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IS UNIVERSITY SPORTS AN ADVERTISEMENT IN THE HIGHER EDUCATION MARKET? AN ANALYSIS OF THE HAKONE LONG-DISTANCE RELAY ROAD RACE IN JAPAN

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Is university sports an advertisement in the higher education market? An analysis of the *Hakone* long-distance relay road race in Japan

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Abstract. A university long-distance relay road race, the *Hakone Ekiden*, is widely acknowledged as the most popular New Year's sporting event in Japan. The event is held immediately prior to the university application period in Japan. Using Japanese panel data for 2001-2014, this study examined how the *Hakone Ekiden* race influences the behavior of students preparing for university entrance examinations. The major finding is that the number of applicants for a university is 3% larger when the university participated in the race than when it did not. Further, universities finishing in the top three in the race saw a 4% increase in the number of applicants compared with other universities that participated in the race. A 1% increase in the television viewing rate for the race led to a 1% increase in the number of applicants for the universities participating in the race. It follows that advertising universities on television would be effective in the university market.

Keywords: long-distance relay road race (*ekiden*), Japan, university market, advertisement, television.

JEL classification: L83; L82; I 29; M37

1. Introduction

In the process of economic development, demand for highly educated people increases. This, in turn, causes demand for higher education to grow, which may influence the structure of the education market. In response to the growth in demand for educated people, the number of higher education institutions increases (Kwoka and Synder 2004). It becomes important to analyze the higher education market. From the viewpoint of economics and industrial organization, the performance and strategy of higher education institutions have been examined, especially in developed countries (e.g., Getz et al., 1991; Siegfied 2004; Winston 2004; Getz and Siegfied 2004, Warning 2004).[1]

Most developed countries are thought to have entered an age of declining birthrates and aging populations. This inevitably has influenced the education market because of the decrease in potential demand. Furthermore, a wave of globalization has led high school students to consider studying abroad. This effect of globalization appears to be larger for universities in Japan than in other developed countries because the university market is more closed to students from other countries. However, for universities in Japan recently, universities in the U.S. and European countries have become rivals in attracting students. Accordingly, competitive pressure in the higher education market has increased in Japan. This gives universities an incentive to reform to survive in the market (Kimura 2012). A number of researchers have accepted the importance of advertising to firm performance (e.g., Porter 1976; Esposito et al., 1990; Butler 1991; Nakao 1993; Rogers and Tokle 1995; Willis and Rogers 1998). This holds also true for higher education institutions such as universities. Advertising is an important factor in managing a university. Among the media, television has a great effect on consumer behavior (Notta and Oustapassidis 2001).[2] This paper deals with the influence of the media on private university applicants under the increasing competitive pressure in the university market in Japan.[3]

[1] The effect of board composition has been investigated (Dubois et al. 2009; Brown 2014).
[2] In modern life, Internet advertising plays a key role (Goldfarb and Tremblay 2014; Lewis and Reiley 2014). However, the importance of television is thought to persist.
[3] Agasisti and Pohl found that German public universities are more efficient than Italian public universities. However, private universities are thought to respond to competitive pressure.

University applicants can obtain various types of information concerning the quality of education and academic research. In addition, universities' participation in sporting events increases their recognition in society, especially if a university is successful in major and popular sports.[4] Universities' performance and success are thought to exert advertising effects (Bremmer and Kesserling 1993). "Athletic events provide opportunities for large numbers of prospective students and their parents—some of whom may have only a passing interest in the athletic event—to visit campuses they might not otherwise visit" (Goff 2004, p. 72).[5]

Since 1987, a university long-distance relay road race, the *Hakone Ekiden*, has been broadcasted throughout Japan every year on January 2 and 3, when most Japanese are enjoying the New Year holiday. The race is broadcasted for more than 10 hours. The race has become widely recognized as a special event on the New Year holiday, mainly because the race has been publicized by the mass media, especially television. Furthermore, some of the universities that have participated in the race are well-known and distinguished universities that attract students from all over the country. The *Hakone Ekiden* race is held immediately before the university application period; entrance examinations for private universities are ordinarily held starting in the beginning of February in Japan. Hence, a university's participation in the *Hakone Ekiden* is thought to increase the number of applicants not only from Tokyo and its outskirts but also from other regions (Mixton and Hsing 1994).[6] Using a panel data set, this paper aims to assess the extent to which participation in the *Hakone Ekiden* race, finish ranking, and the television viewing rate influence the number of university applicants.

The structure of the paper is as follows: Section 2 provides an overview of the university market in Japan and the *Hakone Ekiden* race. Section 3 explains the data and statistical method used in this paper. Section 4 reports the estimation results and their interpretation. Section 5 provides the conclusion of the paper.

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[4] Even though university athletes are amateurs, the distinguished star players could earn $600,000 or more per year if they were paid market-based salaries (Brown 1993).

[5] Various effects of university sports have been investigated thus far (e.g., McCormick and Tinsley 1987; Tucker and Amato 1993, Baade and Sundberg 1996).

[6] An advertising effect on purchase is observed to be large for older people (Lewis and Randall 2014). Therefore, viewing the race causes graduates of the participating universities to increase their attachment to the universities. Then, these graduates encourage their children to apply for admission to the universities when they are preparing for the entrance examination.

2. The Japanese setting

2.1. Overview of the higher education market in Japan.

Japan has experienced rapid economic development, so demand for higher education is thought to increase. Figure 1, illustrating the number of universities in Japan between 1949 and 2014, suggests a constant increase in the number of universities. In contrast, as demonstrated in Figure 2, the number of high school students has generally increased from 1949 to 1990 and then decreased until 2014. In 2014, the number of universities was about 800, approximately four times larger than the number in 1949. The number of high school students was about 55,000 at its peak in 1990 and decreased to 34,000 in 2014. Based on the information shown in Figures 1 and 2, it follows that the number of universities has increased while the population of young people decreased after 1990. Inevitably, the competitive pressure in the higher education market increased in Japan after 1990.[7] For about 60% of universities, in comparison with 2011, the profit-and-loss account worsened in 2012.[8] The decrease in the number of entrance examination applicants led to a decrease in revenues from entrance examination fees.[9] Competitive pressure to attract students causes educational fees to decrease, which in turn worsens the profit-and-loss accounts. In particular, universities concentrated in Tokyo and its outskirts were exposed to increasing competitive pressure.

Advertising is an important strategy to survive in the university market. Some major university sports have been broadcast and are useful for advertising.[10] Above all, the

[7] In Japan, law schools have also faced high competitive pressure (Yamamura 2011). Some law schools have already exited from the market.
[8] December 23, 2013, *Nihon Keizai Newspaper.*
[9] March 27, 2014, *Nihon Keizai Newspaper.*
[10] In Japan, high school baseball games have been broadcasted all over Japan, influencing the Japanese happiness level (Yamamura 2014).

Hakone Ekiden race is thought to make a great contribution to increases in the number of entrance examination applicants and thus to increases in revenue from entrance examination fees, because the race is held directly before the university application period.

2.2. Overview of the Hakone Ekiden.

In a period when competitive pressure has increased, the *Hakone Ekiden* race has rapidly become popular among Japanese mainly because of the Japan-wide television broadcasting of the race. Figure 3, demonstrating the television viewing rate of the race, indicates that the rate is consistently higher than 25% of the population. As indicated in the Appendix, universities that have traditionally participated in the race, such as Waseda, Keio, Meiji, Hosei, and Chuo, have attracted students from all over Japan. Hence, graduates of these universities live not only in Tokyo and its outskirts but also in other regions. The television broadcast of the *Hakone Ekiden* race seems to be enjoyed by graduates of the participating universities who live across Japan. This appears to increase the viewing rate, although the participating universities are limited to those located in Tokyo and its outskirts. The high viewing rate indicates that the *Hakone Ekiden* race is a popular sporting event in Japan. This is the reason that this paper focuses on the effect of television, although the *Hakone* race is covered in various other media, such as newspapers and the Internet.

Only universities located in Tokyo and its outskirts (the Kanto region) can participate in the *Hakone Ekiden* race, so the race began as a local amateur sporting event. The first *Hakone Ekiden* race was held in 1920. Only four universities, Waseda, Keio, Meiji, and

Tokyo-Shihan, participated in the first.[11] The number of universities participating in the race has increased with the development of the race. Now, 20 universities participate in the race. A university must rank among the top 10 finishers of the *Hakone Ekiden* race in the previous year to gain the right to be seeded. Otherwise, a university must rank among the top nine finishers in the elimination race. In addition, there is a quota for a team consisting of runners belonging to various universities that were dropped in the elimination race. In total, 20 university teams can participate in the race.

On January 2 and 3, the race is broadcast for more than 10 hours. The distance covered by the runners is approximately 2,017 km, and the distance is divided into 10 sections. In each section, hence, a runner runs for an average of about 21 km. A team consists of ten runners of varying degrees of skill and speed. Therefore, even if nine runners perform well, the last runner's poor performance may result in a low team ranking. If a runner withdraws from the race, his team is disqualified and thus loses the opportunity to be seeded in the following year's race. Inevitably, each runner shoulders not only their individual pride but also the honor of his university. This greatly motivates the runners to fulfill the duty to stay the course even when they are far from completing their section. Naturally, there are various dramatic scenes during the race. Such scenes are entertaining for viewers, leading the viewing rate to increase.

Further, during the race, runners wear shirts with the name of their university. Accordingly, viewers of the race see the university names and recognize them. In particular, runners in the top group are constantly featured on television. Sports commentators give a running commentary on the state of the race and introduce the teams and the characteristics of the universities, such as their history and famous

[11] The *Haokne Ekiden* started in 1920. Source is the official site of the *Hakone Ekiden* race: http://www.hakone-ekiden.jp/index.php (accessed January 11, 2015).

graduates. Naturally, the program provides advertising for the university. In fact, universities consider it important to participate in the race for advertising purposes (Ikushima 2011). Hence, the *Hakone Ekiden* race is regarded not only as an amateur sporting event but also as a means of advertising universities to prosperous students.

3. Estimated model and interpretation of results

3.1. Data

The studied period of the data is 2001–2014, after the *Hakone Ekiden* became a popular sporting event. During the period, if a team university participated in the race at least once, its university is included in the sample. The number of universities is 26, and their information is presented in the Appendix. All of the universities are private. Accordingly, these universities have a great motivation to gain revenues. They include some distinguished universities, such as Waseda, Meiji, Chuo, and Hosei. These universities were established before 1900 and have a very large number of students. The average number of examinees for these universities is greater than 70,000. Their students come from all parts of Japan. Further, a huge number of graduates is thought to live all over Japan. It seems plausible that these graduates encourage their children to apply to their old universities. However, new universities such as Jobu, Heisei-Kokusai, and Chuogakuin are very small. The average number of examinees is under 1,000 per year. In summary, in the universities included in the sample, there is wide variation in their scale and characteristics. Panel data are constructed for examination. Data on the *Hakone Ekiden* are sourced from the website of the *Hakone Ekiden* race.[12] Other data used in this paper are sourced from *Asahi Shimbun* (2001–2014).

Table 1 includes variable definitions, means, standard deviations, and maximum and

[12] http://www.hakone-ekiden.jp/index.php (accessed January 11, 2015).

minimum values. The key variable is *Examinee*, the number of examinees for each department at the universities. Figure 4 shows the histogram of *Examinee*, suggesting that there is a skew toward a small number and a wide variation of its scale. As indicated in Table 1, the mean value of *Race* is 0.78, indicating that 78% of the sample consists of university departments participating in the *Hakone Ekiden* race. Concerning *Deviation*, to reflect the difficulty of passing the entrance examination, its mean value is 54.9, which is regarded as roughly the middle-ranking group. However, its maximum value is 69, meaning that the top rank department in Japan. In contrast, its minimum value is 43, indicating the bottom rank. Therefore, there is wide variation in the quality and academic rank of the universities participating in the race. With respect to location, even in the same universities, the locations of departments may differ. The data used in this paper distinguish such differences within a university because the data concern departments rather than universities. The mean value of *Tokyo* is 0.84, meaning that 84% of university departments are located in Tokyo.

In the sample, even for the same university, there may be data for years when it participated in the race and for years when it did not participate. Table 2 shows the mean difference test of *Examinee* between the groups participating in the race and those not participating in it. It is clear that the mean of *Examinee* is significantly larger, by 1,000, in participation years than that in non-participation years. This indicates that participating in the *Hakone* race increases *Examinee*. Furthermore, the sample race participants are divided into winners of the first to third prizes and other rankings. *Examinee* for the prizes is significantly larger, by 0.8 thousand, than for others. In addition, Figure 5 shows that the higher the rank achieved in the *Hakone* race is, the larger the number of examinees is. Table 2 and Figure 5 indicate that the name of the university is on the air more, resulting in a larger figure for *Examinee*. Figure 6 shows the positive relation between the viewing rate of the *Hakone* race and *Examinee*, meaning that advertising through television plays a role in the increasing number of entrance examination applicants for the universities participating in the race.

However, in Table 2 and Figures 5 and 6, various other factors are not considered. For closer examination by considering other factors, the regression estimations are conducted in the next part of this paper.

3.2. Function form

To examine the arguments in the previous section, the estimated function takes the following form:

$$Ln(Examinee)_{ikt} = \alpha_0 + \alpha_1 Race_{it} + \alpha_2 Ln(Deviation)_{ikt} + \alpha_3 Ln(Intake)_{ikt} + \alpha_4 Ln(Professor)_{ikt} + \alpha_5 SLn(Cost)_{ikt} + v_i + e_k + \omega_{it,\,ikt}$$

where *Examinees* represents the number of applicants for university *i*'s *k* department in year *t*, and α represents the regression parameters. As demonstrated in Figure 4, there is wide variation in *Examinees.* Then, the log of *Examinees* is used to reduce it. To control for the time-invariant features of universities represented as v_i, dummy variables for universities are included in the model. Further, the number of students is thought to vary widely by department. Therefore, with the aim of controlling for the department's features, represented as e_k, dummy variables for departments are included in the model.

The key independent variable is a dummy for participating in the *Hakone Ekiden* race (*Race*). As discussed earlier, it is thought to be an advertising effect of participating in the race. Therefore, I expect *Race* to have a positive sign. Concerning control variables, the degree of difficulty of entering the university department is ordinarily measured by the deviation values in Japan.[13] The higher the value is, the more difficult it is to pass the entrance examination. Therefore, *Ln (Deviation)* is included. The number of examination applicants seems to be larger for the larger department. The scale of the university departments is captured by including the log of intake quotas and number of professors. The cost of education fees should be taken into account, so *Ln (cost)* is included. The location of the university appears to be an important factor to attract students, so universities participating in the race are roughly divided into those located in Tokyo and those located in its outskirts. To consider for differences in location, a dummy for Tokyo, *Tokyo,* is included.

It is important to explore not only the advertising effect of participating in the race on the number of university applicants but also the effects of rankings and the viewing rate of the race. Ordinarily, the top team is constantly featured on the air. In addition,

[13] The deviation value is called *hensachi* in Japanese.

sports news through other media concentrate on the drama of the contest. Hence, the teams dominating the top ranks of the race are expected to gain an advantage in appealing and advertising to students with an examination imminent as well as their parents. Furthermore, it seems plausible that the higher the viewing rate is, the larger the advertising effect is. However, these factors might only influence the outcome for universities participating in the race. To examine these effects, the Heckman Tobit is appropriate to control for the selection bias and thus is used in this paper. In the first stage of the estimation, a dummy for participating in the race is the dependent variable. The observations are the department-level data for each university. However, the determinants of participating in the race are university-level characteristics rather than department-level ones because the effects of participating in the race are not limited to some departments. A larger number of university students and staff members can enjoy the race when a larger university's team participates in the race. Hence, the positive effects of participating in the race are larger for the larger universities because of the scale economy. Naturally, a larger university has a greater incentive to invest in bolstering the team to participate in the race. To capture the scale of a university, the total intake quota (*TIntake*) and number of departments (*TDepartment*) for a university are used in the first stage. These variables are expected to have positive signs. In the second stage, the key variables are the viewing rate of the race (*View*) and the inverse of the log of the rank in the race (*Rank*). In addition to *Rank,* a dummy variable for university winning the first, second, or third prize (*Top 3*) is used as an alternative measure to capture the impact of the ranking in the race. Based on the argument about the impact of the results of the race discussed above, the anticipated sign of the coefficients of *View* and *Rank* is positive. As control variables, the set of variables used in the robust estimation is also used in the second stage.

4. Results

Table 2 exhibits the results of the robust regression estimation. As for the key variable, the coefficient of *Race* yields the expected positive sign and is statistically significant in all columns. Hence, participating the race increases *Examinee.* Further, its absolute

value is 0.03, which means that number of entrance examination applicants increases by 3% when a university participates in the race compared with when it does not participate. Concerning control variables, a significant positive sign for *Ln (Deviation)* is observed in all columns. Hence, the more difficult it is to pass the examination, the larger *Examinee* is. Demand for higher-quality education is larger if the other factors are equal. However, the number of intakes for a university department does not vary with the number of examinees. In the case of private universities, the examination dates differ by department. Further, ordinarily, the examination date varies by university. Hence, students have other chances even when they cannot be admitted to distinguished and high-level universities. Therefore, students have many opportunities to take entrance examinations for various departments at various universities. It seems appropriate to assume that the difficulty of the entrance examination is positively related to the quality of the university. For private universities, one can apply to many universities in a year and thus be motivated to apply to high-quality university even though it is difficult to be accepted. The estimation results of *Ln (Deviation)* reflect this fact. The sign of the coefficient of *Ln (Intake)* is positive and statistically significant at the 1% level in all estimations. Consistent with expectations, a large intake quota is positively related to the number of applicants. *Ln (Cost)* has a positive sign and is statistically significant at the 1% level. This is inconsistent with expectations. In my interpretation, the cost of a university may reflect its quality because competitive pressure in the market causes unpopular universities to reduce their education fees. Therefore, the result of *Cost* is interpreted as suggesting a positive relation between quality of a university and the demand for it. *Tokyo* has a positive sign and is statistically significant at the 1% level in all columns. It is more convenient to attend a university in Tokyo than one in a suburban area. Therefore, the number of applicants is larger for universities located in Tokyo. The trend has a significant negative sign, reflecting the decrease in the size of the young population applying to universities.

Table 4 presents the results of the Heckman Tobit estimation. To assess the impact of the ranking in the race, *Rank* is incorporated, and its results are presented in columns 1–3. In an alternative model, instead of *Rank*, *Top3* is included, and its results are reported in columns 4–6. In the results of the first stage, *TIntake* has a positive sign and is statistically significant at the 1% level in all columns. The coefficient of *TDepartment*

also shows a positive sign, despite being statistically insignificant. Overall, the results of the first stage are in line with the expectation that the larger universities have a greater incentive to participate in the race. Let us turn now to the results of the second stage. The results for the control variables are almost equivalent to those shown in Table 3. Hence, I focus on the results for the key variables. As consistent with the expectation, the sign of *View* is positive and statistically significant in all columns. This indicates that the race has an advertising effect because a high viewing rate increases the number of applicants for universities participating in the race. The absolute value of the coefficient of *View* is 0.01, implying that a 1% increase in the viewing rate results in a 1% increase in the number of university applicants. The coefficient of *Rank* has the expected positive sign and is statistically significant in columns 1–3. Furthermore, in alternative estimations, the coefficient of *Top3* has the expected positive sign and is statistically significant in columns 4–6. The absolute value of the coefficient of *Top3* is 0.04, indicating that the number of applicants for the universities in the top three rankings is larger by 4% than that of other universities participating in the race.

From the estimation results, I derived the notion that the universities being covered more frequently on the air give students or their parents a greater motivation to apply for these universities. Despite the benefits of advertising through university sports, it is unclear whether investing in sports plays a critical role on survival in the university market. If the cost of bolstering sports is larger than its benefit, university administrators should not use the university teams as a means of advertising. When there is a larger number of departments and the intake quota is large, the advertising effect is larger. The average examination fee is around 30,000 yen ($254) for Japan universities. As shown in the Appendix, for a large university such as Waseda or Meiji, the number of examinees is approximately 100,000. Hence, participating in the *Hakone Ekiden* race leads to a 3% increase in the number of examinees, leading to an increase of 3,000 examinees. This results in an increase in examination revenues is about 90 million yen ($0.76 million). In contrast, for a small university such as Jobu or Chuogakuin, the number of examinees is approximately 0.50 thousand. The *Hakone Ekiden* leads to an increase of 15 examinees. This, in turn, yields only 450,000 yen ($3,800). That is, it is important for university administrators to consider the scale of the university. Furthermore, another critical point is the cost of participating in the race, though the

cost has not been analyzed in this paper. In bolstering a team, there are various costs. For instance, first, it is necessary to recruit new, promising runners to be competitive. Therefore, supervisors should scout for able high school runners with dominant records. A talented high school athlete may be able to enter a distinguished university even if his academic ability is lower than the level required to pass the entrance examination. Thus, able runners are more likely to enter a distinguished university such as Waseda than another university because of branding, if other factors are equal. Hence, less distinguished universities bear additional costs, such as scholarships, to attract able runners. Furthermore, the universities that frequently participate in the *Hakone* race can provide ideal training facilities and have the expertise to improve the runners' ability. Hence, a team of a university that has not yet participated in the *Hakone* race must bear additional costs to put together a team. From a cost-benefit viewpoint, it is more effective and useful for a distinguished university with experience in the *Hakone* race to use it as advertising to improve its competitiveness in the higher education market.

5. Conclusion

The decrease in the young population and increase of the number of universities have caused the higher education market to become increasingly competitive in Japan. In response, universities have attempted to improve quality of education and increase advertising. For instance, it is effective to broadcast the name of a university. However, the cost to buy a great deal of advertising on television is too high from the cost-benefit viewpoint. The *Hakone Ekiden* race is held every year at the New Year holidays. The race is broadcasted for 10 hours across Japan. Its viewing rate is very high, and it is held just before university entrance examinations are held, mainly in February. Participation in the race is considered effective advertising. Furthermore, the universities do not pay a fee to be introduced on the air if their teams survive the elimination race.

This paper used panel data from 2001–2014 to investigate how and the extent to which the *Hakone Ekiden* race influences exerts an impact on the number of entrance examination applicants. The regression analysis found that (1) the number of university applicants is 3% larger when the university participated in the race than when it did not,

(2) among universities participating in the race, a top three ranking in the race increased the number of applicants by 4%, (3) a 1% increase in the television viewing rate for the race led to a 1% increase in the number of applicants for a university participating in the race. It follows that advertising a university through popular university sports is effective in increasing the number of applicants and, in turn, revenues from entrance examination fees.

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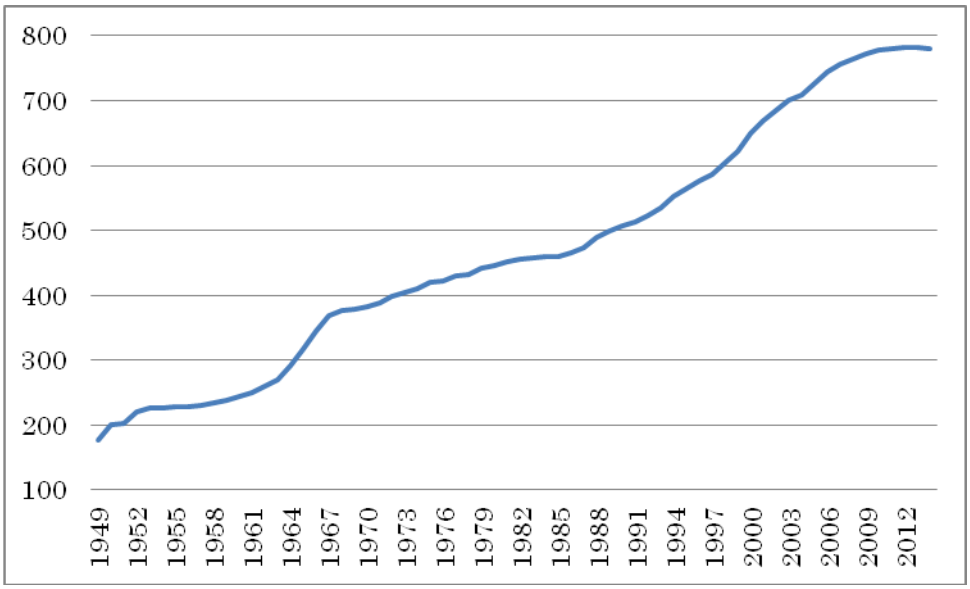
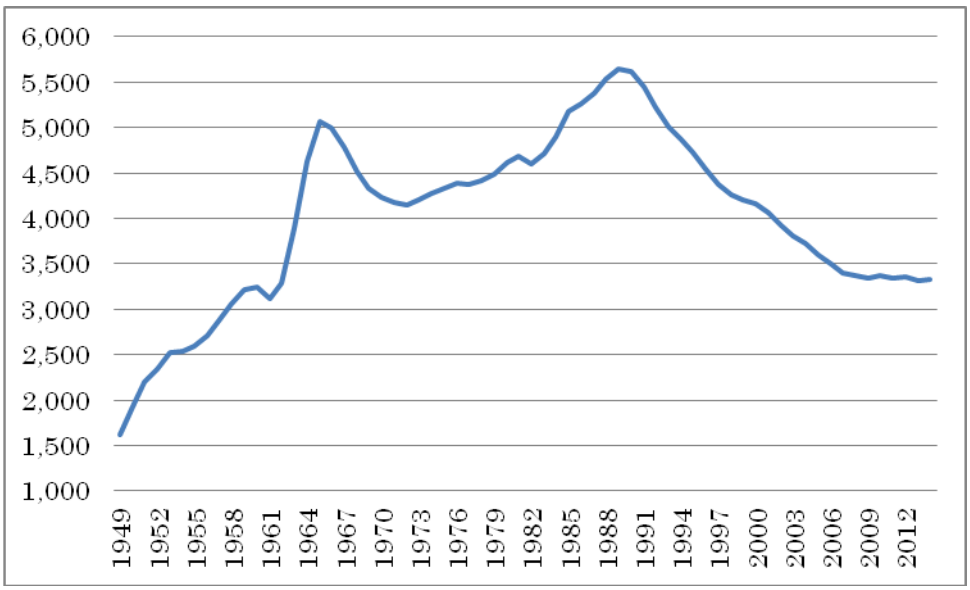
Figure 1. Number of universities in Japan



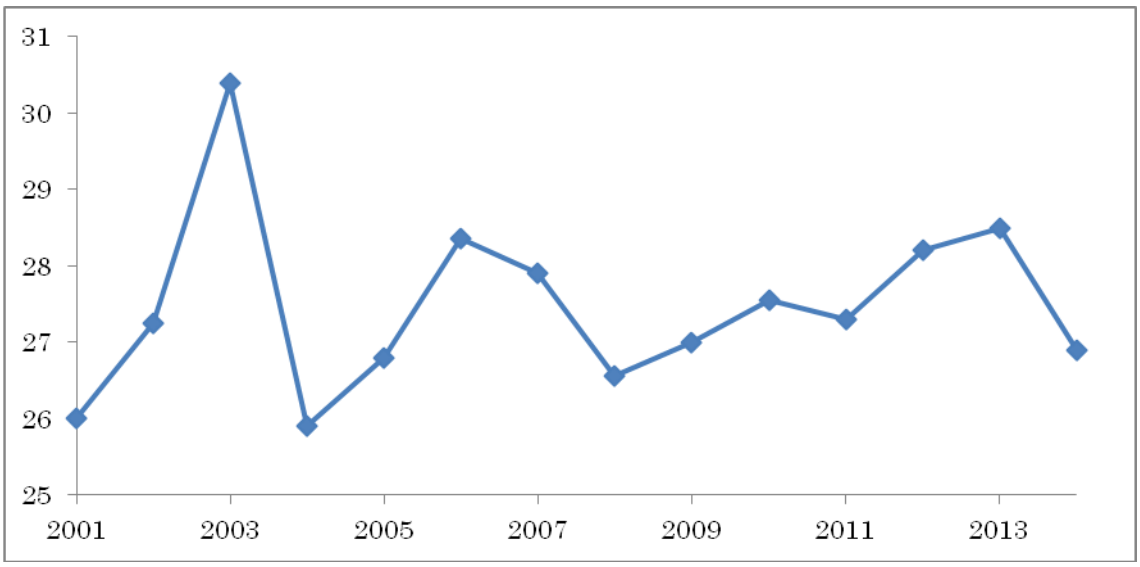
Source: http://www.e-stat.go.jp/SG1/estat/List.do?bid=000001015843 (accessed January 11, 2015)

Figure 2. Number of high school students in Japan



Source: http://www.e-stat.go.jp/SG1/estat/List.do?bid=000001015843 (accessed January 11, 2015)

Figure 3. Television viewing rate of the Hakone race



Source: Website of Video Research Ltd.,
http://www.videor.co.jp/data/ratedata/program/04hakone.htm (accessed September 29, 2014).

Figure 4. Histogram of examinees

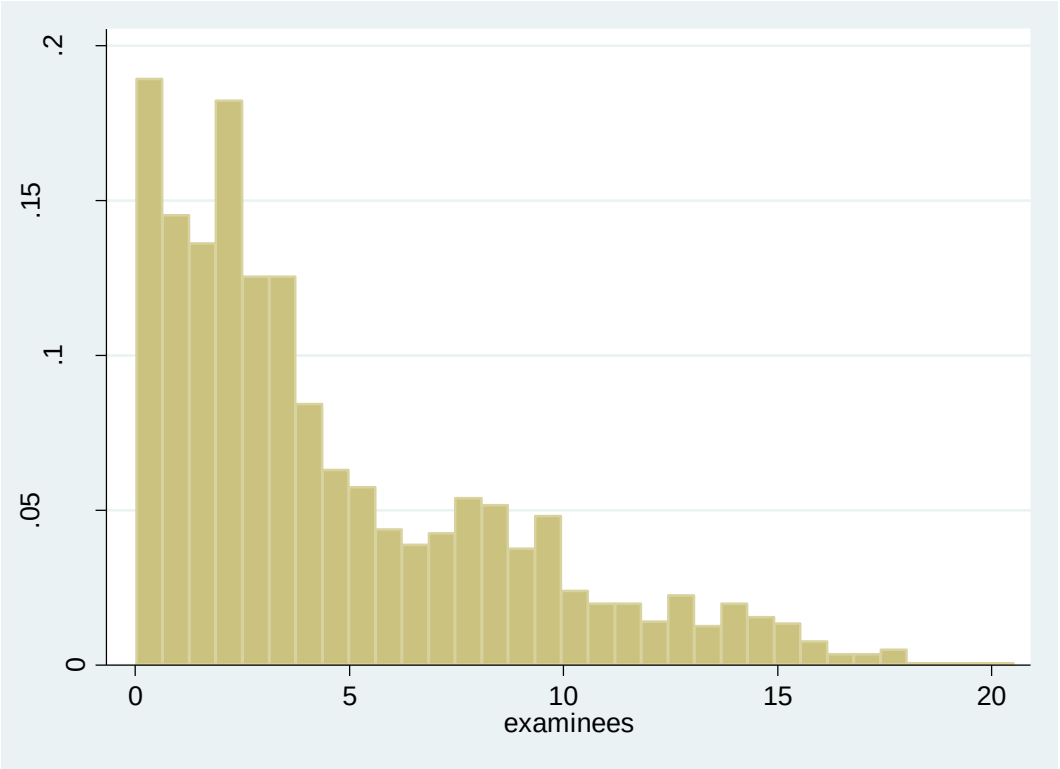


Figure 5. Relation between the rank of the Hakone race and the number of examiness for selected universities.

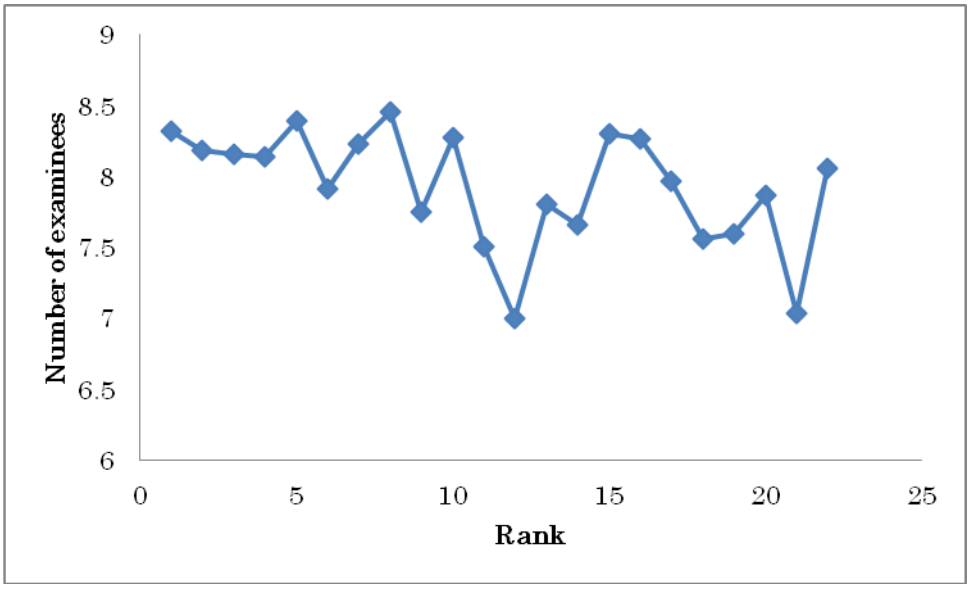


Figure 6. Relation between the viewing rate and the number of examiness for selected universities.

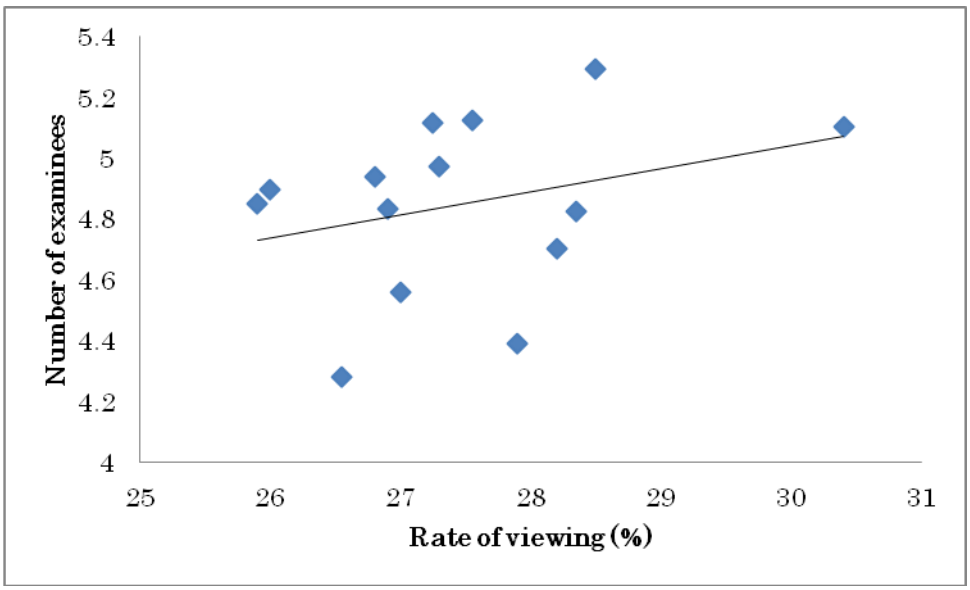


Table 1. Definition of variables and descriptive statistics

	Definitions	Mean	S.d.	Min	Max
Examinee	Number of examinees (thousands).	4.62	4.03	0.03	20.5
Race	Takes 1 if the university is selected to participate in the Hokone race; otherwise 0	0.78	---	0	1
View	Television viewing rate for the Hakone race (average rate between the first and second day)	27.4	1.08	30.4	25.9
Rank	Inverse of logarithm of rank in the Hakone race 1/ln (rank)	0.54	0.27	1.44	0.32
Top3	Takes 1 if the university wins first, second, or third prize in the Hokone race; otherwise 0	0.13	---	0	1
Deviation	Deviation value indicating one's academic level in relation to a certain standard (Asahi, various years)	54.9	6.07	43	69
Intake	Number of intake quotas (thousands)	0.53	3.55	0.04	2.06
Professor	Number of professors	67.7	53.7	4	475
Cost	Cost to enter a university for the first year (thousands in yen)	1619	1590	970	14200
Tokyo	Takes 1 if the campus is located in Tokyo; otherwise 0	0.84	---	0	1
Trend	Time trend	---	---	---	---
TIntake	Total intake quota for a university (aggregated department intake quotas, in (thousands)	4.94	3.41	0.24	13.78
TDepartment	Number of departments in the university	8.73	4.27	1	20

Note: Dummy variable takes 1 or 0; therefore, its mean value can be interpreted as suggesting the rate of those who chose 1.

Table 2. Mean difference test of number of examinees and intake quotas.

Full sample (2272)			
	Selected for the Hakone race	Others	T-values
Examinees	4.8	3.8	4.99***
Sample of universities selected for the Hakone race (1,178)			
	Winners of the first to third prizes	Others	T-values
Examinees	5.5	4.7	2.99***

Notes: *** indicates significance at the 1% level. The unit for examinees and intakes is the thousands. The number in parentheses is the number of observations.

Table 3. Estimation results of robust regression model.

	(1)	(2)	(3)
Race	0.03*	0.03*	0.03*
	(1.73)	(1.91)	(1.78)
Ln (Deviation)	4.30***	4.10***	4.12***
	(13.7)	(12.4)	(12.6)
Ln (Intake)	0.85***	0.85***	0.85***
	(27.4)	(27.1)	(34.0)
Ln (Professor)	-0.004	-0.001	
	(-0.15)	(-0.01)	
Ln(Cost)	0.37***		
	(4.64)		
Tokyo	1.57***	2.07***	2.07***
	(15.4)	(15.5)	(15.4)
Trend	-0.004**	-0.003**	-0.003**
	(-2.46)	(-2.30)	(-2.26)
Constant	-14.2***	-9.20**	-9.69***
	(-3.75)	(-2.57)	(-2.75)
R-squares	0.93	0.93	0.93
Observations	2,259	2,260	2,272

Note: Values in parentheses are z values. Dummies for universities and dummies for departments are included, but the results are not reported. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 4. Estimation results of the Heckman Tobit model.

	(1)	(2)	(3)	(4)	(5)	(6)
View	0.01**	0.01**	0.01**	0.01**	0.01**	0.01**
	(2.06)	(2.09)	(2.14)	(2.07)	(2.08)	(2.15)
Rank	0.06**	0.06**	0.06**			
	(2.01)	(2.05)	(2.08)			
Top 3				0.04*	0.04*	0.04**
				(1.88)	(1.92)	(1.99)
Ln (Deviation)	4.23***	4.21***	4.30***	4.33***	4.31***	4.41***
	(8.18)	(8.26)	(8.38)	(8.50)	(8.60)	(8.80)
Ln (Intake)	0.75***	0.75***	0.77***	0.73***	0.73***	0.75***
	(8.28)	(8.39)	(11.3)	(8.84)	(8.95)	(12.2)
Ln (Professor)	0.03	0.03		0.03	0.03	
	(0.72)	(0.73)		(0.86)	(0.86)	
Ln(Cost)	0.09			0.05		
	(0.69)			(0.43)		
Tokyo	1.10***	1.11***	1.09***	1.10***	1.11***	1.09***
	(7.39)	(7.61)	(7.55)	(7.54)	(7.74)	(7.69)
Trend	-0.001	-0.001	-0.002	-0.001	-0.001	-0.001
	(-0.56)	(-0.58)	(-0.85)	(-0.30)	(-0.32)	(-0.62)
Constant	-14.4**	-14.4**	-12.1**	-17.3***	-16.4***	-16.8**
	(-2.40)	(-2.40)	(-2.20)	(-5.61)	(-8.42)	(-8.91)
First stage						
TIntake	0.11***	0.11***	0.11***	0.11***	0.11***	0.11***
	(5.81)	(5.81)	(5.77)	(5.41)	(5.41)	(5.38)
TDepartment	0.001	0.001	0.002	0.004	0.005	0.006
	(0.06)	(0.06)	(0.11)	(0.41)	(0.41)	(0.45)
Constant	0.16**	0.16**	0.16**	0.21***	0.21***	0.21***
	(2.47)	(2.47)	(2.45)	(3.22)	(3.22)	(3.19)
Log pseudolikelihood	-1,588	-1,589	-1,595	-1,685	-1,685	-1,691
Observations	2,280	2,280	2,291	2,280	2,280	2,291

Note: Values in parentheses are z values calculated using robust standard errors. Dummies for universities and dummies for departments are included, but the results are not reported. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Appendix.

	Name	Number of entrees (2001-2014)	Average number of examinees (thousands)	Total intake quota (thousands)	Number of departments
1	Aoyama	6	52.5	3.7	9
2	Asia	9	10.7	1.3	4
3	Kanagawa	13	27.6	4.2	7
4	Kanto	3	11.0	2.6	7
5	Kokugakuin	8	19.5	2.1	5
6	Kokushikan	7	16.0	2.8	7
7	Kamazawa	14	30.9	3.1	7
8	Juntendo	12	9.9	0.8	4
9	Josai	11	4.8	1.7	5
10	Jobu	6	0.5	0.3	2
11	Senshu	10	32.1	3.7	7
12	Daito	12	14.7	2.6	8
13	Takushoku	7	7.2	2.1	5
14	Chuogakuin	12	0.5	0.7	2
15	Chuo	14	74.0	5.5	6
16	Teikyo	12	30.3	5.1	10
17	Tokai	13	52.9	6.7	18
18	Tokyonogyo	8	30.7	2.4	5
19	Toyo	12	67.5	5.4	11
20	Nihon-taiku	14	3.5	1.4	3
21	Nihon	13	86.1	13.8	14
22	Heisei-kokusai	1	0.1	0.3	1
23	Hosei	11	85.4	6.4	15
24	Meiji	9	104.2	6.7	10
25	Yamanashi	14	0.7	0.9	4
26	Waseda	14	99.0	8.8	13

Note: Total intake quotas and number of departments in 2014.