover only the first week of release. We used the discrete variable as fixed effects indicating each elapsed day. Time fixed effects are year-by-month and day-of-week dummy variables.

Table 1 Basic Statistics

Variable	Obs [*]	Mean	Std. Dev	Min	Max
Daily screening frequencies	634,551	9.76	6.17	1	77
<i>Vertical integration dummy variable</i>					
PDE	634,551	0.03	0.16	0	1
DE	634,551	0.15	0.36	0	1
PD	634,551	0.10	0.31	0	1
# of Firms	634,551	3.29	0.79	1	6
Independent	455,972	3.48	0.67	3	6
PDE	16,415	2.29	0.66	1	4
DE	96,456	2.50	0.67	2	5
PD	66,442	3.36	0.82	2	5
Weekend (Sat-Sun) Dummy Variable	634,551	0.29	0.45	0	1
Production Cost (unit: 100 million won)**	587,601	87.45	71.73	3.67	680.86
# of People Who Review a Film***	632,380	977.78	2003.74	18	26,710
Star Rating***	632,380	8.46	0.98	2.95	9.81
Holiday Dummy Variable	634,551	0.07	0.25	0	1
Duration	634,551	3.00	2.00	0	6

*In the KOBIS screening data, a movie is matched with a theater at the day of first week in each observation

**Production cost data were obtained from online news articles

***Star rating and review data were obtained from NAVER's movie web site (the biggest portal site in Korea), and only the data that were posted before a movie's release were used

Table 2 indicates our empirical strategy of testing hypotheses on the effect of vertical integration with the expected signs of the estimated coefficients. Exhibitors may increase their own (PDE or DE) movies either through enhancing efficiency due to incentive alignment and/or transaction cost saving, or with the simple purpose of excluding competitors. Hence, PDE_{ij} and DE_{ij} by themselves do not discriminate between efficiency and exclusion. However, PD_{ij} —which represents movies that are produced and distributed by integrated firms, but that are not related with exhibitors—has the cutting edge of identification.

Vertically integrated PD movies, which are exhibited by non-related firms, can enjoy the benefit of efficiency enhancement,²⁰ but may be excluded by competing exhibitors. If an integrated theater wants to exclude its affiliate distributor's competitor, then it may reduce screening frequency of unrelated PD movies. At the least, there is no incentive for the theater to play PD movies more unless efficiency gains

²⁰ PD integration may facilitate the coordination in two stages, and the consequent cost-saving can be passed on to the screening stage by offering favorable conditions to the theater in the various terms of contract, such as the method of payment and other ancillary conditions beside revenue sharing. Also, exhibitors may interpret PD integration as a signal of good movies.

exist. Therefore, we expect the direction of PD effects on screening frequency will be negative or insignificant when the exclusion hypothesis holds.

It may be more difficult to enhance efficiency through vertical integration as the number of firms involved increases, since this increase may complicate incentive alignment, coordination, and bargaining. On the other hand, the effects of exhibitors' favoring their own movies and excluding rival movies will be more conspicuous during weekends. It is related to the strategic foreclosure to place affiliated films more on the weekend with access to larger audiences (Chen & Waterman, 2007; Chung et al., 2018).

4 Empirical Results

4.1 Main Results

Table 3 shows our main results. The dependent variables in columns (1) to (4) are daily screening frequency in the whole day, while the peak time from 4 to 10 pm is shown in columns (5) to (8). The subsample analysis for peak time is to measure the quality of screening frequency since theaters can make a larger profit at the peak time.²¹ It can be evidence of exclusion if an integrated theater plays its affiliate films more often during the peak time. So, we consider not only the quantity (frequency) of screening in columns (1) to (4) but also the quality of screening in columns (5) to (8).

Columns (3) and (7) show the estimation results of our baseline model in Eq. 1, while columns (4) and (8) show the estimates when the dependent variable is logged. Other columns report the results in preliminary stages. We will interpret our results mainly in terms of (3). First, the signs of the PD coefficients have the critical role of hypothesis identification, as is highlighted in Table 2. All of the estimated coefficients of PDE, DE, and PD are significantly positive; this is a result that is consistent with the efficiency hypothesis, rather than the exclusion hypothesis, as is indicated in Table 2.

More specifically, the estimated coefficient of PD is positive, sizable, and significant – which is contrary to what the exclusion hypothesis predicts. Further, it is worth remembering that both PD and DE represent vertical integration with two contiguous stages, though the integrated stages are different. By comparing the estimate of DE, where both efficiency and exclusion effect can exist, and the estimate of PD, where only efficiency enhancement appears, we suggest that the exclusionary behavior is not considerable. And the estimated coefficient of PDE is significantly larger than that of PD or DE. This shows that daily screening frequency increases more when the three stages are fully integrated.

²¹ The peak time is defined as 4–10 pm based on the movie start time because theater chains such as CGV generally set this time zone as the peak time and receive higher ticket prices. We also used another window from 6–9 pm for the robust check, and it does not change the main result.

Table 2 Strategy of hypothesis test

	PDE_{ij} DE_{ij}	PD_{ij}	$PDE_{ij} \times firm_{ij}$ $DE_{ij} \times firm_{ij}$ $PD_{ij} \times firm_{ij}$	$PDE_{ij} \times wknd_t$ $DE_{ij} \times wknd_t$	$PD_{ij} \times wknd_t$
Efficiency	(+)	(+)	(-)		
Exclusion	(+)	insig. or (-)		(+)	(-)

The products of the vertical integration dummy variables and *firm* are useful to check whether our estimation results support the efficiency hypothesis. $PDE \times firm$ and $PD \times firm$ have negative and significant coefficients in all specifications of Table 3: As the number of firms that are involved in a movie increases, the positive effect of PDE and PD types of vertical integration on daily screening frequency tends to weaken. On the other hand, $DE \times firm$ has positive and significant coefficients. However, even in this result, the absolute magnitude of the estimates is relatively small.²²

Using the estimated results on the products of the vertical integration dummy variables and *wknd*, we can double-check with the exclusion hypothesis since, if it holds true, the exclusionary behavior of integrated theaters should become more significant during revenue-generating weekends. The estimated coefficients of $PDE \times wknd$ and $DE \times wknd$ are negative or insignificant, while those of $PD \times wknd$ are positive. The latter is significantly positive in all columns, which indicates that PD movies that are independent of theaters are not excluded during weekends by exhibitors. These results are contrary to the exclusion hypothesis in Table 2. Thus, we may conclude that overall, our findings can be better explained in terms of efficiency effects, rather than via exclusion of vertical integration.

The coefficients of the other explanatory variables mostly have the signs that are expected. The number of daily screenings decreases as the number of firms increases. This indicates that if many firms are involved, there may be some difficulties in coordinating with each other to make or play the movies. Coefficients of production costs, # of reviewers, and star ratings—which reflect the ex-ante quality of movies—are significantly positive, as expected. The number of screenings decreases during holidays when the competition between movies is intensified.

Table 4 quantifies the differences of daily screening frequencies between independent and integrated movies by using the full specifications (3) and (7) of Table 3.²³ Overall, vertically integrated movies are screened more frequently than are independent films. Only PD movies have slightly fewer opportunities for

²² Moreover, when we use only the opening date of movies for the analysis, the estimate becomes significantly negative. Analyzing the opening date observations may capture the pure effect of corporate structure on theater decisions by excluding the influence of the market condition.

²³ In the case of PDE movies, the total effect of PDE movies on daily screening frequency in comparison with independent movies is $\beta_1 + \gamma_1 firm_{ij} + \delta_1 wknd_t$. Plugging here the estimates of β_1 (3.38), γ_1 (-1.32) and δ_1 (0.04) in Table 3, the average number of firms in PDE movies (2.29) in Table 1, and 0 (1) for weekdays (weekend), we have the result that PDE movies have more opportunities for screening than do independent movies by 0.36 (0.40) times during a weekday (weekend) on average. We can obtain other results analogously, as is shown in Table 4.

Table 3 The effect of vertical integration on movie screening frequency

	Daily screening frequency			Daily screening frequency (4–10 pm)				
	(1) Y	(2) Y	(3) Y	(4) lnY	(5) Y	(6) Y	(7) Y	(8) lnY
PDE	0.224** (0.038)	3.387** (0.119)	3.376** (0.120)	0.293** (0.010)	0.086** (0.016)	1.248** (0.050)	1.260** (0.051)	0.254** (0.010)
DE	0.997** (0.019)	0.521** (0.065)	0.526** (0.066)	0.086** (0.005)	0.404** (0.008)	0.137** (0.028)	0.148** (0.028)	0.063** (0.005)
PD	-0.139** (0.020)	2.514** (0.076)	2.453** (0.076)	0.228** (0.007)	-0.091** (0.009)	0.927** (0.033)	0.898** (0.033)	0.189** (0.007)
PDE × firm		-1.316** (0.046)	-1.316** (0.046)	-0.100** (0.004)		-0.485** (0.020)	-0.485** (0.020)	-0.085** (0.004)
DE × firm		0.229** (0.024)	0.229** (0.024)	0.009** (0.002)		0.120** (0.010)	0.120** (0.010)	0.014** (0.002)
PD × firm		-0.790** (0.021)	-0.790** (0.021)	-0.069** (0.002)		-0.303** (0.009)	-0.303** (0.009)	-0.059** (0.002)
PDE × wknd			0.042 (0.073)	0.007 (0.006)			-0.040 (0.031)	-0.002 (0.006)
DE × wknd			-0.020 (0.037)	-0.010** (0.003)			-0.036* (0.016)	-0.008** (0.003)
PD × wknd			0.213** (0.036)	0.019** (0.003)			0.100** (0.016)	0.023** (0.003)
firm	-0.242** (0.010)	-0.122** (0.011)	-0.122** (0.011)	-0.014** (0.001)	-0.082** (0.004)	-0.041** (0.005)	-0.041** (0.005)	-0.010** (0.001)
ln(Production cost)	2.023** (0.014)	2.005** (0.014)	2.005** (0.014)	0.156** (0.001)	0.800** (0.006)	0.794** (0.006)	0.794** (0.006)	0.143** (0.001)

Table 3 (continued)

	Daily screening frequency			Daily screening frequency (4–10 pm)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>ln</i> (# of Reviews)	0.860** (0.009)	0.846** (0.009)	0.846** (0.009)	0.060** (0.001)	0.337** (0.004)	0.331** (0.004)	0.331** (0.004)	0.053** (0.001)
Star rating	0.178** (0.007)	0.164** (0.007)	0.164** (0.007)	0.013** (0.001)	0.072** (0.003)	0.066** (0.003)	0.066** (0.003)	0.013** (0.001)
Holiday dummy variable	- 1.212** (0.026)	- 1.177** (0.026)	- 1.181** (0.026)	- 0.128** (0.002)	- 0.542** (0.011)	- 0.529** (0.011)	- 0.531** (0.011)	- 0.126** (0.002)
R-squared	0.571	0.572	0.572	0.667	0.522	0.523	0.523	0.588
Observations	587,601	587,601	587,601	587,601	587,601	587,601	587,601	587,601

The dependent variable is daily screening frequency. Movie characteristics, theater, year × month, day of week, and duration dummy variables are included in all regressions. Movie characteristics dummy variables include genre, rating, film series, distributors, and art film. The estimated coefficients of movie characteristic variables are all significant, and the signs of the estimates are as expected. Robust standard errors are reported in parentheses. ** and * indicate significance at 1% and 5%, respectively

Table 4 Increases in daily screening frequency of vertically integrated movies in comparison with independent movies

Integrated movies	Day of week	Whole day	Peak time (4–10 pm)
PDE	Weekday	0.361 (0.042)	0.149 (0.018)
	Weekend	0.403 (0.068)	0.109 (0.028)
DE	Weekday	1.100 (0.022)	0.447 (0.009)
	Weekend	1.080 (0.035)	0.411 (0.015)
PD	Weekday	− 0.203 (0.022)	− 0.122 (0.009)
	Weekend	0.010 (0.034)	− 0.022 (0.014)

Standard errors are reported in parentheses

screening on weekdays than is true for independent films. This is due to the sample characteristic that the average number of firms in PD movies (3.36) is greater than that in PDE and DE movies (2.29 and 2.5), as in Table 1. Hence, the efficiency effect of PD decreases as the number of firms involves increases, as Table 2 suggests.

4.2 Movie Fixed Effects and Robustness Checks

The results of Table 3 come from variation among movies. Due to the sufficient variation, we can test our hypothesis, but this analysis may not fully control for the movie-specific variables, which could cause bias in our estimates.²⁴ To resolve these possibilities, we can employ the model of movie fixed effects (m_i), and the regression equation is as follows.

$$\begin{aligned}
 Y_{ijt} = & \alpha + \beta_1 PDE_{ij} + \beta_2 DE_{ij} + \delta_1 PDE_{ij} \times wknd_t + \delta_2 DE_{ij} \times wknd_t + \delta_3 PD_{ij} \times wknd_t \\
 & + m_i + c_j + \tau_t + \theta_{it} + \varepsilon_{ijt}
 \end{aligned}
 \tag{2}$$

Equation 2 tests our hypothesis, focusing on the interactions between vertical integration and the weekend dummy variables. In the presence of movie fixed effects, not all of the vertical integration dummy variables are identified. Since the vertical relationship between production and distribution is invariant within a movie, the movie fixed-effect dummy variables (m_i) capture the effect of vertical integration between production and distribution. Hence, PD is omitted in Eq. 2. Likewise, the number of participating firms for a movie varies only when the movie is affiliated

²⁴ For example, vertical integration can be correlated with the quality of movies, and the quality may not be captured perfectly by the control variables that we consider in Table 3. Furthermore, differences in market conditions across movies may remain even after we control theater and time dummies. The release of a foreign blockbuster may create a scarcity of screen space and affect our results if integrated movies are more likely to be released without foreign competition.

with theaters. Hence, we can interpret *firm* effectively as the dummy variable that is equal to one if a movie is not affiliated with a theater and zero otherwise.²⁵

Table 5 shows the results with the model of movie fixed effects. Complementarily, we estimate the equation that includes only the *firm* dummy variable, and exclude all of the integration dummy variables. In all specifications, the estimates of PDE and DE are significantly positive. This means that PD and independent movies will be shown more frequently when they are affiliated with theaters. It can be interpreted as consistent with either efficiency or exclusion. In columns (3) and (6), the negative and significant estimates on *firm* mean that theaters show their affiliate movies more than they show non-affiliate movies, and more than non-affiliate theaters show the movies. These results are in line with Gil (2009), Chung et al. (2018) and Choi et al. (2019).

By using the interaction terms between vertical integration and the weekend dummy variables, we can test the hypothesis of *efficiency versus exclusion*. The results in columns (1), (2), (4), and (5) show that theaters do not show their affiliate movies on weekends more than on weekdays. However, they show non-affiliate PD movies more on weekends than on weekdays. These results are consistent with the hypothesis of efficiency and thus imply that our main results in Table 3 are robust.²⁶

For another robustness check, we separate the screening decision of integrated theaters from that of independent theaters in Table 6. Columns (1) and (2) show the results on *CGV* (*CJ* theaters) and non-*CGV* integrated theaters, respectively. Most PDE movies are produced and distributed by *CJ* affiliates.²⁷ *CGV* theaters increase the screen allocation for PDE movies, while other integrated theaters tend to increase the screening allocation for DE movies. However, their screening allocation for PD is consistently positive, which is further support for our efficiency hypothesis.

Independent theaters have no incentive to foreclose specific films.²⁸ We focus on the rate of increase in the number of screenings in columns (4) and (7), which use the log of the number of daily screenings, because integrated theaters have bigger screen capacities than do independent theaters. The estimates of PD and its products are quite similar in both subsamples, which is also consistent with the efficiency hypothesis.

Moreover, we check how exhibitors react to *CJ*-PD movies in columns (5) and (8). $PD \times CJ$ has negative effects on screenings. Non-affiliated theaters show *CJ*-PD movies less than they show other PD movies. This indicates that *CJ* – the firm with

²⁵ In other words, *firm* is effectively equal to the combination of PDE and DE: $firm = some\ constant - (PDE + DE)$. Hence we cannot include *firm* and its interactions with vertical integration indicators in Eq. 2.

²⁶ The results in Table 3 and Table 5 are robust when we use observations that exclude the top and bottom 1 percentiles of daily screening frequency.

²⁷ *Lotte* and *Megabox* have no PDE observations in our sample data since they are not involved in production. *NEW*, which owns theater chain *CineQ*, has only one movie that it has produced and distributed. So the interaction term, $PDE \times firm$, has no variation in column (2) of Table 6.

²⁸ We consider only the effects on PD because PDE and DE are not defined for independent theaters without affiliated distributors.

Table 5 The effect of vertical integration on movie screening: movie fixed effect

	Daily screening frequency			Daily screening frequency (4 pm-10 pm)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Y	lnY	Y	Y	lnY	Y
PDE	1.225** (0.031)	0.113** (0.003)		0.518** (0.014)	0.111** (0.003)	
DE	1.587** (0.014)	0.152** (0.001)		0.634** (0.006)	0.136** (0.001)	
PDE × <i>wknd</i>	0.027 (0.051)	0.006 (0.004)		- 0.048* (0.023)	- 0.003 (0.005)	
DE × <i>wknd</i>	- 0.019 (0.025)	- 0.010** (0.002)		- 0.029** (0.011)	- 0.007** (0.002)	
PD × <i>wknd</i>	0.172** (0.028)	0.016** (0.002)		0.082** (0.012)	0.021** (0.002)	
<i>firm</i>			- 1.531** (0.011)			- 0.607** (0.005)
Holiday dummy variable	- 0.239** (0.020)	- 0.043** (0.002)	- 0.235** (0.020)	- 0.133** (0.009)	- 0.047** (0.002)	- 0.131** (0.009)
R-squared	0.751	0.799	0.751	0.702	0.715	0.702
Observations	634,551	634,551	634,551	634,551	634,551	634,551

The dependent variable is daily screening frequency. Movie, theater, year, month, day of week, and duration dummy variables are included in all regressions. Robust standard errors are reported in parentheses. ** and * indicate significance at 1% and 5%, respectively

the market share – is competing among theaters rather than exercising market dominance in the screening market.

5 Conclusion

The effects of vertical integration on efficiency or exclusion have important practical consequences for South Korea's movie industry policy, as well as being of interest in industrial economics more generally. The Korea Fair Trade) has issued cease-and-desist orders, which prohibit vertically integrated dominant exhibitors such as *CGV* and *Lotte Shopping* from discriminating in favor of affiliate distributors. Furthermore, recently, several Korean legislators have initiated revisions to the Act of Promoting Movies and Videos, which include the separation of the distribution and exhibition businesses.²⁹

²⁹ The revision of the Act was proposed on 2016.10.31, and expired on 2020.05.29.

Table 6 The effect of vertical integration on movie screening: subsamples

		Daily screening frequency				Independent theaters			
		Integrated theaters				Independent theaters			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
Y	Y	Y	lnY	lnY	Y	lnY	lnY		
CGV	Non-CGV								
PDE	3.764** (0.163)	3.612** (0.123)	0.302** (0.010)	0.286** (0.010)					
DE	-0.731** (0.149)	1.275** (0.089)	0.085** (0.006)	0.088** (0.006)					
PD	2.234** (0.163)	2.480** (0.100)	0.227** (0.007)	0.266** (0.007)	1.517** (0.141)	0.225** (0.018)	0.230** (0.019)		
PD × CJ				-0.073** (0.003)			-0.007 (0.008)		
PDE × <i>firm</i>	-1.597** (0.060)	-1.419** (0.046)	-0.105** (0.004)	-0.102** (0.004)					
DE × <i>firm</i>	0.648** (0.056)	0.201** (0.024)	0.009** (0.002)	0.008** (0.002)					
PD × <i>firm</i>	-0.623** (0.045)	-0.851** (0.029)	-0.070** (0.002)	-0.071** (0.002)	-0.413** (0.039)	-0.060** (0.005)	-0.060** (0.005)		
PDE × <i>wknd</i>	-0.059 (0.078)	-0.771 (1.140)	0.009 (0.006)	0.008 (0.006)					
DE × <i>wknd</i>	-0.009 (0.058)	-0.149** (0.047)	-0.009** (0.003)	-0.009** (0.003)					
PD × <i>wknd</i>	0.679** (0.085)	0.115** (0.045)	0.020** (0.003)	0.020** (0.003)	0.069 (0.057)	0.008 (0.007)	0.008 (0.007)		

Table 6 (continued)

Daily screening frequency		(3)		(4)		(5)		(6)		(7)		(8)	
Integrated theaters		Y		lnY		lnY		Y		lnY		lnY	
<i>firm</i>		- 0.230**	- 0.115**	- 0.014**	- 0.015**	- 0.057**	- 0.003	- 0.003	- 0.003	- 0.003	- 0.003	- 0.003	- 0.003
		(0.022)	(0.016)	(0.001)	(0.001)	(0.019)	(0.002)	(0.002)	(0.019)	(0.002)	(0.002)	(0.002)	(0.002)
<i>ln(Production cost)</i>		2.350**	2.182**	0.164**	0.166**	0.645**	0.093**	0.093**	0.645**	0.093**	0.093**	0.093**	0.093**
		(0.025)	(0.018)	(0.001)	(0.001)	(0.026)	(0.003)	(0.003)	(0.026)	(0.003)	(0.003)	(0.003)	(0.003)
<i>ln(#. of Reviews)</i>		0.962**	0.856**	0.064**	0.062**	0.253**	0.027**	0.027**	0.253**	0.027**	0.027**	0.027**	0.027**
		(0.017)	(0.013)	(0.001)	(0.001)	(0.016)	(0.002)	(0.002)	(0.016)	(0.002)	(0.002)	(0.002)	(0.002)
Star rating		0.276**	0.115**	0.015**	0.014**	0.023	- 0.005**	- 0.005**	0.023	- 0.005**	- 0.005**	- 0.005**	- 0.005**
		(0.013)	(0.010)	(0.001)	(0.001)	(0.012)	(0.002)	(0.002)	(0.012)	(0.002)	(0.002)	(0.002)	(0.002)
Holiday dummy variable		- 1.197**	- 1.272**	- 0.136**	- 0.137**	- 0.408**	- 0.061**	- 0.061**	- 0.408**	- 0.061**	- 0.061**	- 0.061**	- 0.061**
		(0.048)	(0.034)	(0.002)	(0.002)	(0.040)	(0.005)	(0.005)	(0.040)	(0.005)	(0.005)	(0.005)	(0.005)
R-squared		0.518	0.541	0.607	0.607	0.696	0.734	0.734	0.696	0.734	0.734	0.734	0.734
Observations		215,499	307,400	522,899	522,899	64,702	64,702	64,702	64,702	64,702	64,702	64,702	64,702

The dependent variable is daily screening frequency. Columns (1) and (2) report the regression results for CGV and non-CGV theaters, respectively. Columns (3)-(5) use all integrated theater observations such as CGV, Lotte cinema, Megabox, and CineQ. Movie characteristics, theater, year X month, day of week, and duration dummy variables are included in all regressions. Movie characteristics dummy variables include genre, rating, film series, distributors, and art film. The estimated coefficients of movie characteristic variables are all significant, and the signs of the estimates are as expected. Robust standard errors are reported in parentheses. ** and * indicate significance at 1% and 5%, respectively

This paper sheds light on rational competition and industry policies in the Korean movie industry. We gathered a large panel data set (260 movies in 584 theaters) of recent movie screening and vertical integration (from 2013 to 2018), and tested whether exhibitors exclude non-affiliate competitors' movies, or whether exhibitors screen more movies that take advantage of vertical integration in terms of: enjoying information advantages; aligning incentives; and/or reducing transaction costs. The effects on the screening frequency of production-and-distribution-integrated movies that are not affiliated with exhibitors play a critical role in determining the identification criterion in our test. Our results are better explained by the efficiency effects of vertical integration rather than by exclusionary motives in the Korean movie industry.

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