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THE HABITUAL CONSUMPTION PROPENSITY OF KOREAN PROFESSIONAL BASEBALL FANS FOR SUSTAINABLE MANAGEMENT

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ABSTRACT

This study uses data from 1982 to 2014 for the number of spectators in the Korean professional baseball league and estimates the audience demand function and the admission revenue demand function to determine if fans of the Korean professional baseball league have a habitual consumption tendency. The data is also analyzed to establish the effect of price change on the size of crowds and amount of admission revenue to make recommendations for clubs' pricing policies.

Keywords: Professional Baseball, Habitual Consumption, Audience

INTRODUCTION

Korean professional baseball is becoming the most popular sport among the four major sports leagues, but it has a disadvantage in that a substantial portion of its sales is generated from transactions with related parties. In other words, it depends on the support of its parent company. In this situation, the prospects for future professional baseball can be perceived as dim if the club does not make efforts to improve revenue from other sources. For example, the Haitai Tigers changed to the Kia Tigers due to the parent company's default, and the Ssangbangwool Raiders changed to the SK Wyverns after its twists and turns. In addition, due to the acquisition of the Hyundai Unicorns, the Heroes suffered considerable financial difficulties. Even if there is no weakness in the management of the professional baseball team, if the parent company's financial condition is unstable, the reality is that it can affect the existence of the club.

At present, the admission fee for professional baseball in Korea varies according to the seats and days of the week. This is unlike the past, where the same admission fee was charged in accordance with the price autonomy policy for each club, as implemented in 2002. The LG Twins, who use the Jamsil baseball stadium as their home stadium, divided the stadium into seven seating areas, including Green, Navy, Blue, and Premium seats, and differentiated their admission rates. The Kia Tigers have various entrance fees based on the class of seats, such as sky picnic seats, eco-dynamics seats, party seats, and sky boxes for premium customers and family fan groups. These changes are an effort to increase profits for club management to secure self-sufficiency.

However, the admission fee strategy is the most fundamental way to raise the income of the club. Ahn & Lee (2007) suggest an idea for maximizing revenue in their study on consumers' habitual consumption of major league baseball games. Consumption of major league baseball games was found to be as addictive for Americans as tobacco. This suggests that the current audience is very likely to return to the arena again in the future. The presence or absence of this level of habitual consumption is important for entrance fee strategies. This means that admission fees should be determined based on dynamic analysis because an admission rate change affects not only current consumption, but future consumption as well.

This study is based on data from 1982 to 2014 regarding the number of spectators in the Korean professional baseball league and estimates the audience demand function and admission revenue demand function to evaluate whether fans that attend the Korean professional baseball league games have a habitual consumption tendency. In addition, to help clubs set pricing policies, the study analyzes the effect of price changes on the number of people attending and the amount of admission revenue.

RESEARCH DESIGN AND MODEL

The teams' revenues consist of ticket earnings, grant income, advertising income, business income, rental income, trade income, and other income. In 2009, of the eight professional baseball teams, the LG Twins had the highest sales at 34.8 billion won, followed by the Samsung Lions with 34.1 billion won, and then the Giants & Wyverns with 30 billion won.

The LG Twins disclosed separate subsidies, but the Samsung Lions, Doosan Bears, and Heroes reported that the subsidy items were integrated into advertising revenue and business revenue. Except for the Heroes, the proportion of subsidy compared to the sales of most clubs is considerably large. Looking at the cost of sales, the items that make up a significant portion of the cost of sales are the operating expenses of the teams. They are composed of participation costs, entrance deposits, special bonuses, training fees, training equipment fees, salaries, down payments, and bonus related expenses.

The largest related party sales amount was reported by the Samsung Lions at about KRW 28.3 billion, followed by the LG Twins at about 19 billion KRW, and SK Wyverns at about KRW 18.7 billion. Heroes has been operated differently from the remaining seven teams in that there are no related party sales because the team's name generates the most revenue, whereas the other teams are largely funded by transactions with related parties. The sales dependency ratio, which is calculated as related party sales divided by total sales revenue, was 70.6% for the Hanwha Eagles, 66.8% for the Samsung Lions, and 65.3% for the KIA Tigers. The Doosan Bears had the highest amount at about 7.8 billion, followed by the LG Twins and the Lotte Giants at about 7.7 billion, with the SK Wyverns at about 5.4 billion. The greater the ticket earnings, the lesser the sales dependency ratio. Therefore, to improve the financial independence of Korean professional baseball league teams, the most powerful means is increasing entry revenues.

HYPOTHESES AND RESEARCH METHODOLOGY

Since Korean professional baseball is like American major league baseball, the fans' loyalty to baseball is high, so fans with at least a one-time experience watching professional baseball games are predicted to have a habitual and sustainable consumption tendency. Therefore, we establish two hypotheses as follows.

Hypothesis 1: Korean professional baseball league fans will have a habitual consumption tendency.

In addition, although demand may decrease when admission fees rise, admission revenue is likely to rise, and the following hypothesis is proposed.

Hypothesis 2: If admission fees rise, the number of spectators will decrease, but admission revenue will increase.

The data used in this study are cross-sectional data linked to time variables. The problems of heteroscedasticity in cross-sectional data and autocorrelation of time series data may occur simultaneously. Therefore, fixed and random effects models were estimated by constructing panel data that integrated the data. Finally, the Hausman test was used to select the

model suitable for the study's purpose. To solve the problem of non-stationarity of the panel data, the original data was converted to a natural logarithm form.

The regression equation for the number of spectators and admission income is derived using the lifetime consumption model considering habitual consumption propensity as follows.

$$\triangle \ln ATD_{it}=\alpha_i+\gamma_t+\beta_1\triangle \ln ATD_{it-1}+\beta_2\triangle \ln PRICE_{it}+\beta_3\triangle WP_{it}+\beta_4\triangle CP_{it}+\beta_5\triangle POST_{it}+\beta_6\triangle GRDP_{it}+\mu_{it} \quad (1)$$

$$\triangle \ln GATE_{it}=\alpha_i+\gamma_t+\beta_1\triangle \ln GATE_{it-1}+\beta_2\triangle \ln PRICE_{it}+\beta_3\triangle WP_{it}+\beta_4\triangle CP_{it}+\beta_5\triangle POST_{it}+\beta_6\triangle GRDP_{it}+\mu_{it} \quad (2)$$

i=1, 2, ... ,8, t=1982, 1983, ... , 2014

ΔlnATDt is the change in the number of regular season spectators converted to natural logarithm and ΔlnGATEt is change in admission revenue (ticket earnings) of the regular season. α_i is individual effects of 8 team, γ_t is 33-year time effect, and ΔlnATDt-1 is change in the number of spectators during the previous year. ΔlnGATEt-1 means change in admission revenue for the previous year's regular season while ΔlnPRICEt means change in the actual admission fee (nominal admission rate/ price index). Also, ΔWPt is change in winning percentage, ΔCPt is change in competing power levelling index, and ΔGRDPt is change in Gross Regional Domestic Product. Finally, ΔPOSTt stands for change of post season.

ΔlnATD represents the consumption growth rate, which subtracts the previous year's number of spectators from the current year's number of spectators, and β represents the intensity of the habitual consumption propensity. ΔlnPRICE is the change in admission fee, and β2 represents the price sensitivity of Korean professional baseball league fans. In addition, variables such as winning percentage, competing power levelling index, gross domestic product, and a dummy variable for post-season advance were used, which were expected to influence the number of spectators and admission revenue. Finally, we added dummy variables for team and year to control for the team's individual and year effects.

In constructing the panel data for this study of eight clubs over 33 years, a team that succeeded a previous baseball club was regarded to have had the same number of spectators and entrance profits as the previous club did in the prior year. The NC Dynos were excluded from the analysis because they joined the Korean professional baseball league in 2013, and changes in the number of spectators and amount of admission revenue was not available. The data used for the analysis were obtained from the Korea Professional Baseball Almanac from 1983 to 2015, published by the Korea Professional Baseball Commission, and the official website of the Korea Professional Baseball Commission. Gross Regional Domestic Product (GRDP) was calculated from the data on the homepage of the Korea National Statistical Office and City Halls.

EMPIRICAL RESULTS

Ranking from high to low, the top four teams in terms of regular season spectators (ATD) and admission revenue (GATE) were the LG Twins, the Lotte Giants, the Doosan Bears, and the SK Wyverns. On average, the top four teams use a stadium with relatively greater capacity than the bottom four teams. The average entrance fee (PRICE) was highest for the LG and Doosan teams, who use the Jamsil ballpark, while the other six teams were not markedly different. A competing power leveling index (CP) with a lower value means that the team's performance level is equalized, and a higher value means a more unbalanced competing power level. The average competing power index was lowest for Doosan at 1.241, with 1.315 for Lotte, and 1.406 for LG. For these three teams, it appears that competing power leveling has a significant impact on the number of spectators and admission revenue.

The Pearson correlation of the variables used in the spectators and admission revenue regression model is summarized in Table 1. First, the correlations of the variables used in the spectators' regression model are as follows: ATDt-1, WP, competing power leveling index (CP),

post season advancement (POST), and Gross Regional Domestic Product (GRDP) were shown to have correlation with the number of spectators at a significance level of 1%.

The correlations between the variables used in the regression model of admission income show that all independent variables have a significant effect on admission income at significance levels of 1% and 5%. However, the increases in the number of spectators (ATDt-1) and admission revenue in the previous year (GATEt-1) negatively affect the increases in number of spectators and admission revenue of the current season. It seems that additional analysis is needed. In the two regression models, the Gross Regional Domestic Product (GRDP) in the affiliated city has a statistically significant correlation of 0.182 with the entrance fee (PRICE), but this is not too high. Post-season advancement (POST) was highly correlated with the winning percentage (WP) at 0.644 and statistically significant. This is because a team with a high winning percentage advance to the post season. The Variance Inflation Factor (VIF) showed that the collinearity between independent variables was 1.016 to 1.77.

Table 1
CORRELATION ANALYSIS OF REGRESSION MODEL VARIABLES

Correlation Analysis of Regression Variables for Number of Spectators Model							
Variables	**ΔlnATD**	**ΔlnATD$_{t-1}$**	**ΔlnPRICE**	**ΔWP**	**ΔCP**	**ΔPOST**	**ΔlnGRDP**
ΔlnATD	1						
ΔlnATDt-1	-0.198**	1					
ΔlnPRICE	-0.012	0.1	1				
ΔWP	0.439**	-0.027	-0.022	1			
ΔCP	-0.219**	-0.036	-0.003	-0.099	1		
ΔPOST	0.321**	-0.019	0.016	0.644**	0.075	1	
ΔlnGRDP	0.205**	0.018	0.182**	-0.009	-0.04	-0.007	1
Correlation Analysis of Regression Variables for Ticket Revenue Model							
Variables	ΔlnGATE	ΔlnGATE$_{t-1}$	ΔlnPRICE	ΔWP	ΔDR	ΔPOST	ΔlnGRDP
ΔlnGATE	1						
ΔlnGATEt-1	-0.114*	1					
ΔlnPRICE	0.331**	0.11	1				
ΔWP	0.420**	-0.028	-0.022	1			
ΔCP	-0.194**	-0.04	-0.003	-0.099	1		
ΔPOST	0.319**	-0.056	0.016	0.644**	0.076	1	
ΔlnGRDP	0.260**	-0.011	.182**	0.009	-0.04	-0.007	1
* p<0.05, ** p<0.01							

In the random effects model, the null hypothesis H: $\sigma\alpha 2=\sigma\gamma 2=0$ of the Breusch-Pagan test was not rejected, therefore the group effect and time effect are 0 at the same time. However, the null hypothesis was rejected by the Hausman test, and by the two models. Therefore, in this study, we present the analysis results using only the two-way fixed group and time effect model.

The regression results for the number of spectators and admission income are summarized in Table 2. First, regression analysis was performed using the increase rate (Δ lnATD) of the regular season as the dependent variable. The coefficient of increase in the number of spectators (ΔnATDt-1) of the previous year, which indicates the habit of consumption, was estimated to be -0.085 and not significant. The coefficient estimate has a negative sign, which does not seem to indicate habitual consumption propensity. In other words, if the number of spectators in the previous year expands, the growth rate of the current season's spectators will decrease, but the change is not significant. Therefore, Hypothesis 1 that Korean professional baseball fans have habitual consumption propensity was rejected.

It is expected that the winning percentage (ΔWP) has a positive sign, since Korean professional baseball fans are sensitive to the team's winning rate. The coefficient was estimated to be 1.241, with a t-value of 6.04, indicating a significant effect at the 1% significance level.

According to the estimation results, the number of spectator's increases by 12.4% when the team's winning rate is increases by 10%.

The competing power leveling index (CP) was estimated to be -0.49, with a t-value of -3.87, indicating a statistically significant relationship with the number of spectators at a 1% significance level. This means that as competing power is leveled, the number of spectator's increases.

Table 2
REGRESSION ANALYSIS RESULTS

	Dep. Var.: No. of Spectators(∆ln*ATD*)		**Dep. Var.: Ticket Revenues(∆ln*GATE*)**	
Constant	**Coefficient**	**t-value**	**Coefficient**	**t-value**
$\Delta \ln ATD_{t-1}$	0.110	1.21	0.119	1.32
$\Delta \ln GATE_{t-1}$	-0.085	-1.59		
$\Delta \ln PRICE$	-0.475		-0.086	-1.65
ΔWP	1.241	-2.78**	0.504	2.98**
ΔDR	-0.043	6.04**	1.250	6.08**
$\Delta POST$	0.081	-3.87**	-0.043	-3.84**
$\Delta \ln GRDP$	0.299	2.55**	0.079	2.48*
N	251	4.43**	0.298	4.52**
R^2	0.666		0.702	
*p<.05, **p<01				

In addition, post-season advance (∆ POST) and gross regional domestic product (∆ lnGRDP) of affiliated city have positive signs as expected.

Second, regression analysis using the growth rate of admission revenue (∆ lnGATE) as a dependent variable yields similar results to the original regression model, except for the admission fees coefficient. Although the rate of increase in admission fees is shown to have a negative relationship with the number of spectators, it has a significantly positive impact on admission revenue. As admission fees increase, the number of spectators will decrease while admission revenue will increase. Thus, Hypothesis 2 is supported, and has important implications for determining pricing policy.

CONCLUSION

This study examined the influence of fans' habitual consumption propensity and price sensitivity on the Korean professional baseball league by regarding professional baseball games as a commodity. Regression analysis using data from eight team data for the period 1982 to 2014 showed that there was no sustainable and habitual consumption propensity of Korean professional baseball league fans. However, Korean professional baseball league fans seem to be price-sensitive, because as admission fees rise, the number of spectators decreases. Nevertheless, the higher the admission fee, the higher the team's profits.

This result suggests that, to secure financial independence and enhance the addictive propensity of consumers, Korean professional baseball league clubs should implement a pricing policy that will increase admission revenue and further strengthen the strategy of price differentiation. This means that it is necessary to increase entrance revenue through specialty seating, such as family seats and premium seats, which will lead to an increase in audience and relatively higher prices.

The winning percentage showed a positive effect on the number of spectators and the amount of admission revenue, while the imbalance in competing power levelling seemed to have a negative effect. Therefore, a club must maintain high scores in its baseball league to increase the number of spectators and admission income. The League Secretariat will have to implement a policy to level the competing power between clubs.

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