Research Note

To What Extent Does Championship Contention and Relegation Affect Match Attendance in J-League?

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Ⅰ Introduction

J-League, the Japanese professional football league, was established 20 years ago in 1993 and has expanded from a mere 10 teams to a two tier division League with 18 first tier teams (J1 League) and 22 second tier teams (J2 League). And with the introduction of the second tier in 1999 the relegation factor has come to play an important role in the economics of J-League. This research note has the modest objective of providing preliminary empirical evidence on the extent to which J-League match attendance is affected by relegation and the contention for the league championship. There is a dearth of empirical work employing match level data to investigate stadium attendance for Japanese professional team sports. One of the few exceptions is Kawai and Hirata (2008), which focuses on the question of whether substitute sports leagues such as professional baseball cause a decline in J-League match attendance. To our knowledge, with the exception of Kawai and Hirata (2008), this is the only paper to explore J-League attendance and uncertainty of outcome issues using match level data and the first to look at the impact of relegation on attendance.

A large strand of the sports economics literature inspired by the seminal paper by Rottenberg (1956) focuses on the issue of uncertainty of outcome and its impact on attendance. The uncertainty of outcome hypothesis argues that greater competition for the contention of a league championship or greater uncertainty over the outcome of a match should generate greater interest among fans and thus leads to an increase in stadium attendance. The empirical link between the uncertainty of outcome hypothesis and attendance reviewed in Humphreys and Watanabe (2012), Cairns (1990), and Dobson and Goddard (2004) provide an overview of the empirical research on stadium attendance in the context of football. To date, much of the empirical literature employs aggregate season data to create indices to measure the potential competitiveness of a league and seeks to test the uncertainty of outcome hypothesis at this aggregate level. These aggregate indices of competitive balance include the standard deviation of (fraction) wins per season across the teams in a league, and the Gini and Herfindahl-Hirschman indices of a teams wins or revenues. This paper does not make use of such indices since we do not address the issue of competitive balance. Instead we adopt the methodology developed in Jennett (1984) to explore the effect of relegation and contention for the championship using match level data.

Ⅱ Data and Model

We collect win-loss and attendance data for all J1 League matches for the three seasons from 2005 to 2007. This provides us with a pooled sample of 918 observations. The time frame is limited to 2005-2007 since the basic rules and regulations govern-

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ing the league remain unchanged and are consistent throughout the sample period. For example, the number of J1 teams remains constant at 18 teams during this time frame and as of the 2005 season, the 17th and 18th ranked teams are automatically relegated to the J2 League. The 16th ranked team is matched up against the third ranked J2 League to determine relegation and promotion. Also, the win (3 pts), draw (1 pt), loss (0 pt) point system is adopted as of the 2004 season. In addition the extra time sudden death V-Goal system and the League Championship matches are discontinued at the end of the 2003 and 2004 seasons respectively.

In our regression model, match attendance is regressed on a set of explanatory variables designed to capture the impact of championship contention and relegation. Attendance for match i in season t is denoted as A_{it}, β denotes the coefficients to be estimated, and u is the error term.

$$\begin{aligned} A_{it} = {} & \beta_0 + \beta_W Weather_{it} + \beta_{PD} Point\ Diff_{it} \\ & + \beta_{CHH} Champ\ Home_{it} + \beta_{CHA} Champ\ Away_{it} \\ & + \beta_{RELHI6} Releg16\ Home_{it} + \beta_{RELHI7} Releg17\ Home_{it} \\ & + \beta_{RELHI8} Releg18\ Home_{it} \\ & + \beta_{RELA16} Releg16\ Away_{it} + \beta_{RELA17} Releg17\ Away_{it} \\ & + \beta_{RELA18} Releg18\ Away_{it} + u_{it} \end{aligned}$$

The *Champ Home* variable indicates the degree to which a home team contends for the championship. The *Champ Home* index is defined as the reciprocal of the number of games required to take the championship and thus increases in value for teams remaining in contention for the championship. The *Champ* index is recalculated for each team for each week taking into account the wins and losses from the previous week. For example, if 70 points were required for the championship in a particular season and the team currently had 5 wins or 15 points to its credit, then the index would be 1/55. For a team that continues to lose from the outset, the index remains at 1/70. Once the championship is determined with certainty, the index for the champion team is set to one and zero for the remaining teams. *Champ Away* measures the extent to which the away team is in contention for the championship and is defined similarly.

Also in the spirit of Jennett (1984) we construct indices for relegation. We take the reciprocal of the number games before relegation is determined with certainty for both the home and away teams. Unlike Jennett (1984) we obtain such relegation indices by rank (bottom three): *Releg-16*, *Releg-17*, *Releg-18*. If a team continues to win early on in the season, then the index remains at low level and will be set to zero once the team is no longer in danger of being relegated. On the other hand, the index is set to 1.0 once relegation is determined at the rank indicated. We note a clear weakness of both the *Champ* and *Releg* indices is that we assume the required points (games) for a winning season and relegation are known ex post.

For our regression model we also include a weather dummy variable that takes on a value of one if the weather is fair and zero otherwise. Finally, the difference in the point standings between the contending teams, *Point Diff*, is included as another proxy measure for the general uncertainty of outcome of a match independent of relegation and contention for the championship. *Point Diff* indicates a higher degree of uncertainty of outcome as the difference approaches zero.

For our data set the average stadium attendance during these three seasons stands at 18,712 with a standard deviation of 371. The maximum attendance was 62,241 and the minimum was 3,267.

Ⅲ Discussion

The estimated coefficients for the regression model described in the previous section are summarized in Table 1. Our preliminary findings show the two championship contention variables are positive and statistically significant at conventional levels. The sign on the coefficients for the *Champ* variables are consistent with our intuition that attendance increases on average for matches where teams still in contention for the championship are on stage. During the three seasons covered in the paper, Osaka Gamba , Urawa Reds, and Kashima Antlers took the championships in 2005, 2006, and

Table 1 Pooled Data Regression where Dependent Variable is Match Attendance

Variable	Estimated Coefficient	*t*-statistic
Constant**	17178.28	24.34
*Weather**	1180.53	1.63
Point Diff	28.76	0.47
*Champ Home***	39340.1	6.25
Releg-16 Home	−2861.70	1.15
Releg-17 Home	777.71	0.37
Releg-18 Home	−203.40	0.08
*Champ Away***	39340.1	2.79
Releg-16 Away	−529.49	0.23
Releg-17 Away	−2762.3	1.27
Releg-18 Away	256.02	0.11
Number of Observations 918	$R^2 = 0.1$	

*statistical significance at 10% level; ** statistical significance at 1% level.

2007 respectively. These three teams placed in the top three during 2005 and 2007 seasons and top 6 in the 2006 season thus remaining in contention for the championship as the season progressed. Hence as we conjectured the preliminary empirical findings support the notion that greater competition (uncertainty of outcome) at the match level promotes attendance.

We would expect avid fans and the community to rally to the support of their home team if it begins slipping towards relegation. However, the negative coefficients on 4 of the 6 relegation indices indicate that as a team draws closer to automatic relegation match attendance tends to decline on average. One possible explanation for this finding is that the "despair" factor sets in relatively quickly for the relegated teams since these teams tend to win only 4 or 5 games each season. Yet, drawing such conclusions from the data is still premature as the coefficients are not statistically significant.

Finally, the weather dummy variable is statistically significant and shows a positive relationship with stadium attendance. It follows that attendance on average will increase when the weather is good and decline otherwise. As the seating facilities in football stadiums in Japan are not fully covered with a roof it is conceivable that weather plays a role in determining attendance. This raises the question of whether purchasing weather derivatives or related insurance instruments would be of benefit to J-League in hedging risk associated with poor weather.

This note provided preliminary evidence on the impact of relegation and contention for championship on stadium attendance using match level data for J-League. Future work will be directed towards refining the relegation and championship contention indices as well as including control variables, which take into account local community involvement and the home town factor. Further empirical analysis of match level attendance should also provide us with greater insight on the factors affecting the financial stability of professional football clubs since attendance is directly linked to gate receipts and merchandizing (Buraimo et. al., 2006). And in the long run poor attendance levels should have a negative impact on revenues generated from sponsorship and broadcasting rights. As a consequence, attendance will have an effect on future policy regarding the rating and placement of asset backed securities such as revenue backed bonds issued to finance stadium development and other related sports facility projects (Gilliland et. al., 2003) in Japan.

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