E C O N O M I C S B U L L E T I N

Stock Price Reactions to Public TV Programs on Listed Japanese Companies

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Abstract

This paper investigates stock price reactions to Japan fs popular TV program gProject X, h which was broadcast on NHK between 2000 and 2005. @By using a standard event study methodology, we found that stock prices of these companies increased on average after the broadcast. In particular, the programs focusing on product development and marketing tended to raise stock prices.

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1. Introduction

Faced with increasing competition and technological development, Japan's TV broadcasting industry has been under transition in recent years.[1] Japan's major TV broadcasting companies have traditionally depended largely on commercial revenues. However, while new media such as satellite media and the Internet have become increasingly popular, the advertising expenditures on old media including television decreased in 2005 (Dentsu, 2006; Table 1). In addition, zapping[2] and the new technology of commercial (CM) skip[3] are providing further incentives for client firms to decrease advertising expenditures on television. According to the survey conducted by the Nomura Research Institute (2005), the CM skip rate of the TV programs, which were recorded and watched by HDR users in Japan, amounted to 64.3% on average in spring 2005. The estimated loss caused by the CM skip was approximately Y 5.4 billion per year, which was about 2.6% of the entire TV CM expenditures. The revenue from the TV CM is likely to decrease further in the future, considering the continuing diffusion of HDR, which enables viewers to skip CMs.

One of the ways to maintain commercial revenue is to tie up TV programs with client firms. There have already been several examples of this kind of tie-up. For example, TV dramas are sometimes supported by hotels and/or airplanes companies under the condition that the hotels and/or airplanes are shown in the dramas. Another example is quiz shows that use the products of sponsors as presents for winners. Although some analysts have claimed that such tie-ups could actually positively affect consumer sentiment for sponsoring companies, very few papers have attempted to quantify the financial impacts of tie-ups. If we find an increase in stock prices of companies featured on TV, TV broadcasting could provide sponsoring companies with additional incentives for tie-ups, since TV is one of the most appealing media for mass-targeting.

These considerations have led us to investigate how stock prices of companies picked up by Japan's popular TV documentary "Project X" were influenced by content and audience ratings of broadcasting. "Project X" was broadcast by Japan's public broadcasting company, NHK, from 2000 to 2005. Since this program regularly

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[1] For details on recent circumstances related to Japan's broadcasting industry, see Sato (2002) for example.

[2] Zapping is a behavior of switching to another channel usually by using a remote control device in order to avoid commercials.

[3] CM skip is a behavior of forwarding and skipping commercials when playing recorded TV programs.

featured past stories about successful Japanese companies and people, and was also a nationally famous and influential show, we believe that examining the effects of this program could provide information on possible future tie-ups among profit-maximizing firms.

To quantify the influence of documentaries on firms, we employed a standard event study methodology. We found that stock prices of the companies featured on "Project X" increased on average after the broadcast. In particular, the programs focusing on product development and marketing tended to raise stock prices.

Although theoretical consideration is not our main concern, we should note that documentaries per se were not new and some of the stories were already known. There are several hypotheses that could explain our results. First, the so-called price pressure hypothesis states that public attention alone could move stock prices even without any new information (Huberman and Regev, 2001; Meschke, 2002; Barber and Odean, 2005; Fehle et al., 2005).[4] Second, the investor recognition hypothesis indicates that an increase in visibility conveys new information to investors who are not shareholders and encourages some of them to become new shareholders (Merton, 1987). Third, the information hypothesis suggests that the TV broadcasting actually reveals new information. Since we do not examine which hypothesis is most reasonable, the future research should be valuable to pursue the question.

The rest of this paper is organized as follows. Section 2 explains the data. Section 3 describes the event study methodology. Section 4 discusses the results. Concluding remarks are provided in Section 5.

2. Data

First, among 190 "Project X" programs broadcast from 2000 to 2005, we selected as our sample 69 programs that featured listed Japanese companies. Then we divided

[4] Some recent studies on behavioral finance have tried to examine how the attention might influence on investors' decision. In their seminal paper, Huberman and Regev (2001) analyzed a puzzling rise in stock prices of a small biotechnology company, which appeared in *New York Times*, and claimed that public attention alone could move stock prices even without any new information. Inspired by Huberman and Regev (2001), Meschke (2002) provided evidence that CEO interviews on CNBC caused positive stock price reactions between 1999 and 2001. Barber and Odean (2005) showed that individual investors were net-buyers of stocks in news and high trading volume. By using an event study methodology, Fehle et al. (2005) found significantly positive stock price reactions for firms identifiable from the ad contents in Super Bowl broadcasts during 1969-2001.

our sample by industry, content, and audience ratings. The data on audience ratings were obtained from the Video Research Ltd. website (http://www.videor.co.jp).

Next, we calculated the daily stock returns of the listed companies which were featured on "Project X" from 2000 to 2005 and the daily returns of the Tokyo Stock Price Index (TOPIX), by using Toyo Keizai's *Kabuka CD-ROM* 2006, as follows:

$$R_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}}, \text{ and } \quad R_{mt} = \frac{T_t - T_{t-1}}{T_{t-1}},$$

where P_{it} is the stock price of the *i*th firm at time *t*, R_{it} refers to its rate of return, T_t represents TOPIX at time *t*, and R_{mt} is its rate of return.

Figure 2 presents the industry composition of our sample. Since each industry has small number of firms except for electronics industry, we do not analyze the effect of the industry variation on stock prices in the latter sections. Table 2 shows descriptive statistics of daily stock returns of our sample. We note that medians of all categories are almost zero, which indicates that stock markets seemed to be efficient.

3. Methodology

To measure the impact of the broadcasting of the documentary on stock prices, we used the standard event study methodology as described by MacKinlay (1997). We defined the events in two ways: the first is the day after the trailer was broadcast a week before the program (Event 1), and the second is the day after the program was broadcast (Event 2). The reason why we employed the day after broadcast is that both the program and the trailer were broadcast in the evening, after the stock market had closed.

We next chose event windows, which are the period over which stock prices react to the event. We defined the event day as t_0, the initial date of the event window as t_1, and the final date of the event window as t_2. For Event 1, we employed a 7-day event window, and for Event 2 a 3-day event window (see Figure 1). The first 7-day event window is set to examine the whole impact of the program after the trailer was broadcast, while the second 3-day event window is chosen to investigate the direct impact of the program. We set the estimation window at 100 transaction days prior to the event window.

Then the following market model was estimated for each broadcast:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it},$$

where ε_{it} is the zero mean disturbance term. By using the estimated parameters $\hat{\alpha}_i$

and $\hat{\beta}_i$, the abnormal return for the stock of firm *i* in period *t* is calculated by:

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}).$$

The cumulative abnormal return (CAR) is obtained by summing up abnormal returns over the event window:

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it}.$$

By averaging the CAR and its variance $\sigma_i^2(t_1, t_2)$ across *N* firms in the same category, we can compute the average CAR ($\overline{CAR}$) and its variance:

$$\overline{CAR}(t_1, t_2) = 1/N \sum_{i=1}^{N} CAR_i(t_1, t_2),$$

$$VAR\left[\overline{CAR}(t_1, t_2)\right] = \bar{\sigma}^2(t_1, t_2) = 1/N^2 \sum_{i=1}^{N} \sigma_i^2(t_1, t_2).$$

Assuming the null hypothesis H_0 that the mean or variance of returns is not affected by each event, we can test whether the average CAR is zero by using the J-statistic:

$$J = \frac{\overline{CAR}(t_1, t_2)}{\sqrt{\bar{\sigma}^2(t_1, t_2)}} \sim N(0,1).$$

4. Discussion

Table 3 presents the average CAR and the statistical significance for each category. Since our sample is not large, we first tried to find the companies that had extremely high or low J-statistics. We picked up two events about Mizuno and Kawasaki. Mizuno is a sporting goods company, which developed ultra-light shoes for Carl Lewis, a world-famous athlete. The fact that this development story was broadcast before the Sydney Olympic Games might have led to extremely high stock prices with J-statistics of 11.3667 for Event 1 and 11.1259 for Event 2. Likewise, the J-statistics of Kawasaki, an automobile company, were 1.3069 and -10.2683 for Event 1 and Event 2, respectively. Then we calculated the average CARs and J-statistics for both cases with and without Mizuno and Kawasaki.

The average CARs of all companies are significantly positive for both Event 1 and Event 2. In addition, even without Mizuno and Kawasaki, the average CAR is positive at a 1% significance level for Event 2. In other words, companies picked up

by “Project X” tended to benefit from an increase in stock prices.

Regarding the contents, the average CARs of product development are positive at a 1% significance level for both Event 1 and Event 2. Even without Mizuno, the average CAR is significantly positive for Event 2. This means that product development stories tend to push up stock prices, possibly because the past success in product development indicates that firms possess strong basis for competition. The average CAR of marketing is also positive at a 1% significance level for Event 2, possibly because marketing capability is likely to increase sales of products, although we should be careful to derive implications due to the small sample size. In contrast, the average CAR of public works is negative at a 1% significance level for Event 2, and even without Kawasaki, it is also significantly negative for Event 2. Although we need caution to derive implications considering the small sample size, Japanese investors may not regard the TV program on the past public works about building social infrastructure as appealing. This may be because the majority of our sample of public works is about the construction industry, which has long suffered from the setback after the collapse of the bubble economy in 1991 and the decrease in public works since the end of the 1990s.

As for the effect of audience ratings, we expected that higher ratings would lead to larger average CARs. Since the audience rating is the ranking of the number of the audiences of TV programs per week, we conjectured that larger number of audiences would increase the impact of the program on stock prices. Table 3 shows that the average CARs of lower than the 11^{th} rank are significantly positive, while those without Mizuno are insignificant for both Event 1 and Event 2. In contrast, the average CARs of higher than and equal to 10^{th} rank are insignificant, while those without Kawasaki are significantly positive at a 1% level for Event 2. If we take the results without Mizuno and Kawasaki, our results seem to be consistent with our conjecture that a high audience rating may raise stock prices, although we need a little caution in deriving implications considering the small number of the programs with the high audience rating.

5. Concluding remarks

This paper investigates how stock prices of companies featured on Japan’s popular TV program “Project X” were influenced by content and audience ratings of broadcasting. By using a standard event study methodology, we found that stock prices of these companies increased on average after the broadcast. In particular, the programs focusing on product development and marketing tended to raise stock prices.

Acknowledgements

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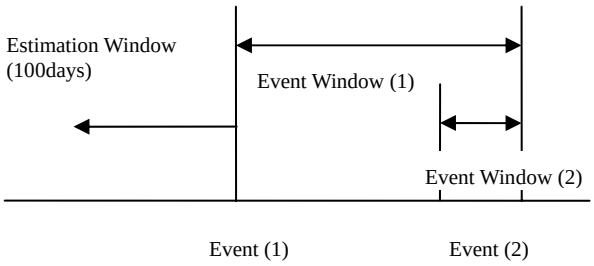
Figure 1: Event and Estimation Windows



Notes on the selection process of the event study:
First, we define the events in two ways: Event 1 is the day after the trailer was broadcast a week before the program, and Event 2 is the day after the program was broadcast. We next choose event windows, which are the period over which stock prices react to the event. For Event 1, we employ a 7-day event window, and for Event 2 a 3-day event window. The first 7-day event window is set to examine the whole impact of the program after the trailer was broadcast, while the second 3-day event window is chosen to investigate the direct impact of the program. Then we set the estimation window at 100 transaction days prior to the event window.

Figure 2: Industry Composition

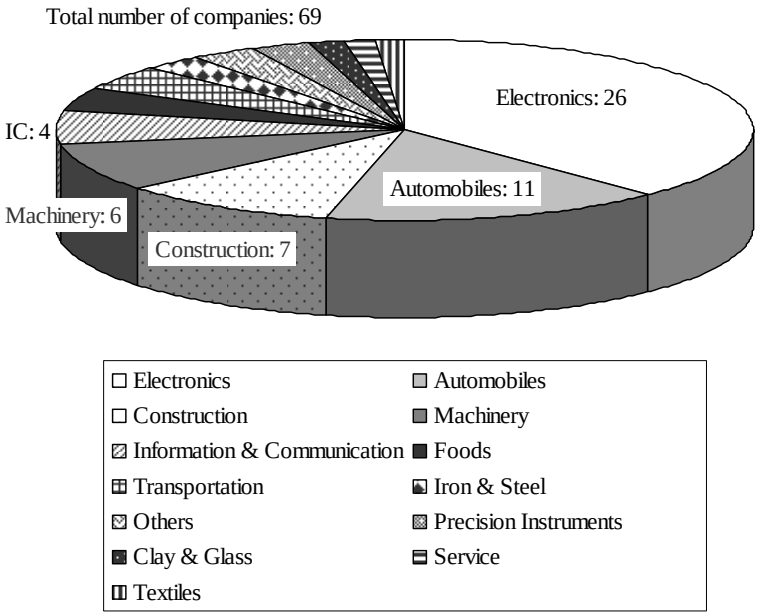


Table 1: Advertising Expenditures by Medium (2003-2005)

	Advertising expenditures (Y billion)			Weight		
	2003	2004	2005	2003	2004	2005
Major Media	3,582.2	3,676.0	3,651.1	63.0%	62.8%	61.2%
(Growth rate, %)		(2.6%)	-(0.7%)			
Newspaper	1,050.0	1,055.9	1,037.7	18.5%	18.0%	17.4%
(Growth rate, %)		(0.6%)	-(1.7%)			
Magazines	403.5	397.0	394.5	7.1%	6.8%	6.6%
(Growth rate, %)		-(1.6%)	-(0.6%)			
Radio	180.7	179.5	177.8	3.2%	3.1%	3.0%
(Growth rate, %)		-(0.7%)	-(0.9%)			
Television	1,948.0	2,043.6	2,041.1	34.3%	34.9%	34.2%
(Growth rate, %)		(4.9%)	-(0.1%)			
Sales Promotion	1,941.7	1,956.0	1,981.9	34.2%	33.4%	33.2%
(Growth rate, %)		(0.7%)	(1.3%)			
Satellite Media-Related	41.9	43.6	48.7	0.7%	0.7%	0.8%
(Growth rate, %)		(4.1%)	(11.7%)			
Internet	118.3	181.4	280.8	2.1%	3.1%	4.7%
(Growth rate, %)		(53.3%)	(54.8%)			
Total	5,684.1	5,857.1	5,962.5	100.0%	100.0%	100.0%
(Growth rate, %)		(3.0%)	(1.8%)			

(Source) Dentsu (2006).

Table 2: Descriptive Statistics of Daily Stock Returns

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Number of observations
All sample	0.0003	0.0000	0.1735	-0.3333	0.0194	0.0947	11.9157	14,904
TOPIX	0.0000	-0.0001	0.0632	-0.0636	0.0124	-0.1315	1.8887	7,452
Indivisual firms	0.0007	0.0000	0.1735	-0.3333	0.0245	0.0821	8.4776	7,452
(Contents)								
Product development	0.0003	0.0000	0.1735	-0.1553	0.0239	0.5311	3.7761	4,212
Marketing	0.0013	0.0000	0.1623	-0.0942	0.0220	0.5276	3.7328	1,944
Public works	0.0008	0.0000	0.1277	-0.3333	0.0294	-0.9907	16.1965	1,296
(Audience rating)								
≤ 10	0.0011	0.0000	0.1509	-0.3333	0.0300	-0.8772	13.5972	1,404
>11	0.0006	0.0000	0.1735	-0.1553	0.0230	0.5622	4.0725	6,048

Table 3: Average CARs and J-Statistics

	Number of observations	Event 1		Event 2	
		CAR	J-statistic	CAR	J-statistic
All sample	69	0.0056	2.2161 **	0.0073	2.8996 ***
(without Mizuno and Kawasaki)	67	0.0017	0.6658	0.0087	3.4221 ***
Content					
Product development	39	0.0109	3.3389 ***	0.0122	3.7265 ***
(without Mizuno)	38	(0.0050)	(1.5258)	(0.0006)	(1.9579) **
Marketing	18	0.0041	0.9934	0.0178	4.3165 ***
Public works	12	-0.0094	-1.2184	-0.0241	-3.1224 ***
(without Kawasaki)	11	-(0.0138)	-(1.7309) **	(0.0002)	(0.1915)
Audience rating					
≤ 10	13	0.0073	1.0395	0.0089	1.2764
(without Kawasaki)	12	(0.0046)	(0.6464)	(0.0352)	(4.9194) ***
>11	56	0.0052	1.9620 *	0.0069	2.6185 **
(without Mizuno)	55	(0.0011)	(0.3935)	(0.0029)	(1.0900)

Note: ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.