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Emergence of a professional sports league and human capital formation for sports: The Japanese Professional Football League.

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Abstract

The Japanese Professional Football League (J-league) was established in 1993. Based on individual level data, this study investigated how emergence of the league affected Japanese people playing football using the differences-in-differences method. The following main findings were obtained. (1) In areas where a J-League team's home town was located, people were more likely to play football after emergence of the J-League than before it emerged. (2) There was a positive effect of the J-league on people who were younger and older than 25 years old between 1991 and 1996. (3) Between 1991 and 2006, this positive effect persisted and increased for younger people, while it disappeared for older people.

Running title: Emergence of professional sports

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Keywords: Football; Emergence of professional league; industrial development

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I. INTRODUCTION

The Japanese Professional Football League (J-League) was launched in 1993. Prior to the launch of the J-League, the Japanese national team consisted of amateur players and its performance was well below the level required to advance to the FIFA World Cup. Therefore, Japan could not win any preliminary matches for the FIFA World Cup. Japan won preliminary competitions and qualified for the first time to play in the 1998 FIFA World Cup held in France. After Japan's first appearance in the final stage of the 1998 FIFA World Cup, Japan qualified for consecutive FIFA World Cups in 2002, 2006, and 2010¹. This finding suggests that the J-League has progressed, to a certain extent, to the international level².

The reason for this finding is not only because excellent foreign players played for the J-League³ and several foreign coaches were employed (Takahashi 2013), but also because human capital of Japanese players has accumulated through the J-League team's training system. Similar to professional football leagues in Europe (Gerrard, 2012), an academy system was established after the J-League's launch. J-League teams have a youth team, which is considered as its subsidiary organization for training young football players. Youth team players can acquire techniques and learn the strategies of the professional team, resulting in human capital accumulation. The youth team mainly comprises players from the J-League team's local region.

¹ In 1986, the FIFA president (Joan Havelange) declared that "the World Cup will be held in Asia" (Takahashi, 2013). The 2002 World Cup was held in Japan and Korea.

² Less developed countries have caught up with developed countries in the football industry (Yamamura 2009).

³ "A number of high-profile foreign players were recruited, including England's Gary Lineker, Germany's Pierre Litbarski, and Brazil's Zico and Dunga (Dobson and Goddard 2001, p.108).

Prior to the launch of the J-League, football was not a major sport in Japan. Teenage players belonged to school teams, which aimed to win the match against rival schools rather than to train players for professional teams. However, the emergence of the J-League resulted in football becoming a major and popular sport in Japan. Accordingly, the club's youth team provides an opportunity for young people residing in its home town an incentive to play football. An increase in young amateur football players leads to an increase in the supply of labor for J-League teams and accumulation of human capital, which improves the performance of the J-League. A number of excellent Japanese players, such as Shinji Kagawa (Manchester United), came through such a system. Based on individual level data, this study used the differences-in-differences approach to examine how the emergence of the J-League team is related to people playing football.

II. DATA AND METHODS

This study used the "Survey of Time Use and Leisure Activities" (STULA) for statistical analysis. The Japanese Government (Ministry of Internal Affairs and Communications, Statistical Bureau in Japan) conducted the STULA to provide information about Japanese people's social behavior in daily life, which includes people playing football within the previous year. This survey includes observations randomly chosen from almost all regions throughout Japan. These surveys are scheduled to be held every 5 years. The STULA enabled comparison of people playing football before and after the launch of the J-League because the surveys were conducted in 1991 and 1996. In addition, combined STULA data in 1991 and 2006 were also

used to investigate the long-term effect of the J-League⁴. Therefore, based on these data sets, the short-term and long-term effects of the J-League on human capital formation within a home town can be assessed.

The STULA data were gathered from respondents older than 15 years of age. However, not all respondents answered all of the survey questions. Accordingly, data concerning some variables used in the estimations were not available. Furthermore, the sample was restricted to males because females cannot become J-League players. Consequently, the number of observations used in the regression estimations was 233,806 for data of 1991 and 1996, and 197,021 for data of 1991 and 2006.

The key variable, the proxy for playing football, was defined as follows. In the STULA questionnaire, respondents were asked “Did you play football within the previous year?” The possible responses to this question were “Yes” or “No”. Based on this response, the dummy variable of playing football was constructed. Furthermore, the respondent’s residential location was recorded in the STULA data, which enabled identification of the respondent’s residential prefecture⁵. Based on this information, a dummy variable was constructed to represent the prefecture where the home of the J-League team was located.

To control for various individual factors, various control variables were incorporated as independent variables, such as age, schooling years, annual household income, marital status dummy, and dummies to capture social positions⁶.

⁴ The STULA was also conducted in 2011. However, data from this survey were not available and therefore, the most recent survey available is the STULA in 2006.

⁵ A Japanese prefecture is the equivalent to a state in the United States or a province in Canada. There are 47 prefectures in Japan.

⁶ From the data set, a workers dummy, student dummy, house-worker dummy, and non-worker dummy were constructed.

Econometric framework and estimation strategy

The function to examine the hypothesis takes the following form:

$$\text{Playing football}_{itc} = a_0 + a_1 J\text{-League96}_c * 1996 \text{ year dummy}_t + a_2 J\text{-League96}_c + a_3 1996 \text{ year dummy}_t + X' B + u_{itp},$$

where *playing football*_{itp} (equals 1 if respondents played football within a year, otherwise it equals 0) represents the dependent variable in the individual *i*, year *t*, and prefecture *p*. Therefore, the probit model was employed for estimations. The regression parameters are denoted by α , and B is the vector of the regression parameters for the control variables, which capture the effect of various individual characteristics. The error term is denoted by u . The vectors of the control variables are denoted by X , which includes the individual's characteristics, such as schooling years, age, marital status dummy, household income, and social position dummies. Furthermore, in Japan, prior to emergence of the J-League, professional baseball was the major professional sport (Yamamura and Shin, 2009). Therefore, the professional baseball league can be regarded as a substitute for the J-League. To capture the effect of the substitute, X contains the dummy for the professional baseball team, which equals 1 when the respondent's residential prefecture is where the professional baseball team is located, otherwise, it equals 0.

J-League96 equals 1 when the respondent's residential prefecture was where the J-League team was located in 1996, otherwise, it equals 0. The term *1996 year dummy* equals 1 when the observations were collected in 1996, otherwise, it equals 0. The differences-in-differences approach was used to examine the effect of the emergence of the J-League team in residential prefectures on playing football. The treatment group included

residents who lived where the J-League team's home was located and the control group included residents in other prefectures. As mentioned above, the J-league was established in 1993. Therefore, the dates of 1991 and 1996 were before and after establishment of the J-league, respectively. The interaction term, *J-League96 * 1996 year dummy*, captures the difference in playing football during the period of 1991–1996 between residents who lived where the J-League team's home was located and residents in other locations. In addition, the long-term effect of emergence of the J-League team was examined using data from 1991 and 2006. Further, instead of *1996 year dummy* and *J-League 96*, *2006 year dummy* and *J-League 06* were used. *J-League 06* equals 1 when the respondent's residential prefecture was where the J-League team was located in 2006⁷. If the J-League team enhanced playing football and then human capital accumulated, these cross terms had a positive sign.

III. Estimation results.

Table 1 shows the results based on the sample from 1991 and 1996. For the full sample, the coefficient of *J-League96 * 1996 year dummy* was positive and statistically significant at the 1% level. Older people, who are over 25 years old, can play football as amateurs, but they are less likely to become professional players. Therefore, young people playing football is relevant to human capital accumulation for the J-League, whereas older people playing football is not relevant. In addition to full sample estimation, the sample was divided into young and old people. Even after dividing the sample into young people who were 25 years or younger and those who were older than

⁷ The initial membership of teams progressively increased. Inevitably, prefectures where the J-League team's home was located increased from 10 in 1996 to 22 in 2006. Therefore, *J-League96* is not equivalent to *J-League06*.

25 years, *J-League96 * 1996 year dummy* still had a positive sign and was statistically significant. However, there was a marginal effect of *J-League96 * 1996 year dummy* (0.026) in column (2), which was more than 10 times larger than that in column (3). These results suggest that emergence of the J-League team caused residents of where the J-League was located to play football. This effect was larger for young people than older people.

Table 2 shows the results based on the sample from 1991 and 2006. *J-League06 * 2006 year dummy* yielded the predicted positive sign and was statistically significant at the 1% level in column (1). Marginal effect of *J-League06 * 2006 year dummy* was 0.003, which was the same as the marginal effect of *J-League96 * 1996 year dummy* shown in Table 1. In column (2), its marginal effect of *J-League06 * 2006 year dummy* was 0.031, which was larger than the marginal effect of *J-League96 * 1996 year dummy* shown in Table 1. *J-League06 * 2006 year dummy* was not statistically significant. The positive relationship between the interaction term and the dependent variable disappeared for older people. The results of Tables 1 and 2 suggest that the long-term effect of emergence of the J-League team made a greater contribution to human capital formation than its short-term effect.

IV. Conclusion

Based on individual level data, this study investigated how the emergence of a professional league has affected Japanese people playing football. Regression estimations showed that in areas where a J-League team was located, people were more likely to play football after emergence of the J-League than before it. This effect was increased for young people over time. These findings suggested that emergence of the J-league led to young people playing football, which fostered home-grown players and enhanced the human capital formation required for improving team performance.

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Table 1.

Probit analysis on the effect of emergence of the J-league team on men playing football (sample of 1991 and 1996).

	(1) Full sample	(2) Age ≤25 years	(3) Age >25 years
<i>J-league96* 1996 year dummy</i>	0.003*** (2.76)	0.026*** (2.61)	0.002** (2.27)
<i>1996 year dummy</i>	0.022*** (34.4)	0.106*** (19.6)	0.010*** (21.6)
<i>J-league96</i>	0.002*** (2.80)	0.006 (0.73)	0.002*** (3.19)
Log Pseudo-likelihood	-48,119	-27,209	-16,133
Observations	233,806	50,333	161,087

Note: Numbers are marginal effects. Numbers in parentheses are z-statistics calculated using robust standard errors. ***indicates significance at the 1% level. Various control variables and constants were included, but their results are not reported.

Table 2.

Probit analysis on the effect of emergence of the J-league team on men playing football (sample of 1991 and 2006).

	(1) Full sample	(2) Age ≤25 years	(3) Age >25 years
<i>J-league06* 2006 year dummy</i>	0.003*** (3.41)	0.031*** (3.34)	0.001 (1.01)
<i>2006 year dummy</i>	0.019*** (23.8)	0.046*** (6.47)	0.013*** (20.6)
<i>J-league06</i>	0.0004 (0.62)	-0.007 (-0.12)	0.001** (2.11)
Log Pseudo-likelihood	-35,748	-19,261	-16,133
Observations	197,021	35,934	161,087

Note: Numbers are marginal effects. Numbers in parentheses are z-statistics calculated using robust standard errors. ***, ** indicate significance at the 1% and 5% levels, respectively. Various control variables and constants were included, but their results are not reported.