

The Relationship between Rental and Sale in the Japanese Video Market

by Sumiko ASAI*

Introduction

The motion picture industry has several different revenues sources. After theatrical exhibition, home video such as digital versatile disc (DVD) is released and is followed by premium cable services and pay-per-view services via satellite broadcasting. The movie is finally distributed to the public for free through terrestrial television broadcasting. Furthermore, home video is divided into video for rental and for sale, giving the public several options for enjoying a movie.

The marketing method that distributes a program through several channels at different times is called the windowing strategies. While producing a movie is very expensive, whether the movie will be a hit or not remains uncertain until after its release. Among all content industries, the motion picture industry is especially risky, judging from the possibility of hits and films' enormous production costs. Given such uncertainty, windowing strategies are designed to maximize the profits from hit movies by price discrimination. Recently, the Internet has been utilized to distribute movies, in addition to traditional channels such as television. This shows that windowing strategies are still in the development stage.

The main focus of marketing researches into motion pictures has been on box office revenues. This is reasonable, since movies that prove to be unpopular at the cinema do not tend to be distributed through other channels. However, while annual box office revenues were 202 billion yen in 2006, movie DVDs sales to retailers and rental stores reached 217 billion yen that year, surpassing the box office revenues in Japan, according to the data collected by the Motion Picture Producers Association of Japan, Inc. (MPPAJ) and the Japan Video Software Association (JVA).

We do not usually view the same movie repeatedly, so we select one distribution channel for viewing a program. Since the time intervals between theatrical exhibition and video release, and between video release and broadcasting differ, these distribution channels do not simultaneously compete with each other. If we miss going the theater, we have a chance to view the movie through video or broadcast after a certain time has passed. On the other hand, while Japanese movie

* Sumiko ASAI is an Associate Professor of Information Economics at the School of Social Information Studies, Otsuma Women's University.

companies generally release DVDs about seven months after films' initial release into theaters, DVDs for rental and sale are released almost simultaneously, and the relationship between rental and sale differs from the relationship between other windows.

Although the video rental system is popular with consumers, producers of digital content such as music CDs and game software have different views on the rental system. In Japan, it is prohibited to rent music albums featuring Japanese artists for a maximum period of three weeks after their sales release, in consideration of the impact of rental on albums sales. For albums featuring foreign artists, the rental prohibition period is one year after sale release. The game software industry has a more negative attitude toward the rental system. Game software is exclusively sold in a packaged format¹ and rental services are not provided except in a few cases. It seems that the motion picture industry does not view the rental system negatively in terms of the prohibition period.

However, consumers do not generally rent a video that they have already purchased. If rental perfectly substitutes for purchase, the introduction of the video rental system may not contribute to the expansion of the total video market, which consists of both sale and rental. The purpose of this paper is to ascertain through empirical studies whether or not the video rental system disturbs growth of the video retail market. If these markets do not have a substitute relationship, does the rental system provide consumers with access to a wide variety of content? First, this study examines the quantitative relationship between video rental and sale. Second, it analyzes the impact of the rental system on the variety of movies consumers are able to view, in other words, the qualitative difference between rental and sale.

The rest of the paper is organized as follows: The subsequent sections provide an overview of the Japanese video market and a brief review of the related studies. Following the overview, the model and the estimation results of empirical studies are described. The final section offers some concluding remarks.

Overview of the Japanese Video Market

Although the home videocassette market expanded with the diffusion of VHS-formatted videocassette recorders (VCRs) in the 1980s, VCRs have been replaced by DVD players since the late 1990s. As of March 2007, the penetration rate of DVD players into households reached 65.1 percent, according to the Consumer Confidence Survey conducted by the Japanese Cabinet Office. In proportion to the penetration of DVD players, the ratio of DVD sales to total video sales reached 98.3 percent in 2006, according to the data collected by the JVA. This shows that videotapes have been replaced by DVDs. Therefore, this study focuses on DVD software, since DVD is now the main format used in the home video market.

In Japan, the videotape rental business started in 1977, and the same system

also has been applied to DVDs. The Japanese Copyright Law gives copyright holders the distribution rights, which mean that videos may not be rented without their permission. According to these provisions, anyone who intends to enter the home video rental business has to obtain permission for lending DVDs from the copyright holders. However, it is difficult for rental stores to negotiate with every copyright holder to obtain such permission and it is also complicated for copyright holders to give permission to each rental store. Therefore, copyright holders trust the JVA with rental permission and the JVA comprehensively permits the owners of rental stores to provide rental services in order to simplify the licensing procedures. That is to say, DVDs are clearly divided into those for sale and those for rental based on the Copyright Law.

Table 1 shows the market trend for DVDs, using the JVA data. The JVA has collected data as measured by quantity and sales from video production companies and published them through the website of the JVA. Retail in Table 1 means DVD sales to retailers from video production companies, and Rental in Table 1 indicates DVD sales to rental stores. The retail market was 142 billion yen in 2001, and it reached 262 billion yen in 2005, nearly doubling over this four-year periods. However, the retail market shrunk by 40 billion yen in 2006 with the result that the total market decreased for the first time. Although the DVD rental market was only 6.7 billion yen in 2001, it has expanded steadily up until the present time. As a result, the rental market represented one third of the total DVD market in 2006.

Table 1: The Trend for DVDs (billion yen)

	Retail	Rental	Total	Ratio of Retail to Total (%)
2001	142.2	6.7	148.9	95.5
2002	178.3	15.7	194.0	91.9
2003	222.0	33.3	255.3	86.9
2004	250.9	67.2	318.1	78.9
2005	262.2	83.8	346.0	75.8
2006	221.4	101.9	323.3	68.5

Source: The Japan Video Software Association (JVA)

The JVA has classified DVDs into 19 genres such as foreign movies and Japanese movies. Measuring the genre share of DVD sales to retailers and rental stores showed that the top ranked genre was foreign movies. These movies represented a 34.7 percent share of all genres on average for the period from 2001 to 2006. Second place went to animated Japanese movies with an average share of 23.2 percent, and third was Japanese movies. The share of the top three genres was 73 percent on average for the five-year period in which measurements were made.

That is to say, three quarters of all DVDs retail sales are movies.

Sales of foreign movie DVDs to retailers and rental stores decreased by 31 billion yen in 2006 as compared with the previous year, causing the total DVD market to shrink, as mentioned above. This paper calculated the correlation coefficient between box office revenues and movie DVDs sales to consumers in order to examine the relationship between them. Japanese and foreign movies were measured including animated movies, which earned box office revenues exceeding 1 billion yen in 2005. Data on box office revenues are available from the website of the MPPAJ. Since the average interval between a movie's release and a video's release is seven months in Japan, some DVDs were released in 2006. Therefore, DVD sales in 2006 are also covered. The DVD sales data are measured by unit and are available from the *Oricon Yearbooks 2006 and 2007*. The correlation coefficient between the box office revenues for Japanese movies and their corresponding sales as DVDs was 0.965 and the correlation coefficient between box office revenues for foreign movies and their DVDs sales was 0.917. Thus, a strong and positive relationship existed. Box office revenues of foreign movies decreased from 116 billion yen in 2005 to 94.9 billion yen in 2006. From the positive relationship between box office revenues and DVDs sales, it appears that the decrease in DVDs sales of foreign movies in 2006 was caused by a slump in foreign movies², and this is the main factor contributing to the decrease in total DVDs sales in 2006.

Average price may be calculated by dividing sales by quantity. Prices of DVDs for retailers set by video production companies differ significantly from those set for rental stores. The average price of DVDs shipped to retailers was 2,884 yen in 2006, while that of DVDs shipped to rental stores was 4,511 yen. When rental stores lend music CDs to consumers, copyright license fees for the rentals are paid to copyright holders in proportion to the number of times that the CDs are rented. In contrast, for visual DVDs, in many cases, the license fees for the rentals are included in the price of DVDs shipped to rental stores and these fees are set at a fixed rate, regardless of the number of times the DVD is rented. One factor contributing to the difference in DVDs prices between retailers and rental stores is the license fee for rental. Furthermore, while the average price of a DVD in the total market was 3,567 yen in 2001, the average price in 2006 was 3,253 yen. The prices of DVDs shipped to both retailers and rental stores tended to decrease.

Related Literature

While the primary focus of many studies on the motion picture industry is the factors involved in the success of a movie³, the rental system and windowing strategies have received little attention. When video rental stores in the U.S. obtain videos from movie distributors, revenue-sharing contracts have been widely used since the late 1990s, whereas, in Japan, a fixed rate for license fees has been

popular. Regarding the contracts in the rental system, Mortimer (2007) investigated the effect of the introduction of revenue-sharing contracts on firms and consumer welfare. In relation to the windowing strategies, Lehmann and Weinberg (2000) focused on the timing of video release after theater exhibition and calculated the optimal release time based on exponential sales curves. They also reported that the correlation coefficient between domestic box office revenues and DVD rental revenues was 0.24 in 2001, and that the correlation between box office revenues and DVD sales was 0.81 in 2002. Furthermore, Weinberg (2005) conducted an overview of the U.S. video market and raised research issues regarding the market. Although Eliashberg, Elberse and Leenders (2006) also pointed out that the relationship between the theatrical and non-theatrical window is one of the research areas in the motion picture industry that is worthy of examination, we found few studies that examined the relationship between windows.

The provision of video sale and rental services starts at almost the same time. In this sense, the relationship between sale and rental of DVDs closely resembles the relationship between sale of music CDs and Internet distribution including file sharing rather than the relationship between other windows in the motion picture industry. However, while file sharing is largely illegal, the rental of DVDs in this study is completely lawful.

Turning to the literature on the Internet distribution of music, several empirical studies on the relationship between distribution channels have already been conducted using a few different approaches. First, Liebowitz (2006) analyzed the music market using aggregated time series data and concluded that file sharing reduced the sales of packaged music. Second, Oberholzer and Strumpf (2007) conducted an empirical analysis on the effect of file sharing on records sales using data by title. They measured record purchases using instrumental variables and found that the effect of downloads on CD sales was statistically indistinguishable from zero. Third, Zentner (2006) used European individual-level data collected through the mail by a research company and measured the probability of music purchase by individuals. From the analysis, Zentner reported that peer-to-peer usage reduced the probability of purchasing music by 30 percent.

This paper estimated two DVD sales and rental demand functions, adding variables that have an impact on sales and rental demands in order to examine the relationship between DVD rental and DVD sale. The first is an analysis using aggregated data from January 2001 to December 2006. The second is cross-section analysis using data by title in 2005.

Analysis using Time Series Data

The JVA has published data on monthly shipments of DVDs to rental stores and retailers. Since these monthly data are not classified by genre, the subject of

analysis is the overall DVD market. This paper specified the demand functions of retailers and rental stores by equations (1).

$$\begin{aligned} \ln(\text{retail sale}) &= \alpha_1 + \beta_1 \ln(\text{retail price}) + \gamma_1 \ln(\text{rental sale}) + \lambda_1 \ln(\text{DVD player}) \\ \ln(\text{rental sale}) &= \alpha_2 + \beta_2 \ln(\text{rental price}) + \gamma_2 \ln(\text{retail sale}) + \lambda_2 \ln(\text{DVD player}) \end{aligned} \quad (1)$$

where variable retail sale indicates DVDs shipped to retailers, and rental sale is DVDs shipped to rental stores. Both retail sale and rental sale are measured in thousands of units. Retail price is the average price and is calculated by dividing sales to retailers by sales quantity. Similarly, rental price is calculated by dividing sales to rental stores by quantity. Retail price and rental price are measured in yen. Researchers have often pointed out that a positive feedback mechanism operates between hardware and software in the information industry. Gandal, Kende and Rob (2000) found that indirect network externalities existed between CD players and CD titles. Karaca-Mandic (2003) elucidated the positive relationship between DVD players and DVD software. Taking into consideration the positive feedback between hardware and software, this study adds the variable DVD player which indicates the cumulative production of DVD players (unit: thousands). The starting point is January 2001. Retail and rental sales data are available from the JVA, and the data on DVD players are available from the website of the Japan Electronics and Information Technology Industries Association (JEITA). Table 2 reports the sample summary.

Table 2: Sample Summary Statistics (time trend data)

	retail sale	retail price	rental sale	rental price	DVD player
average	5736.6	3145.1	841.9	5575.6	12234.9
max	14399.0	4489.8	2571.0	14048.8	30593.0
min	1909.0	2441.6	39.0	3717.9	81.0
standard deviation	2221.4	410.4	706.5	1357.8	9780.3

β_1 and β_2 are expected to be negative values. If γ_1 is negative, the development of rental services is considered to disturb the growth of the retail market. Similarly, when γ_2 is negative, the expansion of the retail market is considered to have a negative impact on the rental market.

This paper estimated equations (1) simultaneously using the full information maximum likelihood method. Table 3 shows the estimation results. The coefficients of β_1 and β_2 are negative as anticipated. γ_1 is -0.0198 and negative, but is not significant at the 10 percent significance level. These findings do not support the

hypothesis that the development of the rental system disturbs the retail market. On the other hand, γ_2 is significantly positive indicating that the retail market leads to the expansion of the rental market. Both λ_1 and λ_2 are positive. Although video rental stores hitherto stocked videocassettes, it can be seen that they have replaced videocassettes with DVDs with the penetration of DVD players into households.

Table 3: Estimation Results (time trend data)

retail sale		rental sale	
α_1	15.3166 (3.3876)*	α_2	0.9535 (2.8420)
β_1	-1.0134 (0.4055)**	β_2	-1.0006 (0.1429)*
γ_1	-0.0198 (0.2182)	γ_2	1.0816 (0.3744)*
λ_1	0.1751 (0.1674)	λ_2	0.5211 (0.0705)*
adjusted R ²	0.613	adjusted R ²	0.936
Log likelihood	-1064.10		
The number of observations	72		

The standard errors are in parentheses. * 1 percent level ** 5 percent level

Analysis using Cross Section Data

This paper also specified the demand functions using cross-section data by title. The subject of estimation is the rental top 100 as calculated by the number of times that a DVD was rented in 2005. These ranking data have been published on the website of the Compact Disc & Rental Commerce Trade Association of Japan (CDV-Japan) since 2005. There are a few DVDs of television dramas in the rental top 100. While movies are generally on a single DVD, television dramas series require multiple DVDs and are sold as a DVD set. On the other hand, when television dramas DVDs are rented, a single DVD rather than a DVD set is rented. That is to say, the manner in which television dramas DVDs are sold and how they are rented is different. Therefore, television dramas DVDs were excluded from the observations for estimation. Demand functions for rental and sale are specified by equations (2).

$$\begin{aligned} \ln(\text{sale}) &= \alpha_1 + \beta_1 \ln(\text{price}) + \gamma_1 \ln(\text{rental times}) + \lambda_1 \text{box office} \\ \ln(\text{rental times}) &= \alpha_2 + \gamma_2 \ln(\text{sale}) + \lambda_2 \text{anima} \end{aligned} \quad (2)$$

where the variable rental times represents the number of times that the DVD was rented in the rental top 100. The variable sale is units by title sold from retailers to

consumers. The explanatory variable price is the price of DVDs which consumers purchase and is measured in yen. This is not the same as retail price in equations (1), as the variable retail price in equation (1) is the average price of DVDs. DVD sale and the price data are available from the *Oricon Yearbook 2006*. Explanatory variable box office represents the box office revenues of the movie on the DVD. Since a more popular movie is expected to generate a large number of DVD sales as shown by the correlation coefficients, the variable box office measured in billions of yen is added. The MPPAJ publishes only the titles and revenues of movies which have annual box office revenues exceeding one billion yen. Box office revenues of 46 titles in the rental movie top 100 did not reach one billion yen and these data are therefore not available. When box office revenues are less than one billion yen, the variable box office is set to 0. Therefore, the variable is not transformed into a logarithm. While ordinary movies are viewed by adults, most animated movies are produced for children and viewers of ordinary movies and animated movies differ. Therefore, this paper adds a binary variable anima to identify genre. Anima is set to 1 if the DVD is an animated movie and is 0 otherwise. Table 4 describes the sample summary.

Table 4: Sample Summary Statistics (cross-section data)

	sale	price	rental times	box office	anima
average	120853.7	3958.6	54942.3	22.6	0.14
max	1514370	8400.0	210132	396	1.0
min	15718	999	18687	0.0	0.0
standard deviation	204404.2	1098.3	36173.3	47.3	0.35

Equations (2) are also estimated using the full information maximum likelihood method and Table 5 shows the estimation results. The estimated coefficient of γ_1 indicating the impact of the rental system on the retail market is 0.2568 and positive, but is not significant at the 10 percent significance level. γ_2 is significantly positive. The positive impact of retail on the rental market is common to the results attained from the analysis using the time series data. λ_1 is significantly positive, as anticipated. λ_2 is significantly negative indicating that there is consumers' preference for purchasing rather than renting animated videos

Table 5: Estimation results (cross-section data)

retail sale		rental times	
α_1	10.4632 (8.2197)	α_2	7.3854 (1.0522)*
β_1	-0.2914 (0.3766)		
γ_1	0.2568 (0.6257)	γ_2	0.3101 (0.0945)*
λ_1	0.0109 (0.0022)*	λ_2	-0.5489 (0.2412)**
adjusted R ²	0.400	adjusted R ²	0.429
Log likelihood	-2361.63		
The number of observations	100		

The standard errors are in parentheses. * 1 percent level ** 5 percent level

Qualitative Difference

This section examines the qualitative difference between rental and sale of DVDs, while the above two estimations are quantitative analyses. The subject of analysis is the rental ranking of the top 30 movie DVDs in 2005, and the correspondence between rental rankings and sale rankings is examined. If the top 30 rental DVDs overlap with the top selling 30, it implies that the rental system is competing with the retail market. If there is no overlap between them, we may say that the introduction of the rental system contributes to enhancing the variety of movies that consumers can enjoy. Rental and sales rankings data from 2005 are available from the CDV-Japan's website and the *Oricon Yearbook 2006*, respectively.

Fifteen of the top 30 DVD rentals titles entered the top selling 30. Another 5 rental DVD titles appeared on the sales charts ranking from 31 to 100. However, the rest of the 30 rentals, 10 titles did not appear on the sales charts top 100. That is to say, the rental rankings do not always correspond with the sales rankings. Weinberg (2005) also reported that there was virtually no overlap between the top 10 rentals and the top 10 selling videos in 2002 in the U.S. It is supposed that consumers choose whether to rent or purchase depending on the title, provided that we examine the correspondence among the top 30 DVDs. However, the observations in this study are limited to data in 2005 due to the availability of data. If studies using abundant and future data will reach the same conclusion, we may assert that the rental system provides consumers with the opportunity to choose from a variety of content.

Conclusions

This paper conducted empirical studies to examine the relationship between rental and sale of DVDs and found that the rental system does not disturb the development of the retail market. The results imply that rental stores are large-scale and regular customers for video distributors and that the rental system may be regarded as another channel that enables distributors to increase their revenues. Furthermore, it seems that consumers distinguish between purchase and rental by DVD title, and that the rental system provides them with opportunity to have contact with a wide variety of content.

However, since the number of observations and independent variables used for the estimations are limited in this paper due to the availability of data, it is desirable to re-estimate the demand function using numerous observations in order to strengthen the results reported in this study. At present, available data are limited to the ranking of rental DVDs since 2005 and to movies whose box office revenues exceed 1 billion yen. Thus, the storage of data in the field of video content is not complete. The establishment of a database is essential for further studies on the Japanese motion picture industry.

Furthermore, this paper dealt with the impact of the rental system on the retail DVD market. Recently, several distributors have introduced the Internet distribution of movies. Although the video distribution market through the Internet is still in its infancy, it may have an impact on the sales of packaged content such as DVDs. The impact of Internet distribution on the packaged content market needs to be considered.

NOTES

1. Recently, it has become common for game software to be distributed through the Internet.
2. Most foreign movies released in Japan are Hollywood movies. Although box office revenues of foreign movies released in Japan decreased from 116 billion yen in 2005 to 95 billion yen in 2006, box office revenues in the U.S. increased by 5.5 percent in 2006.
3. For example, Prag and Casavant (1994), Vany and Walls (1999), Vany (2006) and Asai (2006).

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