

CPRC Discussion Paper Series
Competition Policy Research Center
Japan Fair Trade Commission

**An Empirical Investigation of the Toho–Subaru
Antitrust Case: A Merger Case in the
Japanese Movie Theater Market**

Mitsuru SUNADA
Competition Policy Research Center, JFTC
CPDP-43-E August 2009

1-1-1, Kasumigaseki, Chiyoda-ku, TOKYO 100-8987 JAPAN

Phone:+81-3-3581-1848 Fax:+81-3-3581-1945

URL:<http://www.jftc.go.jp/cprc.html>

E-mail:cprcsec@jftc.go.jp

**An Empirical Investigation of the *Toho–Subaru* Antitrust Case:
A Merger Case in the Japanese Movie Theater Market***

Mitsuru SUNADA[†]

Competition Policy Research Center, Japan Fair Trade Commission, Tokyo, JAPAN

Abstract

This study assesses a merger case in the Japanese movie theater market in the early 1950s. Utilizing information about the location of theaters in the Tokyo metropolitan area, I examine the relationship between the number of attendees and the structure of local market competition. The results reveal that nearby rival theaters have negative effects on the attendance of a theater, and these effects do not dissipate even at around 10 km from each theater. Based on the empirical results, it appears that the Tokyo High Court has defined the geographic movie theater market as being relatively small.

Keywords: Antitrust; Local market competition; Merger; Movie theater market.

JEL classification codes: L11; L41; L82; N45; N75.

* This study is an outgrowth of a research project at the Competition Policy Research Center (CPRC). Earlier versions of this study were presented at Hitotsubashi University, the IIOC, the JEA Annual Meeting, Kyushu University, Kwansai Gakuin, and Nihon University. I would like to express sincere gratitude to Cory Capps, Noriyuki Doi, Ricard Gil, Daiji Kawaguchi, Sachiko Kuroda, Keizo Mizuno, Hiroyuki Odagiri, Hiroshi Ohashi, Yosuke Okada, Hiroyuki Okamuro, Tatsuo Tanaka, Ichiro Uesugi, and various seminar attendees for their useful comments and suggestions. The views expressed in this paper are mine, and do not reflect the views of the CPRC or the Japan Fair Trade Commission (JFTC). Needless to say, all remaining errors are mine.

[†] Researcher: mitsuru_sunada at jftc.go.jp

1. Introduction

This study assesses the *Toho–Subaru* antitrust case, a merger case in the Japanese movie theater market in the early 1950s, utilizing information about the geographic distribution of theaters. Retailers are differentiated in geographic space (location) as well as in product space, and the market power of retailers depends on the relevant geographic market in which they compete. Hence, assessment of local market competition is very important in merger reviews of retail industries.

The *Toho–Subaru* case began in 1950, that is, three years after the founding of the Japan Fair Trade Commission (JFTC). Although a long time has passed since then, the case is important in the history of Japanese competition policy because it is one of only a few cases in which the geographical market definition was a main issue in trials, and the JFTC and the companies competed for a suitable geographic movie theater market in Tokyo. However, as explained below, the arguments of both sides were not based on scientific evidence and were somewhat arbitrary. More than 50 years has passed, and innovation in computers and econometrics has enabled us to scientifically investigate local market competition and reassess past antitrust cases.¹

Davis (2006a) studies the U.S. movie theater market and finds a negative correlation of the numbers of own and rivals' screens with box office revenues. He calls these effects *cannibalization* and *business stealing* effects, respectively. Moreover, he finds that the cannibalization and business stealing effects are localized and dissipate at around 15 miles (24 km) from each theater. Therefore, he concludes that the relevant competitive market is an area within an approximate 15-mile (24 km) radius of each theater.² Davis (2006b) studies spatial competition in the U.S. movie theater industry,

¹ In *Federal Trade Commission v. Staples*, econometric analysis was extensively employed in the trial by the defendant and plaintiff. Dalkir and Warren-Boulton (2004) is a case report by the economists involved in the *FTC v. Staples* case, and Baker (1999) reviews the case from an economist's viewpoint. Ashenfelter et al. (2006) provides a detailed discussion of econometric analyses used in the trial. Manuszak and Moul (2008) reassess this case, introducing a new method to examine the relationship between prices and local market competition. Warren-Boulton and Dalkir (2001) examine the case using an event study approach. White (2008) points out the importance of follow-up studies of past merger cases.

² Davis (2006a) studies the relationship between box office revenues and local market structure, while Davis (2005) examines the relationship between admission prices and market structure and finds a statistically significant correlation between admission prices and local market competition. However, the effects of market structure on prices are economically small. Hence, the results of these two studies suggest that the effects of market structure on box office revenues occur through

utilizing a demand model in which products are location specific and consumers have preferences for both geographic proximity and other theater characteristics. Based on the results of SSNIP (small but significant non-transitory increase in price) tests, he concludes that geographic markets consist of circles of at most a 15-mile (24 km) radius around theaters.³

In this study, following Davis (2006a) and utilizing data on the number of monthly attendees and location of theaters in the Tokyo metropolitan area in 1950, I examine the relationship between the number of attendees and the structure of local market competition. The results reveal that nearby rival theaters have negative effects on the attendance of a theater, and these effects do not dissipate even at 10 km from each theater. Hence, the relevant geographic movie theater market is defined as a circle with radius of at least 10 km. If the larger market can be defined, the expected anticompetitive effect of the merger must be smaller. Therefore, the Tokyo High Court seems to have defined the geographic movie theater market as being relatively small. In line with previous works, the results of this study suggest that the application of econometric analysis is useful in merger reviews of retail industries. Moreover, this study is one attempt to empirically assess past Japanese antitrust cases, and will contribute to further developments of Japanese competition policy.⁴

The paper is organized as follows: in the second section, I briefly review the *Toho–Subaru* case, paying attention to geographic market delineation. The third section describes the data used in this study. In the fourth section, I explain an empirical model and some econometric issues. The fifth section presents the empirical results. The sixth section discusses the definition of the relevant geographic market in the *Toho–Subaru* case. The seventh section provides concluding remarks.

movement of consumers (quantity).

³ Using a similar empirical model without quantity data, Thomadsen (2005) studies how ownership structure and market geography jointly influence fast food prices in California. Pinkse et al. (2002), using a semiparametric approach, study spatial price competition in the U.S. wholesale gasoline market, and conclude that the market is highly localized. Gaynor and Vogt (2003) study mergers among Californian hospitals and assess the 1997 merger between two hospital chains, estimating a random utility model with consumer-level micro data. Smith (2004) applies a model of consumer discrete choice and expenditure to the U.K. supermarket industry, and shows that mergers among the four leading firms increase prices.

⁴ Myojo and Ohashi (2009) assess the economic consequences of a horizontal merger in the Japanese steel industry in 1970 utilizing a dynamic oligopoly model. They find that the merger enhanced the production efficiency of the merging party, and the exercise of market power was restrained primarily by fringe competitors.

2. Toho–Subaru Case

2.1 Agreement between Toho and Subaru

The *Toho–Subaru* case concerned a merger in the Japanese movie theater market in the postwar years of recovery following World War II.⁵ Toho Co. Ltd. (Toho) was a major film studio in Tokyo and its business field was film production, distribution and exhibition of movies as well as other performing arts. On the other hand, Subaru Enterprise (Subaru) was a film distribution and exhibition company that had other entertainment and recreation businesses as well as real estate dealing and leasing.⁶

On January 26, 1950, Toho and Subaru signed a contract for the tentative joint administrative agreement that Toho would rent Subaru's two theaters in the Yurakucho area, *Subaru Za* and *Orion Za*. The contract consisted of six articles as follows. (i) Toho and Subaru would jointly operate *Subaru Za* and *Orion Za*. (ii) Toho would lend 30 million yen to Subaru without interest, and the repayment term would be five years. (iii) The contracted term of joint administration would be five years. However, whenever Subaru repaid the loan in full, Subaru could cancel the contract with a notice period of three months. (iv) The operating policy for the two theaters would be determined by consultation between Toho and Subaru. (v) Concerning box office revenues, 15% of monthly box office revenues was to be allocated to Subaru, and the remainder to Toho. Toho would incur the entire cost of operation. (vi) The contract would take full effect upon the decision of a Subaru shareholders' meeting as well as the completion of process required by the Anti-Monopoly Act (AMA).⁷

2.2 Intervention by JFTC and Hearing

According to provisions of the AMA, Toho submitted notification of the agreement with Subaru to

⁵ This subsection is based on JFTC (1951; 1952) and Inoue (2007).

⁶ Toho and Subaru were operating companies in August 2009.

⁷ Chapter 4 of the AMA prohibits business combinations (stockholdings (Article 10), interlocking directors (Article 13), mergers (Article 15), and acquisition of business (Article 16)) which may substantially restrain competition in a particular field of trade or through which unfair trade practices have been employed. If some conditions are met, every merging corporation shall notify the JFTC in advance of their plan with regard to such a merger. In addition, Article 16 provides for these rules to be applied to a lease of the whole or a substantial part of the business of another corporation. In this study, we use the term 'merger' to refer to types of business combination covered by chapter 4 of the AMA. For more details, see Hayashi (2008).

the JFTC. In those days, movies were a popular leisure activity; hence, potential effects on consumers were not negligible. After the investigation, the JFTC challenged the case because of concerns that according to the fourth article of the agreement, Toho could control both *Subaru Za* and *Orion Za*; hence, the agreement would reduce competition between these and the Toho theaters. After the hearing, the JFTC prohibited Toho from making agreements that would enable Toho to control these two theaters.

JFTC (1951) found that the Marunouchi and Yurakucho area in which *Subaru Za* and *Orion Za* were located formed a relevant geographic market with a group of potential attendees. In addition, the JFTC also found that if the Marunouchi and Yurakucho area was too small as a geographic market, it would be included in the area occupied by the Ginza branch of the Tokyo Association of Theater Owners (TATO), excluding the following theaters: *Shinbashi Enbujo*, *Mitsukoshi Gekijo*, *Shiraki Gekijo*, and *Ningyocho Shochiku Eiga Gekijo* (area occupied by the Ginza branch, excluding four theaters), can be regarded as a relevant geographic market.⁸

= Table 1 =

Because Toho had seven theaters in the Tokyo metropolitan area, and six of these were located in the Marunouchi and Yurakucho area (see the first panel of Table 1), assessment of the market power of Toho depended on how the relevant geographic movie theater market in Tokyo was defined.⁹ If the Marunouchi and Yurakucho area or the Ginza branch-occupied area excluding four theaters was defined as the relevant geographic market, the market power of Toho might be increased by the agreement. On the other hand, if a larger area than these was relevant as a local movie theater market, Toho was unlikely to obtain additional market power before or after the deal. In the end, the wider the defined geographic market was, the smaller the expected anticompetitive effect of the merger between Toho and Subaru had to be.¹⁰

The capacity (number of seats) of Toho's theaters, including Subaru's two, was 9,742 and their share of total capacity of theaters within the Marunouchi and Yurakucho area (10,787) was 90.31% (see Table 2). On the other hand, there were 20 theaters within the Ginza branch-occupied area, and the share of Toho's theaters including Subaru's two in terms of total capacity of theaters within the

⁸ These four theaters were excluded because the first two were not regular movie theaters and the remaining two were located far from *Subaru Za* and *Orion Za*, respectively.

⁹ Another theater, *Shibuya Toho*, was outside the Ginza area.

¹⁰ For a graphic image of market definition, refer to Figure 1 in the appendix. Note that this is a map of the current Tokyo metropolitan area, and it is somewhat different from that of the 1950s. The original map was downloaded from <http://www.freemap.jp/>.

Ginza branch-occupied area (16,807) was 57.96% (see Table 2).

= Table 2 =

2.3 Court of Appeals

Toho appealed the ruling of the JFTC at the Tokyo High Court. In the appeal, Toho alleged that the Marunouchi and Yurakucho area could not be a geographic market. Additionally, Toho argued that the Tokyo metropolitan area should be defined as a geographic market, because the Marunouchi and Yurakucho area was in the center of Tokyo and easily accessible from all neighboring areas. Toho also claimed that if the Tokyo metropolitan area was too large as a geographic market, it was appropriate for the area occupied by all member theaters of the Ginza branch of the TATO.¹¹

On September 19, 1951, the Tokyo High Court upheld the decision of the JFTC and dismissed the appeal. In the decision, the Tokyo High Court judged that, while the Marunouchi and Yurakucho area was too small as a geographic movie theater market, the Tokyo metropolitan area was too large. In the end, the Ginza branch of the TATO-occupied area was defined as an appropriate geographic market, excluding the following theaters: *Shinbashi Enbujo*, *Mitsukoshi Gekijo*, *Shiraki Gekijo*, and *Ningyocho Shochiku Eiga Gekijo*. Finally, the Tokyo High Court concluded that the agreement between Toho and Subaru would effectively lessen competition in the market.¹²

The implication for the geographic market by the Tokyo High Court seems somewhat arbitrary and inconsistent: for example, according to JFTC (1952), although the Tokyo High Court accepted that the idea defining the Tokyo metropolitan area as a relevant geographic movie theater market was undeniable, after a few sentences it ruled that an area narrower than the Tokyo metropolitan area, the Ginza branch-occupied area excluding the above four theaters, was suitable as a geographic market.

3. Data

3.1 Main Data Sources

The main data source for this study is Jiji Tsushin-sha (1951), which reports numbers of attendees of selected theaters in each prefecture from January to June of 1950. I use data for theaters in the Tokyo metropolitan area (70 theaters). In addition, the almanac contains a directory of theaters operating in

¹¹ Toho argues that *Meiji Za* and *Kabuki Za*, which were under reconstruction, should have been included in addition to the four theaters excluded by the JFTC.

¹² The Tokyo High Court ruled that the joint administrative agreement between Toho and Subaru was a type of lease contract that enabled Toho to control businesses of Subaru.

September 1950 (184 theaters). The directory lists the name, address, telephone number, name of owner and manager, capacity (number of seats), and program pattern for each theater that was active in September 1950.

I make the following adjustments. First, there is an inconsistency: a theater, *Asakusa Shochiku Eiga Gekijo*, is not listed in the directory, but data for its numbers of attendees are reported. Hence, I substitute the information on the theater from the directory of Jiji Tsushin-sha (1952). Second, the Jiji Tsushin-sha directory (1954) reports the establishment date of theaters, according to which eight other theaters were active in 1950.¹³ These theaters are included in my dataset. Therefore, the total number of theaters is 192, and for 70 of these the monthly number of attendees from January to June of 1950 is available.

3.2 Ownership

Table 3 reports the ownership structure of movie theaters in the Tokyo metropolitan area. According to this, Shochiku Co., Ltd. (one of the major film studios in Japan and its business fields are very similar to Toho) was dominant in terms of number of theaters within the Tokyo metropolitan area: Shochiku owned 17 theaters, which accounted for 8.85% of the total number of theaters. In contrast, Toho owned only seven theaters (3.13% of the total) not including *Subaru Za* and *Orion Za*. Moreover, six of theaters owned by Toho were located within a very narrow area, that is, the Marunouchi and Yurakucho area.

= Table 3 =

3.3 Program Pattern

In the appeal, Toho argued that the movie quality was an important factor in assessing the effect of the agreement. In Japan, block booking was permitted by law and was popular in the movie distribution market.¹⁴ If a distribution company tended to distribute the same movies to contracting theaters in the same month, movie quality largely depended on which distributor a theater contracted with. Table 4 reports the program patterns of movie showings of each theater in terms of contracted

¹³ The eight theaters were *Mita Eiga Za*, *Bunkyo Eiga Gekijo*, *Nishi Koyama Bunka Gekijo*, *Mukojima Kan*, *Tamanoi Eiga Gekijo*, *Tachibana Eiga Gekijo*, *Ekoda Bunka Gekijo*, and *Ohizumi Kaikan*.

¹⁴ On the other hand, it has been illegal in the U.S. since the *Paramount* ruling. Chapter seven of De Vany (2005) is a detailed review of the *Paramount* case, and Gil (2007) empirically investigates the ruling.

distributors.¹⁵ For example, 29 theaters showed only movies distributed by Central Motion Picture Exchange (15.10%).¹⁶ The second major pattern of programs is ‘Mixed,’ which means that theaters screen movies from various distributors (27 theaters (14.06%)). We can see this type of contract as a type of free booking. Ninety theaters bought only Shochiku’s films (19 theaters: 9.90%). On the other hand, the theaters that exclusively contracted with Toho accounted for only 2.08% of the total (four theaters). In addition, two theaters screened movies distributed by both Daiei and Tokyo Eiga Haikyu.¹⁷

= Table 4 =

3.4 Local Market Structure

Following Davis (2005; 2006a), I quantify the local market competition faced by each theater, counting the number of theaters owned by the same owner and the number of rival theaters within a specified distance ring

$$(1) \quad \text{own}_j^h = \#\{k \in G_j \mid a^h < d(l_j, l_k) \leq b^h\},$$

$$(2) \quad \text{rival}_j^h = \#\{k \notin G_j \mid a^h < d(l_j, l_k) \leq b^h\},$$

where l_j and l_k represent the locations of theaters j and k , and $d(., .)$ defines the distance between j and k . a^h and b^h are the lower and upper bounds of the h th distance ring. G_j is the set of theaters owned by the same owner as j . $\#\{A\}$ denotes the number of elements in the set, A . Therefore, own_j^h (or rival_j^h) is the number of theaters owned by the same owner of theater j (or, the number of rival theaters) within the h th distance ring. This study defines the following four distance rings (i.e. $h = 1, 2, 3,$ and 4): 1) $0 \text{ km} < d \leq 1 \text{ km}$, 2) $1 \text{ km} < d \leq 5 \text{ km}$, 3) $5 \text{ km} < d \leq 10 \text{ km}$, and 4) $10 \text{ km} < d \leq 15 \text{ km}$.

¹⁵ The true meanings of some abbreviations in the original document are difficult to understand without sufficient explanatory notes. For example, we can infer that ‘Eastern’ stands for films produced and distributed by the USSR or China, but this is uncertain. However, what we must know is not the exact meanings of abbreviations, but the differences among patterns of showings of theaters.

¹⁶ Central Motion Picture Exchange exclusively distributed American movies.

¹⁷ This study considers that ‘Daiei & Tokyo Eiga Haikyu’ and ‘Tokyo Eiga Haikyu & Daiei’ are different patterns of film showings, because I can infer that in the former case a theater mainly showed Daiei films, whereas another theater in the latter case mainly screened films distributed by Tokyo Eiga Haikyu.

Based on the addresses of theaters, the distance of each theater from others can be computed. First, each address is geocoded (identified by a combination of longitude and latitude). Then the distance between two theaters is computed as a great circle distance.¹⁸ Table 5 reports the descriptive statistics of own and rival theater counts for 192 theaters in Tokyo in 1950. According to this table, the mean own theater count is less than one, except for the third radius (1.292), and fewer than half of the theaters had other theaters owned by the same owner within any radius, because most theaters were independent. On the other hand, most theaters faced competition from rival theaters located within various distance rings. For example, about half of the theaters had 2, 31, 73, and 50 theaters within the first, second, third, and fourth distance rings, respectively.

= Table 5 =

4. Empirical Methodologies

4.1 Regression Model

This study estimates the following reduced-form regression equation relating the structure of local market competition to the number of attendees at each theater

$$(3) \quad \ln(\text{attend}_{jt}) = a_1 \text{'own}_j + a_2 \text{'rival}_j + z_j b + c \text{ distance}_j + \text{month}_t + \text{cons} + u_{jt},$$

where attend_{jt} is the number of attendees of theater j in month t . $\text{own}_j' = [\text{own}_j^1, \dots, \text{own}_j^4]$, and $\text{rival}_j' = [\text{rival}_j^1, \dots, \text{rival}_j^4]$. z_j denotes observable theater characteristics of theater j . This study takes (the log of) the number of seats as the capacity of each theater. In addition, as explained below, program patterns are also controlled using dummy variables. The term month_t is a fixed effect of month t . a_1 , a_2 , b , and c are parameters to be estimated. u_{jt} is an error term.

Davis (2006b) shows that moviegoing demand depends on the distance between a consumer and a theater, utilizing a discrete-choice model of product differentiation. We cannot observe the distance of each consumer from respective theaters. Hence, in this study, it is assumed that the population of each ward is situated at the location of each local governmental headquarters, and the mean distance from consumers to theater j is calculated as the weighted mean of the distance between headquarters of each ward and theater j , as follows

¹⁸ I use the *Geocoding Tools & Utilities* website (<http://newspat.csis.u-tokyo.ac.jp/geocode/>). Because the data source is old and the designations of some theaters' addresses have changed over the years, there will be noise in the estimated distance.

$$(4) \quad \text{distance}_j \cong \sum_{k=1}^{23} \left(\frac{\text{pop}_k}{\text{pop}^{\text{Tokyo}}} \right) d(L_k, l_j),$$

where pop_k is the population of ward k , and $\text{pop}^{\text{Tokyo}} (= \sum_k \text{pop}_k)$ is the total population of the Tokyo metropolitan area in 1950.¹⁹ L_k is the location of the headquarters of ward k , and $d(L_k, l_j)$ is the (great circle) distance between L_k and l_j .

4.2 Effects of Local Market Structure

Although Davis (2006a) finds negative correlations of the numbers of own and rivals' screens with box office revenues (cannibalization and business stealing effects), Chisholm and Norman (2009) find a positive correlation between the box office revenues of theaters in Boston and South Florida and the number of theaters within a specified radius, and they conclude that *agglomeration* effects dominate business stealing (or cannibalization) effects in the movie theater markets.²⁰

The main objective of this study is to verify the extent to which movie theaters affected each other in Tokyo in 1950, and this study does not incorporate agglomeration effects. Even if agglomeration effects are explicitly incorporated, it is difficult to distinguish agglomeration effects from business stealing (or cannibalization) effects because the empirical model is a reduced form. Therefore, I only test whether estimated a_1 ' and a_2 ' are statistically significant or not, in order to assess a relevant geographic market for movie theaters in Tokyo. In this study, I call a_1 ' and a_2 ' *competitive* effects of own and rival theaters on the central theater. I will briefly discuss agglomeration effects in the empirical results of this study below.

4.3 Fixed Effects

Because directories are only available once a year, information about theater location does not change during the sample period. Therefore, fixed effects for respective theaters cannot be included. I include the following fixed effects in the reduced form regression equation.

¹⁹ In the Tokyo metropolitan area, there are 23 wards (*Ku* in Japanese): Chiyoda, Chuo, Minato, Shinjuku, Bunkyo, Taito, Sumida, Koto, Shinagawa, Meguro, Ota, Setagaya, Shibuya, Nakano, Suginami, Toshima, Kita, Arakawa, Itabashi, Nerima, Adachi, Katsushika, and Edogawa. Population data for each ward of the Tokyo metropolitan area are taken from the General Administrative Agency of the Cabinet (1953).

²⁰ Chung and Kalnins (2001) show similar empirical results to those of the Texas's lodging industry, and Kalnins (2006) states that retail and service firms may purposely locate together because of agglomeration benefits.

Einav (2007) points out large seasonal or sometimes weekly fluctuations of box office revenues in the US movie industry. In this study, because of data limitation, to deal with possible seasonal fluctuation in the total movie attendance, I simply include the monthly dummies (February to June), that is, $time_t$ in (3).

Quality of movies screened by a theater is expected to depend on the distributor(s) with which the theater contracts. Therefore, to control movie quality, I estimate the models including the dummies for patterns of program (program pattern dummies, hereinafter). Another source of quality difference among theaters is a *good location* effect that managers know more about than researchers and had built theaters at such good places where demand was high. To deal with such an effect, I incorporate the ward dummies. Thus, the u_{jt} is decomposed as follows

$$(5) \quad u_{jt} = f_c + f_w + \Delta u_{jt},$$

where f_c and f_w is the fixed effects of program pattern c and ward w of theater j . Δu_{jt} is a residual error term.

4.4 Instruments

To control the possible correlation between Δu_{jt} and local market structure variables, and correlation between Δu_{jt} and the mean distance from consumers, following Berry et al. (1995), Thomadsen (2005), and Davis (2006b), I estimate models utilizing the following variables as instruments.

First, as in previous studies, I assume that own theater characteristics (capacity of each theater) are exogenous.²¹ Second, the maximum capacity of rival theaters within each distance ring is also used because theaters' managerial decisions were affected by competitive pressure from rivals. Third, I use the number of theaters belonging to the same owner, and dummies for theaters owned by Shochiku, Toho, and Nikkatsu. These change the cost of entry and operation. Moreover, the distance from the nearest rival theater is utilized as an instrument because it is a demand shifter. Fourth, I use the average of the mean distance of rival theaters within a 15 km radius as an instrument for the mean distance from consumers.

In addition to these variables, population within each radius in 1947 is used as an instrument,

²¹ Theater owners are assumed to first decide the specifications (e.g. capacity) of a new theater, and after that, they decide on location, given the locations and specifications of rival theaters. This study considers the location decision and competition stages, and each theater specification is assumed to be predetermined.

because the past potential market size of each location would partly affect the location decision for theaters. Population within each radius of theater j is calculated as the sum of population of wards whose headquarters are located within 1 km (5 km, 10 km, or 15 km) of theater j . Table 6 reports the descriptive statistics of regression variables.²²

= Table 6 =

5. Results

Table 7 reports the estimation results. The first and second columns are the OLS results. The first model includes the program pattern and ward dummies, but not the month dummies. Concerning the structure of local market competition, except for own theaters within the second distance ring, the estimated coefficients of all local market competition variables are negative, and the estimated coefficients of own theaters within the fourth (10–15 km) distance ring and the coefficients of rivals within the second (1–5 km), and third (5–10 km) distance rings are statistically significant. The estimated coefficient of capacity is positive, that of mean distance from consumers is negative, and both are statistically significant at the 1% level. The second model adds the month dummies into the first model. The results of the second model are similar to those of the first, but the estimated coefficients of own theaters within the third distance ring are statistically significant.

The OLS results of the effects of local market competition on attendance are vague. As mentioned in the previous section, there is an endogeneity problem of local market structure variables and mean distance from consumers. The third and fourth columns report the instrumental variable estimation results. These correspond to the first and second models, respectively.²³

In the third model, except for own theaters within the fourth distance ring, the estimated coefficients of all local market competition variables are negative and larger than those in the OLS results in magnitude. Although all estimated coefficients of own theater counts are not statistically significant, the estimates of rival theater counts within the second and third distance rings are statistically significant at the 1% and 10% levels, respectively. The estimated coefficient of mean distance from consumers is larger than that from the OLS results. Moreover, the Hansen J statistics of the third

²² The data are old and the designations of some theaters' addresses have changed over the years; hence, the estimates of distances from each theater to other theaters (or consumers) may have noise. Because the estimated coefficients have a bias toward zero provided measurement errors are unbiased, we can consider the estimates to be the minimum effects of competition on attendance in terms of absolute value.

²³ The first-stage regression results are reported in Table 8 of the appendix.

model do not reject the null hypothesis ($J = 5.599$: $df = 5$; p -value = 0.347), and hence the endogeneity problem is less serious.

The fourth model adds month dummies into the third model. Although most results are similar to the third model, all estimated coefficients of local market competition variables are slightly larger than those in the third model. The estimates for own theater counts within the third distance ring and the coefficient of rival theaters within the first distance ring are statistically significant at the 5% and 10% levels, respectively. The estimate for rivals within the third distance ring is more precise. Again, the Hansen J statistics do not reject the null hypothesis of orthogonality of instruments ($J = 6.510$: $df = 5$; p -value = 0.260), and the endogeneity problem is not so serious in this specification.

In summary, the results shows that nearby rival theaters have competitive effects on the attendance of a centered theater, and these effects do not disappear even at 10 km from a theater. On the other hand, the effects of own theaters are not clear.

= Table 7 =

6. The Tokyo Movie Theater Market in 1950

According to Davis (2006a), these results have implications for the delineation of the geographic market and the assessment of market power in the *Toho–Subaru* case. The econometric analysis in the previous sections shows that in the 1950 Tokyo movie theater market, rival theaters within 10 km had statistically significant competitive effects on the central theater. Therefore, the relevant geographic movie theater market in Tokyo of 1950 can be defined as a circle with a radius of at least 10 km.

= Table 8 =

Table 8 reports the share of Toho's theaters including *Subaru Za* and *Orion Za* within each radius of these two theaters as a relevant geographic market, in terms of the number of theaters and capacity.²⁴ If we can define the area, at least, 10 km radius from *Subaru Za* and *Orion Za* as a geographic market, the share of Toho in the number and capacity decreases: for example, within a circle with 10 km radius from *Subaru Za* and *Orion Za*, the share of Toho was 6.52% in terms of number of theaters and 13.95% in terms of capacity.

²⁴ We have to note that the figure for each theater capacity is taken from Jiji Tsushin-sha (1951; 1952). Hence, the total capacity of Toho's theaters including *Subaru Za* and *Orion Za* is not identical to that reported in JFTC (1951; 1952).

As mentioned in Section 2, the wider the defined relevant geographic market, the smaller the anticompetitive effect of the agreement between Toho and Subaru must be. If a larger relevant geographic market than above can be defined, we can say that the merger would not have had a serious anticompetitive effect. In other words, the geographic market defined by the Tokyo High Court seems to have been relatively small.

7. Concluding Remarks

In 2004, the JFTC issued merger guidelines (JFTC (2004; 2007)) that outline the analytical and evaluative framework applied when the JFTC reviews mergers under the AMA, although, at the time of the *Toho–Subaru* case, there were no such guidelines for merger reviews by the JFTC.²⁵

The guidelines provide for the concept of definition of a relevant geographic market, and list the geographic business area of a supplier, the area where consumers travel for shopping, features of products and services, and transportation cost as important factors to be considered.²⁶ The philosophy behind the guidelines harmonizes with the empirical models of previous works and this study. The transportation cost is expected to increase with the distance between a consumer and a store, and the utility attained by consumers from shopping will decrease as the store is located further from them. Therefore, the area where consumers travel for shopping should be bounded. Econometric analyses of local market competition are an effective tool for scientific merger reviews.

The empirical results of this study show that the effects of nearest rivals (0–1 km) are smaller in magnitude than those of more distant rivals (1–5 km, and 5–10 km). One possible explanation is that agglomeration effects reduce the negative effects of competition on attendance. To separately identify these effects, we must incorporate agglomeration effects in the model. This is beyond the scope of this study, and will be a future research topic.

Finally, I must note the limitations of this study. First, because the time span of the data on the number of monthly attendees is only six months and the location of theaters did not vary during the sample period, I cannot control for the fixed effects of theaters. Second, in this study, physical

²⁵ The guidelines were revised in 2007. The main points of the revision include: (i) the concepts of the SSNIP test of market definition and the international market are explicitly incorporated into a merger review; (ii) the Hirschman-Herfindahl index is adopted as a threshold of the safe harbor rule; (iii) the criteria for assessment of competitive pressure from import, entry, and customers are revised; and (iv) structural merger remedies are principally applied. For more details, see Kawahama et al. (2008).

²⁶ See Section 2-3 of JFTC (2004; 2007).

distance between theaters and consumers is used as a measure of spatial differentiation. However, actual travel time may be more appropriate for accounting for spatial differentiation among movie theaters.

Appendix A: Map of Tokyo Metropolitan Area and Market Definition

= Figure 1 =

Appendix B: First-stage Regression Results

= Table 9-1 & 9-2 =

References

- Ashenfelter O, Ashmore D, Baker JB, Greason S, Hosken S. Empirical methods in merger analysis: Econometric analysis of pricing in *FTC v. Staples*. *International Journal of the Economics of Business* 2006; 13(2); 265–279.
- Baker JB. Econometric analysis in *FTC v. Staples*. *Journal of Public Policy & Marketing* 1999; 18(1); 11–21.
- Berry S, Levinsohn J, Pakes A. automobile prices in market equilibrium. *Econometrica* 1995; 63(4); 841–890.
- Chisholm DC, Norman G. Spatial competition and agglomeration: An application to motion pictures. mimeo 2009.
- Chung W, Kalnins A. Agglomeration effects and performance: A test of the Texas lodging industry. *Strategic Management Journal* 2001; 22(10); 969–988.
- Dalkir S, Warren-Boulton FR. Prices, market definition, and the effects of merger: *Staple-Office Depot* (1997). In: Kwoka Jr JE, White LJ (Eds), *The antitrust revolution: Economics, competition, and policy* (5th edition), chapter 7, Oxford Univ. Press: Oxford, UK; 2009. p. 178–199.
- Davis P. The Effect of local competition on retail prices: The US motion picture exhibition market. *Journal of Law and Economics* 2005; 48(2); 377–708.
- Davis P. Measuring the business stealing, cannibalization and market expansion effects of entry in the U.S. motion picture exhibition market. *Journal of Industrial Economics* 2006a; 54(3); 293–321.
- Davis P. Spatial competition in retail markets: Movie theaters. *RAND Journal of Economics* 2006b; 37(4); 964–982.
- De Vany A. *Hollywood economics: How extreme uncertainty shapes the film industry*. Routledge: Abingdon, U.K.; 2004.
- Einav L. Seasonality in the U.S. motion picture industry. *RAND Journal of Economics* 2007; 38(1); 127–145.
- Gaynor M, Vogt W. Competition among hospitals. *RAND Journal of Economics* 2003; 34(4); 764–785.

- General Administrative Agency of the Cabinet. Showa 25 nen kokusei chosa hokokku (Population census of 1950) Report by prefecture; part 13: Tokyo-to; Vol. VII; Tokyo; 1953 (in Japanese).
- Gil R. An empirical investigation of the Paramount antitrust case, forthcoming in *Applied Economics* 2009.
- Hayashi S. Merger regulation in the antimonopoly law, *Nagoya Journal of Law and Politics* 2008; 224; 21–117.
- Inoue A. Japanese antitrust law manual: Law, cases and interpretation of the Japanese antimonopoly act. *International Competition Law Series 27*; Kluwer Law International: Netherland; 2007.
- Japan Fair Trade Commission. Toho kabushiki kaisha no ken (the case of Toho, Co.): Showa 25 nen (han) 10 go. *Shinketsushu (JFTC Decision Report) 1951*; 2, 321–328 (in Japanese).
- Japan Fair Trade Commission. Toho kabushiki kaisha no ken (the case of Toho, Co.): Showa 25 nen gyo (na) 21 go. *Shinketsushu (JFTC Decision Report) Appendix 1 1952*; 3; 635–657 (in Japanese).
- Japan Fair Trade Commission. Guidelines to application of the antimonopoly act concerning review of business combination. 2004; revised in 2007.
- Jiji Tsushin-sha. Eiga nenkan (Jiji motion picture almanac). Tokyo; 1951; 1952; 1954 (in Japanese).
- Kalnins A. Markets: The U.S. lodging industry,” *Journal of Economic Perspectives* 2006; 20(4); 203–218.
- Kawahama N., Sensui F, Takeda K, Miyai M, Wakui M, Ikeda C, Hayashi S. *Kigyo Ketsugo Gaidorain no kaisetsu to bunseki (Merger and acquisition guidelines: examination and analysis)*. Tokyo: Shojihomu; 2008 (in Japanese).
- Manuszak MD, Moul CC. Prices and endogenous market structure in office supply superstores. *Journal of Industrial Economics* 2008; 50(1); 94–112.
- Myojo S, Ohashi H. Assessing the consequences of a horizontal merger and its remedies in a dynamic environment. mimeo 2009.
- Orbach BY, Einav L. Uniform prices for differentiated goods: The case of the movie-theater industry. *International Review of Law and Economics* 2007; 27(2); 129–153.
- Pinkse J, Slade ME, Brett C. Spatial price competition: A semiparametric approach, *Econometrica* 2002; 70(3); 1111–1153.
- Smith H. Supermarket choice and supermarket competition in market equilibrium. *Review of Economic Studies* 2004; 71(1); 235–263.
- Thomadsen R. The effect of ownership structure on price in geographically differentiated industries *RAND Journal of Economics* 2005; 36(4); 908–929.
- Warren-Boulton FR, Dalkir S. Staples and Office Depot: An event probability case study. *Review of Industrial Organization* 2001; 19(4); 467–479.
- White L. The role of competition policy in the promotion of economic growth. CPRC Discussion

Paper Series, Competition Policy Research Center, Japan Fair Trade Commission; CPDP-31-E;
2008.

Table 1. Movie Theaters in Marunouchi and Yurakucho Area and Ginza Branch Occupied Area

Theater name	Ward	Owner	Marunouchi Yurakucho	Ginza branch
<i>Subaru Za</i>	Chiyoda	Subaru	yes	yes
<i>Orion Za</i>	Chiyoda	Subaru	yes	yes
<i>Marunouchi Meiga Za</i>	Chiyoda	Subaru	yes	yes
<i>Teikoku Gekijo</i>	Chiyoda	Toho	yes	yes
<i>Nichigeki Chika Gekijo</i>	Chiyoda	Toho	yes	yes
<i>Hibiya Eiga Gekijo</i>	Chiyoda	Toho	yes	yes
<i>Yuraku Za</i>	Chiyoda	Toho	yes	yes
<i>Nihon Gekijo</i>	Chiyoda	Toho	yes	yes
<i>Nichigeki Sho Gekijo</i>	Chiyoda	Toho	yes	yes
<i>Piccadilly Gekijo</i>	Chiyoda	Shochiku	yes	yes
<i>Hiko Kan Toyoko Gekijo</i>	Minato	Toyoko Eiga	no	yes
<i>Shinbashi Metro Eiga Gekijo</i>	Minato	Toyoko Eiga	no	yes
<i>Ginza Zensen Za</i>	Chuo	Tokyo Kogyo	no	yes
<i>Theatre Ginza</i>	Chuo	Tokyo Kogyo	no	yes
<i>Movie Ginza</i>	Chuo	Individual	no	yes
<i>Ginza Shochiku Eiga Gekijo</i>	Chuo	Shochiku	no	yes
<i>Togeki Chika Gekijo</i>	Chuo	Shochiku	no	yes
<i>Tokyo Chuo Gekijo</i>	Chuo	Shochiku	no	yes
<i>Tokyo Gekijo</i>	Chuo	Shochiku	no	yes
<i>Tsukiji Eiga Gekijo</i>	Chuo	Shochiku	no	yes
<i>Shinbashi Enbujo*</i>	Chuo	Shochiku	no	no
<i>Shiraki Gekijo*</i>	Chuo	Shirakiya	no	no
<i>Mitsukoshi Gekijo*</i>	Chuo	Mitsukoshi	no	no
<i>Ningyocho Shochiku Eiga Gekijo*</i>	Chuo	Individual	no	no

Note: The sources are JFTC (1951; 1952) and Jiji Tsushin-sha (1951; 1952; 1954). Theaters with * are four theaters excluded from Ginza branch-occupied area by the JFTC and the Tokyo High Court.

Table 2. Share of Toho Theaters in *Toho–Subaru*

	No. of theaters	Capacity (No. of seats)
Toho + <i>Subaru Za</i> and <i>Orion Za</i>	8	9,742
Marunouchi & Yurakucho	10	10,787
Toho's share	80.00%	90.31%
Ginza occupied area	20	16,807
Toho's share	40.00%	57.96%

Note: The sources are JFTC (1951; 1952) and Jiji Tsushin-sha (1951; 1952; 1954).

Table 3. Ownership Structure of Movie Theaters in the Tokyo Metropolitan Area

Owner	Theaters in TMA			Samples	
	No.	Share	Cum.	No.	Coverage
Shochiku	17	8.85%	8.85%	15	88.24%
Toho	7	3.65%	19.27%	5	71.43%
Nikkatsu	7	3.65%	16.15%	7	100.00%
Tokyo Kogyo	6	3.13%	19.27%	5	83.33%
Musashino Eiga	6	3.13%	22.40%	5	83.33%
Individual	5	2.60%	25.00%	0	0.00%
Sanwa Kogyo	5	2.60%	27.60%	5	100.00%
Toyoko Eiga	5	2.60%	30.21%	3	60.00%
Misu Shoji	5	2.60%	32.81%	0	0.00%
Subaru Kogyo	3	1.56%	34.38%	2	66.67%
Kyoritsu Kogyo	3	1.56%	35.94%	3	100.00%
Shin Nihon Kogyo	3	1.56%	37.50%	2	66.67%
Individual	3	1.56%	39.06%	0	0.00%
Chiyoda Kogyo	3	1.56%	40.63%	0	0.00%
Individual	3	1.56%	42.19%	0	0.00%
Rosa Eiga-sha	2	1.04%	43.23%	2	100.00%
Hikari Kogyo	2	1.04%	44.27%	0	0.00%
Koto Rakutenchi	2	1.04%	45.31%	2	100.00%
Sakama Shoji	2	1.04%	46.35%	1	50.00%
Individual	2	1.04%	47.40%	1	50.00%
Miyako Kogyo	2	1.04%	48.44%	0	0.00%
Individual	2	1.04%	49.48%	2	100.00%
Individual	2	1.04%	50.52%	1	50.00%
Others	95	51.56%	100.00%	12	12.63%
Total	192	100.00		70	36.46

Note: September 1950. The source is Jiji Tsushin-sha (1951; 1952; 1954). The second, third, and fourth columns describe the ownership structure of theaters in the Tokyo metropolitan area (TMA), and the last two report the number and coverage of my regression sample theaters.

Table 4. Program Patterns of Theaters in Terms of Distributors

	Theaters in TMA			Samples	
	No.	Share	Cum.	No.	Coverage
Central	29	15.10%	15.10%	21	72.41%
Mixed	27	14.06%	29.17%	7	25.93%
Shochiku	19	9.90%	39.06%	10	52.63%
Daiei	16	8.33%	47.40%	9	56.25%
Tokyo Eiga Haikyu	13	6.77%	54.17%	5	38.46%
Shin Toho	8	4.17%	58.33%	6	75.00%
Europe	7	3.65%	61.98%	3	42.86%
Toho	4	2.08%	64.06%	1	25.00%
Central & Foreign	4	2.08%	66.15%	0	0.00%
Japanese & Foreign	4	2.08%	68.23%	0	0.00%
Mixed & Foreign	3	1.56%	69.79%	0	0.00%
Japanese	3	1.56%	71.35%	0	0.00%
Tokyo Eiga Haikyu & Foreign	2	1.04%	72.40%	0	0.00%
Daiei & Tokyo Eiga Haikyu	2	1.04%	73.44%	0	0.00%
Eastern	2	1.04%	74.48%	2	100.00%
Japanese & Mixed	2	1.04%	75.52%	1	50.00%
Western	2	1.04%	76.56%	1	50.00%
Others	45	23.44%	100.00%	4	8.89%
Total	192	100.00%		70	36.46%

Note: September 1950. The source is Jiji Tsushin-sha (1951; 1952; 1954). The second, third, and fourth columns describe the program patterns of movie showings of each theater in terms of contract distributors, and the last two report the number and coverage of my regression sample theaters. For example, “Daiei & Tokyo Eiga Haikyu” means that there were two theaters that showed movies distributed by Daiei and Tokyo Eiga Haikyu.

Table 5. Local Market Structure of Each Theater in Tokyo Metropolitan Area

	No. of own theaters				No. of rival theaters			
	$0 < d \leq 1$	$1 < d \leq 5$	$5 < d \leq 10$	$10 < d \leq 15$	$0 < d \leq 1$	$1 < d \leq 5$	$5 < d \leq 10$	$10 < d \leq 15$
Mean	0.781	0.646	1.292	0.125	4.104	30.000	66.979	51.031
S.D.	1.686	1.656	2.584	0.452	4.695	16.327	23.379	15.317
Min.	0	0	0	0	0	1	13	30
Max.	7	13	14	3	20	80	101	89
Percentiles:								
1%	0	0	0	0	0	2	13	31
5%	0	0	0	0	0	7	15	31
10%	0	0	0	0	0	10	33	34
25%	0	0	0	0	1	16	53	36
50%	0	0	0	0	2	31	73	50
75%	1	1	1	0	5	39	84	64
90%	2	2	4	0	11	49	93	71
95%	5	3	7	1	16	63	97	81
99%	7	13	14	3	19	80	101	89

Note: The number of sample theaters is 192. For more details, please see the main text.

Table 6. Descriptive Statistics of Regression Variables

	No.	Mean	S.D.	Min.	Max
ln(attend)	416	10.981	0.619	7.698	12.421
Own theaters:					
0 km < $d \leq 1$ km	416	1.716	2.309	0.000	7.000
1 km < $d \leq 5$ km	416	1.159	1.980	0.000	13.000
5 km < $d \leq 10$ km	416	2.870	3.485	0.000	14.000
10 km < $d \leq 15$ km	416	0.221	0.658	0.000	3.000
Rival theaters:					
0 km < $d \leq 1$ km	416	6.666	5.390	0.000	19.000
1 km < $d \leq 5$ km	416	35.707	10.710	8.000	72.000
5 km < $d \leq 10$ km	416	79.745	12.650	46.000	101.000
10 km < $d \leq 15$ km	416	45.224	12.839	30.000	84.000
Mean distance from consumers	416	8.763	0.862	7.700	12.418
Capacity (no. of seats)	416	9.639	6.034	2.440	37.180
Distance from nearest rival theaters	416	0.212	0.402	0.000	1.776
Shochiku own	416	0.216	0.412	0.000	1.000
Toho own	416	0.072	0.259	0.000	1.000
Nikkatsu own	416	0.101	0.302	0.000	1.000
No. of theaters (same owner)	416	6.966	5.643	1.000	17.000
Avg. of rivals' dist. from cons. (w/i 15 km)	416	9.919	0.221	9.531	10.340
Population within radiuses:					
$d \leq 1$ km	416	331.745	283.442	89.681	1,086.142
$d \leq 5$ km	416	778.757	150.780	389.522	1,086.142
$d \leq 10$ km	416	2,556.093	401.143	1,495.265	3,178.327
$d \leq 15$ km	416	3,803.942	348.707	2,597.825	4,177.548
Max. cap. among rivals within radiuses:					
0 km < $d \leq 1$ km	416	14.268	10.996	0.000	37.180
1 km < $d \leq 5$ km	416	21.871	8.783	5.200	37.180
5 km < $d \leq 10$ km	416	28.996	7.889	15.100	37.180
10 km < $d \leq 15$ km	416	15.226	9.165	6.200	37.180

Note: Population is reported in 1,000 persons, and capacity (the number of seats) is in 100 seats.

Mean distance from consumers is reported in 1,000 persons.

Table 7. Results of Attendance Regression

	(1)	(2)	(3)	(4)
	OLS	OLS	IV	IV
<i>a</i> ₁ : Own theaters				
0 km < <i>d</i> ≤ 1 km	-0.001 (0.020)	-0.002 (0.018)	-0.032 (0.026)	-0.032 (0.022)
1 km < <i>d</i> ≤ 5 km	0.002 (0.019)	0.000 (0.017)	-0.004 (0.024)	-0.008 (0.022)
5 km < <i>d</i> ≤ 10 km	-0.021 (0.015)	-0.022 * (0.013)	-0.028 (0.017)	-0.034 ** (0.014)
10 km < <i>d</i> ≤ 15 km	-0.109 ** (0.043)	-0.112 *** (0.036)	0.012 (0.064)	-0.021 (0.054)
<i>a</i> ₂ : Rival theaters				
0 km < <i>d</i> ≤ 1 km	-0.004 (0.015)	-0.005 (0.013)	-0.026 (0.019)	-0.028 * (0.016)
1 km < <i>d</i> ≤ 5 km	-0.051 *** (0.016)	-0.052 *** (0.014)	-0.068 *** (0.020)	-0.074 *** (0.018)
5 km < <i>d</i> ≤ 10 km	-0.028 ** (0.013)	-0.029 ** (0.012)	-0.032 * (0.016)	-0.037 *** (0.014)
10 km < <i>d</i> ≤ 15 km	-0.013 (0.015)	-0.014 (0.013)	-0.019 (0.018)	-0.022 (0.016)
<i>b</i> : ln(Capacity)	0.493 *** (0.051)	0.491 *** (0.045)	0.461 *** (0.050)	0.468 *** (0.044)
<i>c</i> : Mean distance	-0.980 *** (0.206)	-0.978 *** (0.169)	-1.354 *** (0.289)	-1.422 *** (0.242)
Constant	25.071 *** (3.585)	25.381 *** (3.025)	27.836 *** (4.907)	29.489 *** (4.145)
Program pattern dummies	yes	yes	yes	yes
Ward dummies	yes	yes	yes	yes
Month dummies	no	yes	no	yes
<i>R</i> ²	0.706	0.779	0.693	0.768
Hansen <i>J</i> stat. (<i>df</i> = 5)	-	-	5.599	6.510
<i>p</i> -value	-	-	0.347	0.260

Note: No. = 416. Dependent variable is the log of the number of attendees divided by the total population of Tokyo metropolitan area. Standard errors are in parentheses. ***, **, and * denote significant at 1%, 5%, and 10% level.

Table 8. Local Market Competition among Tokyo Movie Theaters in 1950

	No. of theaters			Capacity (*)		
	Total	Toho + 2	Share	Total	Toho + 2	Share
<i>Dist. from Subaru Za & Orion Za</i>						
$d \leq 1$ km	13	8	61.54%	16,103	12,556	77.97%
$d \leq 5$ km	52	8	15.38%	45,285	12,556	27.73%
$d \leq 10$ km	138	9	6.52%	100,038	13,956	13.95%
$d \leq 15$ km	189	9	4.76%	116,746	13,956	11.95%
Tokyo metropolitan area	192	9	4.69%	117,306	13,956	11.90%

Note: September 1950. Each theater capacity (the number of seats) is taken from Jiji Tsushin-sha (1951; 1952), and hence the total capacity of Toho's theaters as well as that of *Subaru Za* and *Orion Za* is not identical to that reported in JFTC (1951; 1952).

Table 9-1. First-stage Regression Results of Endogenous Variables

	Own $0 < d \leq 1$		Own $1 < d \leq 5$		Own $5 < d \leq 10$		Own $10 < d \leq 15$	
Avg. dist. from rivals (15 km)	10.782	***	2.484		-7.242	***	-6.025	***
	(1.030)		(2.161)		(1.801)		(0.666)	
ln(Capacity)	-0.059		-0.204	*	0.414	***	-0.150	***
	(0.077)		(0.108)		(0.113)		(0.041)	
Distance from rival	-0.243		-4.020	***	3.708	***	0.555	***
	(0.166)		(0.324)		(0.291)		(0.099)	
No. of theaters (same)	0.163	***	0.026		0.469	***	0.343	***
	(0.034)		(0.040)		(0.033)		(0.028)	
Population in 1947:								
$d \leq 1$ km	-0.001	***	0.005	***	-0.005	***	0.001	***
	(0.000)		(0.000)		(0.000)		(0.000)	
$d \leq 5$ km	0.001	***	0.001		-0.003	***	0.001	***
	(0.000)		(0.001)		(0.001)		(0.000)	
$d \leq 10$ km	-0.002	***	0.004	***	0.000		-0.002	***
	(0.000)		(0.001)		(0.001)		(0.000)	
$d \leq 15$ km	0.002	***	-0.003	***	0.000		0.001	***
	(0.000)		(0.001)		(0.001)		(0.000)	
Max. capacity of rivals:								
$0 \text{ km} < d \leq 1 \text{ km}$	-0.173	***	-0.125	***	0.270	***	0.027	***
	(0.009)		(0.016)		(0.015)		(0.007)	
$1 \text{ km} < d \leq 5 \text{ km}$	-0.011		-0.125	***	0.082	***	0.053	***
	(0.015)		(0.019)		(0.016)		(0.009)	
$5 \text{ km} < d \leq 10 \text{ km}$	0.069	***	-0.154	***	0.042	**	0.043	***
	(0.014)		(0.019)		(0.019)		(0.008)	
$10 \text{ km} < d \leq 15 \text{ km}$	0.035	*	0.159	***	-0.183	***	-0.012	
	(0.019)		(0.018)		(0.024)		(0.009)	
Constant	-109.444	***	-19.816		71.666	***	56.594	***
	(9.640)		(20.500)		(17.024)		(6.204)	
R^2	0.963		0.908		0.972		0.800	

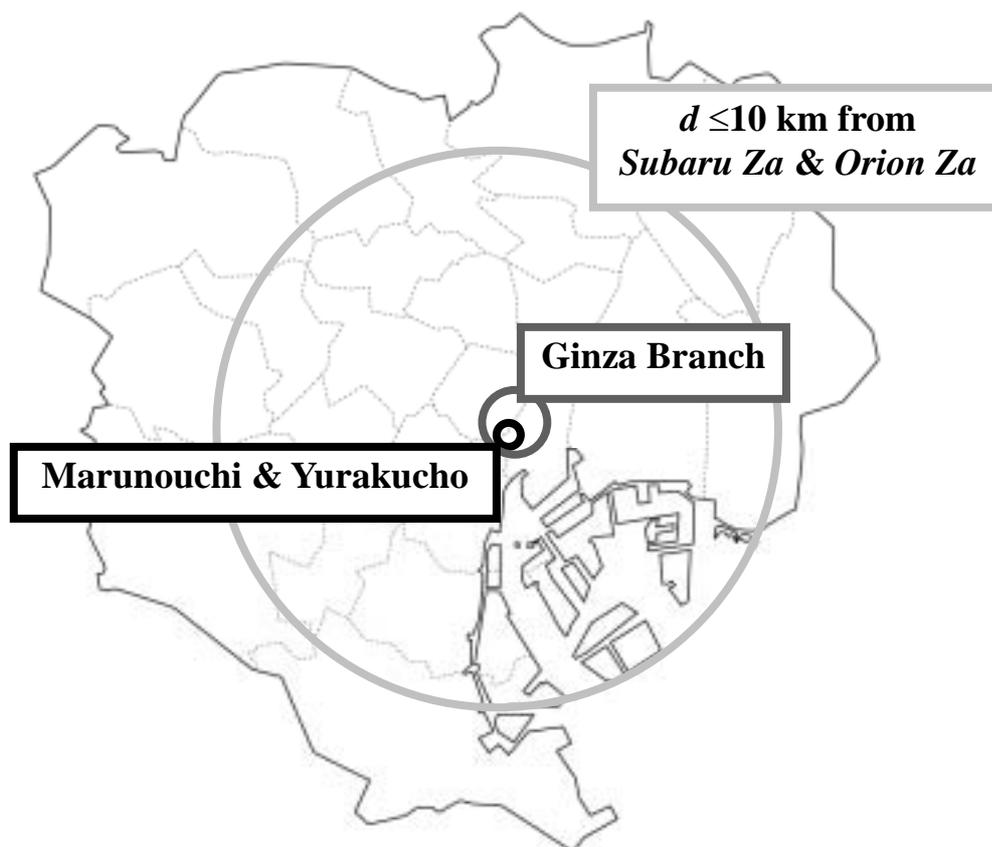
Note: No. = 416. All regressions include program pattern, ward dummies, and dummies for theaters owned by Shochiku, Toho, and Nikkatsu, respectively. Standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Table 9-2. First-stage Regression Results of Endogenous Variables

	Rival		Rival		Rival		Rival		Distance	
	$0 < d \leq 1$		$1 < d \leq 5$		$5 < d \leq 10$		$10 < d \leq 15$		from Cons.	
Avg. dist.	4.779		-4.296		9.317		25.052	***	-0.849	**
	(2.924)		(12.321)		(7.018)		(7.636)		(0.353)	
ln(Capacity)	0.454	***	-0.121		-0.654		0.391	*	-0.003	**
	(0.152)		(0.629)		(0.460)		(0.211)		(0.001)	
Distance	-1.808	***	-2.388	*	5.146	***	-1.156		-0.134	***
	(0.388)		(1.374)		(0.872)		(0.860)		(0.039)	
No.	0.160	***	-0.707	***	-0.351	***	-0.210	***	-0.004	
	(0.055)		(0.186)		(0.105)		(0.081)		(0.005)	
Pop. in 1947:										
$d \leq 1$ km	-0.002	***	0.000		0.003	***	-0.001		0.000	
	(0.000)		(0.001)		(0.001)		(0.001)		(0.000)	
$d \leq 5$ km	0.002	**	0.006	**	-0.012	***	0.004	***	0.000	**
	(0.001)		(0.003)		(0.002)		(0.001)		(0.000)	
$d \leq 10$ km	0.000		0.035	***	-0.006	*	-0.027	***	-0.001	***
	(0.001)		(0.004)		(0.003)		(0.002)		(0.000)	
$d \leq 15$ km	0.001		-0.020	***	0.018	***	0.002		0.000	
	(0.001)		(0.003)		(0.003)		(0.002)		(0.000)	
Max. cap.:										
$0 < d \leq 1$	0.295	***	-0.056		-0.028		-0.243	***	-0.002	
	(0.023)		(0.082)		(0.055)		(0.055)		(0.003)	
$1 < d \leq 5$	-0.025		0.262	***	0.095	*	-0.349	***	-0.012	***
	(0.032)		(0.088)		(0.058)		(0.058)		(0.003)	
$5 < d \leq 10$	-0.073	**	-0.121		0.354	***	-0.222	***	-0.008	**
	(0.032)		(0.086)		(0.062)		(0.067)		(0.003)	
$10 < d \leq 15$	0.010		-0.362	***	0.204	***	0.050		0.011	**
	(0.025)		(0.127)		(0.061)		(0.059)		(0.005)	
Constant	-44.031		62.204		-101.119		-139.263	*	22.418	***
	(27.444)		(117.910)		(66.291)		(72.150)		(3.365)	
R^2	0.971		0.930		0.977		0.986		0.987	

Note: No. = 416. All regressions include program pattern, ward dummies, and dummies for theaters owned by Shochiku, Toho, and Nikkatsu, respectively. Standard errors are in parentheses. ***, **, and * denote significance at 1%, 5%, and 10% levels.

Figure 1. Map of Tokyo Metropolitan Area



この地図の作成にあたっては、国土地理院長の承認を得て、四国発行の数値地図200000（地図画像）を使用したものである。（承認番号 平16地保、第62号）

Note: The original map was downloaded from the website of www.freemap.jp. This is a map of the current Tokyo metropolitan area, and it is somewhat different from that of the 1950s.