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An Analysis on the Economical Ripple Effects of Sports Events Held by Local Authorities Using Inter-industry Relation Analysis

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Abstract: This study aims to analyze the economic ripple effect of a sport event on the city that hosts the event using the Simple Location Quotient method (SLQ) and an inter-regional-industry relation table. The SLQ is one of the most widely used economic base analysis methods, which compares the local economy indices to those of a reference site to identify specializations in the local economy. For this analysis, this paper investigates the expenditures of the participants on a youth soccer tournament hosted by the city of Gyeongju, South Korea using an interview method. The results of the analysis show that the sport event has contributed tens of millions of US dollars to the regional economy. In addition, the value added to the city consists of the wages of the employees, the business surplus, the consumption of fixed capital and the net production cost. Also this paper provides a few important implications on the method used to investigate the economic ripple effect including choices of survey subjects and economic matrices.

Key words: Ripple effects on a regional economy, inter-regional-industry relations model, inter-regional-industry table, the simple location quotation method

INTRODUCTION

Recently, sports have been classified as a high value-added industry, rather than as mere health promotion or a leisure activity. Additionally, sports have become a business that seeks profit maximization through investment. In other words, sports, which used to be only a means to provide a visual service, have taken an unparalleled position in business. According to Crompton (1995), sports teams and events are deemed business investments, which promote the regions that support them on an individual or group level. Among the many reasons for supporting sports, to enhance the economy is perhaps the foremost reason for investing in professional athletes, university facilities and sporting events. Regional sporting events encourage tourism that produces profits for the hosting regions. On the individual level, for an athlete or a business person, it may be easier to measure such a return on investment but on a larger scale, in terms of a region, the estimation of a sports investment return can be difficult in such a broad public environment. Hence, there is a need for a suitable analysis method.

Crompton (1995) described the reasons for regional investments in sports in a sequence. First, it provides taxes from the people of the hosting region in the form of a fund. Local councils can then use the fund in subsidizing sporting events or facility developments. These events draw people from other regions, encouraging them to spend inside and outside the facilities. Such money from other regions generates profits for the council and promotes employment. Thus, the cycle is completed; the local residents come to consider generating funds their own responsibility and in return, receive benefits in the form of profits or employment.

Turco and Kelsey (1992) defined the economic effect of sports investment as the net profit from the expenditures within sporting events and facilities and Crompton (1995) reported that the purpose of the analysis of the economic effect is to measure the total economic profit.

The economic ripple effects of such sporting events have drawn the attention of local authorities and corresponding research is actively ongoing (Ahlert, 2001; Hinch and Higham, 2001; Arthur and Andrew, 1996).

According to Hunter (1988), in practice, the analyses of these economic effects are politically motivated to justify the cost of public officials in sports organizations or the costs of the regional host councils. Also, Crompton (1995) suggests that public officials, under pressure to explain the benefit of the tax distribution, are interested in the economic analysis as a way to make a point about government subsidies to private sports enterprises and show the public benefit. He also suggests that the development of such research in sports organizations shows that these investments are valuable to public officials and taxpayers and are a financial asset to the host region.

Some research papers (Fimrite, 1992), advocate the subsidizing of sporting events by local authorities, mentioning the economic profit, while other researchers like Baade and Dye (1990) question the viability of the economic figures they support. Especially, Baade (1987) who spotted that regional public servants and beneficiaries of the subsidies purposefully perform their research with an aim to exaggerate economic figures in order to persuade voters to support these investments.

Lipsitz (1984) and Baade and Dye (1990) claim that the analysis is conducted freely, independent from such pressure, but Dunnavant (1989) points out that consultants are hired in order to tell the clients what they want to hear. Further, Crompton (1995) and Turco and Kelsey (1992) all indicate that the credibility and objectivity of research papers dealing with these economic effects are not reliable due to differences in estimation methods. Such problems arise when estimating the ripple effects through indirect measurement of the total consumption of all potential participants before the sporting events occur (Crompton 1995; Turco and Kelsey, 1992). Their research indicates that an objective and quantitative estimation is lacking for the ripple effect analysis, because the only analysis done for such effects has been for the Olympics, the World Cups and other so-called mega-sporting events.

According to Fletcher (1989), in terms of methods to analyze the effect, there are economic-based models, income-expenditure models and inter-industrial models. The income-expenditure model is used for small-size economy analysis, while the inter-industrial model is useful for nationwide analysis. It turns out that an inter-industrial model developed by Leontief (1996) not only analyzes the correlation between industries, but also the correlation of the economic effects of the total consumption of individuals to industries, including the measurement of profits from people from other regions.

The methods for producing an inter-regional-industry table are, in general, the survey method and the non-survey method. In the first case, the advantage is high accuracy and the drawbacks are time and money. The second method induces an inter-regional-industry table from a national inter-industry table combined with regional output data and offers an advantage in terms of time and money. For this reason, a non-survey method was used for this study. Of non-survey methods, there is a Location Quotient method (LQ), RAS method and Supply-demand Pool Method. Among these methods, LQ is widely used in Korea due to practicality and efficiency (Kang and Kim, 2010; Lee, 2008, 1997; Lee and Choi, 2003).

For an objective and quantitative estimation of the effects of nation-wide sporting events held by local authorities, actual participants, rather than potential participants, were used in the preparation of the list of input data and the analysis of the effect is based on a regional inter-industry table rather than a national one implementing LQ. The purpose of this research is to analyze the regional industrial structure via an inter-industry relation model and to examine the ripple effect of nationwide sporting events held by local authorities on regional economies (based on a regional inter-industry table) using SLQ(simple location quotient method).

MATERIALS AND METHODS

This research considers the delegations and visitors of the 2012 Hwa-Rang-Dae-Gi National Elementary School Youth Soccer Tournament, which was held in Gyeongju, South Korea, as the data population, 186 delegations of 455 teams of 186 schools and 450 visitors out of 636 are chosen to be the sample target. The self-administration survey method was conducted by teams of 20 professionals who, with two to a team, were sent to the Gyeongju public stadium, a soccer park and the Alcheon stadium to conduct one-on-one, face-to-face interviews. As for the response rate, 175 delegations (94.0%) and 415 visitors (92.7%) responded, a total of 590 people (92.7%). Of these, survey papers of 145 delegations (82.8%) and 378 visitors (91.0%) were selected as valid, equaling a sampling size of 532 (88.6%).

This study focuses on ensuring the objectivity of the expenditure estimation of the nationwide tournament. In order to achieve this, the data from Gyeongju-si, Korea Youth Football Association, soccer institutes of Gyeongju-si, are included to avoid any omission and to figure out the expenditure pattern of delegates and visitors, the cost of lodging, transportation, food and beverage, shopping and admission. Moreover, the regional industrial structure is analyzed through a regional inter-industry model; the ripple effect of the tournament is analyzed based on the 2005 regional inter-industry relation table published by the Bank of Korea in 2009 and the region of Gyeongju is analyzed in detail using SLQ.

Production estimations: The LQ of Gyeongju is classified by industries on the regional inter-industry relation table and input in GRDP standard is shown Table 1.

Input coefficient estimations: The Location Quotient (LQ) is a method to estimate the relative importance of a certain regional industry to the economy of the entire nation. It is common to produce input coefficients by using the national inter-industry relation table, but in this analysis of the tournament, the regional inter-industry relation table is used, so the equation for the LQ is as follows:

Table 1: Gross products of Gyeongbuk and Gyeongju (in% and US dollars)

Industry	Gyeong-buk	Gyeongju	Weight	LQ
Agriculture•Forestry•Fishing	3,376,692,103	243,862,466	7.2	0.9
Mining	199,760,426	18,781,721	9.4	1.2
Manufacturing	28,461,489,796	1,757,413,487	6.2	0.8
Electricity•Gas•Steam•Waterwork	1,913,112,689	374,303,461	19.6	2.4
Construction	3,746,527,063	479,464,951	12.8	1.6
Wholesale and Retail	2,142,070,098	182,528,838	8.5	1.0
Transportation	1,644,116,238	150,865,129	9.2	1.1
Lodging and Foods	814,520,852	129,530,612	15.9	2.0
Information and Broadcasting	824,925,466	62,905,058	7.6	0.9
Finance and Insurance	1,522,945,874	149,616,681	9.8	1.2
Real estate and Leasing	2,342,949,423	221,307,010	9.4	1.2
Business service	809,318,545	65,888,199	8.1	1.0
Public•National defence•Public service Administration	3,881,618,456	258,283,940	6.7	0.8
Education service	3,056,930,790	300,744,454	9.8	1.2
Public health and Welfare	1,386,339,840	136,932,564	9.9	1.2
Art•Sports•Leisure service	382,632,653	75,367,347	19.7	2.4
Other services	1,177,921,917	91,489,796	7.8	1.0
Total	57,683,872,227	4,699,285,714	8.1	1.0

The regional gross products are priced in the standard of 2009, Gyeongsangbuk-do

Table 2: Number of employees of Gyeongbuk and Gyeongju regions (in US dollars)

	No. of enterprises			No. of employees		
Industry	Gyeong-buk	Gyeongju	LQ	Gyeong-buk	Gyeongju	LQ
Agriculture•forestry•fishing	247,560	14,197	479	2,586,513	158,829	501
Mining	103,815	8,873	713	1,178,350	62,999	436
Manufacturing	16,801,242	1,903,283	946	242,174,800	29,111,801	980
Electricity•gas•steam•waterwork	155,280	15,084	811	5,850,932	1,689,441	2,354
Sewage•waste disposal recycling restoring	433,008	43,478	838	4,534,161	432,121	777
Construction	5,458,740	458,740	702	57,651,287	5,011,535	709
Wholesale and retail	41,511,091	4,154,392	835	98,323,869	9,553,682	792
Transportation	13,826,974	1,405,501	849	34,872,227	3,137,533	733
Lodging and foods	37,658,385	4,537,711	1,006	86,086,957	12,179,237	1,153
Publishing imaging broadcasting information service	775,510	60,337	649	8,228,039	593,611	588
Finance and insurance	1,990,240	160,603	674	23,360,248	2,087,844	728
Real estate and leasing	3,316,770	347,826	875	10,813,665	1,086,069	819
Science and technology	2,138,421	257,320	1,004	12,849,157	1,364,685	866
Industrial facility administration and business support service	1,244,011	131,322	881	21,444,543	1,325,643	504
Public•national defense•public service administration	1,102,041	77,196	585	39,873,114	3,038,154	621
Education service	8,269,743	898,846	907	69,323,869	6,993,789	822
Public health and welfare	4,955,634	453,416	764	48,934,339	4,840,284	806
Art•sports•leisure service	4,782,609	543,035	948	13,608,696	2,799,468	1,677
Association•organizations repairing and other individual service	20,883,762	2,137,533	854	41,116,238	4,105,590	814

Manufacturing industry is listed in detail, Gyeongsangbuk-do

$$LQ_i^r = \frac{X_i^r / X^r}{X_i^N / X^N}$$

Where:

X_i^r : The number of employees of i industry in r region (the number of enterprises, etc; the rest the same)

X^r : the number of employees in r region

X_i^n : The number of employess of i industry in Gyeongbuk

X^N : The number of employees in Gyeongbuk

As a result of the calculations, Table 2 shows that LQs of Gyeongju were high in the following industries: mining, lodging and foods, real-estate and leasing and business service. LQ computes the regional input coefficients by deducting the amount of transfer from Gyeongbuk to Gyeongju in order to discern the input structure among industries, assuming the regional input structure corresponds to that of Gyeongbuk.

Single-region I/O analysis model: Industries within a national economy buy goods and services as raw or supplementary materials, or get involved in activities such as consumption, investment and export. This model estimates such relationships between industries, quantitatively. The regional inter-industry relation table illustrates the trade details by industry by partitioning a nation into regions to reflect their trade patterns and different production technology structures.

Input system of a regional inter-industry relation table:

Gross production = Gross input

Gross input = Intermediate input+value add (input system)

Intermediategrossproduction = Intermediate consumption + Final consumption − Imports − Input(distribution system)

Final consumption = consumption + investment + exports + clearance

Total consumption(totalsupply) = Intermediate consumption + Finalconsumption

The input coefficient is intermediate input, such as the purchase of raw materials and fuel from other industries divided by the total input, which indicates the intermediary goods needed per one unit of output of each industry.

Producing the input coefficients: When (a_{11}, a_{21},…, a_{n1}) are the details of the first industry sector, (X_{11}, X_{21},…, X_{n1}) divided by the total input, X_1, is the input coefficient that describes the size of industries needed for producing one unit of output in the first industry. The equation is as follows:

$$a_{ij} = \frac{X_{ij}}{X_j}$$

The measurement of the amount of induced production of each industry, directly and indirectly, from a unit increase of final demand, will be called the analysis for production inducement effects.

Producing the production inducement coefficient: From the supply-demand relationship of the outputs of each industry on the inter-industry relation table, it can be noted that when the sum of intermediate consumption and final consumption is subtracted by the imports, it coincides with the total production, so equations such as Eq. 1 as follows can be derived:

$$\begin{aligned} X_{11} + X_{12} + X_{13} + Y_1 - M_1 &= X_1 \\ X_{21} + X_{22} + X_{23} + Y_2 - M_2 &= X_2 \\ X_{31} + X_{32} + X_{33} + Y_3 - M_3 &= X_3 \end{aligned} \quad (1)$$

Since the input coefficient is obtained from intermediate inputs divided by the total production, the Eq. 1 can be transformed as follows:

$$\begin{aligned} a_{11}X_{11} + a_{12}X_{12} + a_{13}X_{13} + Y_1 - M_1 &= X_1 \\ a_{21}X_{21} + a_{22}X_{22} + a_{23}X_{23} + Y_2 - M_2 &= X_2 \\ a_{31}X_{31} + a_{32}X_{32} + a_{33}X_{33} + Y_3 - M_3 &= X_3 \end{aligned} \quad (2)$$

There are three unknowns in Eq. 2, X_1, X_2 and X_3. Since it is a linear simultaneous equation of three unknowns, it can be solved for the unknowns and it can be shown in matrix form as Eq. 3 as follows:

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix} + \begin{bmatrix} Y_1 \\ Y_2 \\ Y_3 \end{bmatrix} - \begin{bmatrix} M_1 \\ M_2 \\ M_3 \end{bmatrix} = \begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix} \quad (3)$$

Expressing Eq. 3 neatly is as Eq. 4 follows:

$$AX+Y-M = X \quad (4)$$

where, A is the input matrix, X is the total production vector, Y is the final consumption vector and M is the imports vector.

Expanding Eq. 4 to solve for X is as follows:

$$\begin{aligned} X - AX &= Y - M \\ (I - A)X &= Y - M \\ X &= (I - A)^{-1}(Y - M) \end{aligned} \quad (5)$$

Here, the matrix, $(I-A)^{-1}$, is called a production inducement coefficient, where I is an identity matrix. With the production inducement coefficient set, X can be obtained easily and it directly or indirectly varies according to Y and M. The coefficient can be defined as, $(I-A)^{-1}$ = R and by multiplying it the final consumption can be calculated. Also, by multiplying the value-added inducement coefficient and employment inducement coefficient to the production inducement coefficient, the effects of value-added inducement and employment inducement can be obtained. Thus, the ripple effect can be thoroughly analyzed by looking at the obtained value-added inducement coefficient and employment inducement coefficient.

ANALYSIS

Analysis of the ripple effects

Methodology and structure: The ripple effects to the regional economy are analyzed based on the 2005 regional inter-industry relation table from the Bank of Korea. As a methodology to classify the industries, a 78-sector table (the Korean Standard Industrial Classification Table) is used to select the input sectors. Production inducement cost is the sum of added value inducement cost and intermediary input cost, with this representing a multiplier effect.

Production inducement cost = Added value inducement cost+ Intermediary input cost

The added value cost consists of the wage of employees, operating surplus, consumption of fixed capital (depreciation) and net production cost:

Value added inducement cost = Wage+Surplus+Decpreciation +Net production cost

Calculating the inputs: The input is obtained by adding up the investment costs (event supporting cost and facility investment cost) and the total expenditure of participants (the delegations, cheering squad, parents and normal visitors). The operating cost of the tournament is estimated to be $1,004,436. Of this, $967,169 is from the event supporting costs of the Korean Youth Football Association and the Gyeongju football institute; $28,393 is from the wages of the Gyeongju health center and the Gyeongju volunteer center workers; $8,873 from the direct support of Gyeongju. Forty million won towards building the light shields and the wages for the maintenance is included in the event-supporting cost calculation minus one billion won for facility materials.

The expenditure of the participants is the sum of the expenses spent by parents, the cheering squad and the delegations and this, as shown in Table 3, is estimated to be $20,797,692. To begin, the expense of the delegations is calculated by multiplying an individual expense per day by the total number of delegations. To enhance accuracy, the list of participants was obtained directly from the Gyeongju Football Association for the calculation. In the list, the number of players in the U-12, U-11, U-10 categories were 3,813, 2,311 and 1,152, respectively. In total, the number of players was 7,276 (including the delegations). Excluding for the repeated players, the size of player group was 6,876; they stayed 10.3 days on average; therefore, the size of the accumulation is 60,983. The expenditure of visitors (including parents and cheering squads) is calculated by multiplying the individual expenditure by the total number of visitors as shown in Table 4. The data is obtained from Gyeongju, which frequently recorded the number of visits to practices, the opening ceremony and each stadium, with the average stay calculated as 5.9.

Deciding the total expenditure: The total expenditure (of input sectors) is estimated to be $20,797,692, which consists of the expenditure of the visitors, the cost of supporting the events and the investment in the facilities as shown in Table 5. Specifically, the total wages spent for the tournament is estimated at $299,733, including the extra pay-per-game for coaches and referees and the travel expenses for coaches, supervisors and referees. The wage rate is taken from the report, "2010 Total Expenditure of Households by Purpose" (Bank of Korea) by extracting the component ratios of wages for each category. The component ratios are obtained by averaging the values of the regions of Daegu and Gyeongbuk:

$$\sum_{i=1}^{12} D_i^* = \sum_{i=1}^{12} (W^* \times R_i^*)$$

where, D_i^* is the expenditure per category, W^* is the total wage and R_i^* is the ratio per category. Sixteen categories were selected to be input categories by appropriating the total expenditure per category.

Analyzing the economic ripple effects

The ripple effect on the regional economy

Production inducement cost: The ripple effect can be calculated using an impact factor (backward linkage effect) and sensitivity index (forward linkage effect) for input cost as presented in Table 6. The impact factor is a coefficient that represents an impact on all industries with a unit increase in production of an industry. That is to say, it is a coefficient that quantifies the capital goods purchase level of an industry and distinguishes that from other industries. It is called the backward linkage effect:

Table 3: Individual expenditure of the player groups

Type	Daily expenditure (dollars)	Average stay (days)	Total consumption per person (dollars)	Size of the player groups (people)	The sum of expenditures (dollars)
Lodging	13.17	10.33	136.07	6,876	935,226
Transportation	3.14	10.33	32.42	6,876	222,715
Food and beverage	14.39	10.33	148.62	6,876	1,021,295
Shopping	2.93	10.33	30.22	6,876	207,631
Admission	1.32	10.33	13.68	6,876	94,055
Others	3.88	10.33	40.09	6,876	275,067
Total	38.83	10.33	401.10	71,029	2,757,764

Table 4: Visitors (parents and cheering squad) daily expenditure

Type	Daily expenditure (dollars)	Average stay (day)	Average total expenditure per person (dollars)	The size of cheering squads (people)	The sum of expenditures (dollars)
Lodging	15.80	5.999	94.77	60,983	5,779,059
Transportation	7.28	5.999	43.68	60,983	2,663,709
Food and beverage	10.76	5.999	64.56	60,983	3,937,001
Shopping	3.75	5.999	22.50	60,983	1,371,783
Admission	2.58	5.999	15.45	60,983	942,325
Leisure	3.56	5.999	21.33	60,983	1,300,799
Others	5.59	5.999	33.53	60,983	2,044,366
Total	49.31	5.999	295.81	365,837	18,039,042

Table 5: Setting up the input categories (in US dollars)

Code	Industries	Total input costs (a+b)	Event supporting cost and Facility investment (a)	Expenditure of the visitors (b)
16	Textile and fabric	88,731	88,731	
17	Clothes and textile product	92,280	92,280	
30	Plastic product	32,831	32,831	
44	Visual, audio and communication apparatus	31,943	31,943	
48	Automobile	167,702	167,702	
57	Wholesale and retail	1,704,525	125,111	1,579,414
58	Restaurant and lodging	11,712,511	39,042	11,673,469
59	Land transportation	2,886,424	0	2,886,424
63	Broadcasting	78,083	78,083	
67	Business professional service	46,140	46,140	
68	Other business service	40,816	40,816	
71	Medical and public health	26,619	26,619	
73	Hygienic service	11,535	11,535	
74	Publishing and culture service	23,070	23,070	
75	Amusement service	2,337,178	0	2,337,178
78	Others	2,645,075	324,756	2,320,319
	Total	21,926,353	1,128,660	20,797,693

Table 6: The ripple effect to a regional economy (In US dollars; people)

Region	Production inducement	Value added inducement	Employment inducement
Gyeongbuk (Gyeongju)	29,812,777	12,034,605	722
Throughout	45,480,035	18,583,851	908

With the price standard of 2012

Table 7: Structure of value added. (In US dollars; people)

Region	Wage inducement	Operating surplus	Depreciation of fixed capital	Net production tax
Gyeongbuk (Gyeongju)	5,927,240	4,193,434	1,016,859	1,583,851
Throughout	8,026,619	7,002,662	2,138,421	2,777,285

With the price standard of 2012

$$\text{Impact factor} = \frac{\sum_{i=1}^{n}}{\frac{1}{n}\sum_{j=1}^{n}\sum_{i=1}^{n} r_{ij}} = \frac{\text{Heat sum of the production inducement coefficients}}{\text{The average heat sum of the production inducement coefficients of the entire industry}}$$

The index of the sensitivity of dispersion is a coefficient that quantifies the level of impact on a certain industry when the final consumption of production of the entire industry increases by one unit. It is called the forward linkage effect:

$$\text{The index of the sensitivity of dispersion} = \frac{\sum_{i=1}^{n}}{\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{n} r_{ij}} = \frac{\text{Heat sum of the production inducement coefficients}}{\text{The average row sum of the production inducement coefficients of the entire industry}}$$

It is estimated that the production inducement is $29,812,777; value-added inducement is $12,034,605 and employment inducement is 722 people in the second row of Table 6.

Value-added inducement: The compensation of employees includes social security, annuity and insurance that employers pay for as well as wages in cash or in kind and is estimated at $5,241,348. The operating surplus, perceived as adding value as a reward for profit-pursuing enterprises participating in production activities, is estimated at $4,193,433. The depreciation of fixed capital is the reduction in value of fixed capital assets due to deterioration or daily damages and it is estimated at $1,016,858. The taxes on production represent those imposed on producers for production, purchase, or use of goods and services. In practice, producers include such taxes in the price of their products. Here, the tax estimation is $1,583,850. The details on the structure of value added are displayed in Table 7.

The ripple effects on each industry: Generally, industries with high input show a high ripple effect. This is seen in the industries related to tourism such as restaurant and lodging, water and air transportation, amusement services, track and field sports industries and wholesale and retail industries.

General ripple effect: In order to analyze the ripple effect of the tournament, 16 input sectors were selected among 78 sectors in a regional inter-industry table. The input consisted of event supporting expense ($1,128,660) and the visitors' expenditure ($20,797,692) amounting to $21,926,353. The economic ripple effect was composed of production induction ($30,049,689), value-added induction ($12,034,605) and employment induction (722 people). Of

the value-added induction, $5,243,123 was from the compensation of employees; $4,193,433 was from the operating surplus; $1,016,858 was from the depreciation of fixed capital and $1,583,850 was from the net production tax. It is common to extract information from broadcast media, advertisements and other marketing campaigns when analyzing the economic ripple effects of a single event of culture, sports, or art, but the size of the tournament was negligible in terms of awareness so such information was excluded in the analysis. However, in the input sectors, there is a broadcasting sector, so any such backward/forward linkage effects are well reflected. Production inducement does not only represent the business profit or deficit from the event, but the backward/forward linkage effects of the input as a whole (Table 8).

Table 8: The ripple effect on each industry (In US dollars; people)

Sector name	Production induction	Added value induction	Employment induction	Wage induction	Operating surplus	Depreciation of fixed capital	Net production tax
Agricultural product	777,285	555,368	49.4	34,605	476,752	36,823	7,187
Livestock product	571,340	222,715	14.9	10,293	187,933	22,893	1,508
Forestry product	37,711	30,701	2.1	3,549	21,650	1,686	3,815
Marine product	87,134	35,226	1.3	20,941	11,358	2,751	355
Agricultural•forestry•fishery service	24,667	11,269	0.8	6,566	3,993	621	89
Coal and crude oil	-	-	0.0	-	-	-	-
Metal ores	-	-	0.0	-	-	-	-
Non-metal ores	1,775	976	0.0	266	532	89	-
Meat and dairy products	779,769	86,868	1.9	40,461	15,705	11,801	18,900
Processed marine product	48,270	9,760	0.4	4,880	3,017	887	976
Milling	485,626	23,869	0.7	10,204	7,986	4,969	710
Other foods	192,192	59,716	2.3	22,626	17,214	6,921	12,866
Beverage	73,292	31,056	0.4	9,139	3,017	2,839	16,149
Feed	73,114	5,590	0.2	4,525	-266	1,331	89
Tobacco	9,051	6,744	0.0	532	799	89	5,324
Fabric and textile	109,938	23,602	0.8	13,221	6,744	3,372	266
Clothes and fabric product	135,138	50,577	0.8	21,650	19,166	6,655	3,106
Leather product	8,784	2,662	0.1	1,597	444	177	532
Wood and wooden products	12,866	3,194	0.2	2,130	444	355	177
Pulps and papers	93,966	25,732	0.6	13,576	6,034	3,638	2,484
Printing and copying	63,177	28,394	0.2	14,552	7,720	3,283	2,928
Coal product	11,180	976	0.0	532	266	444	-266
Crude oil product	5,235	621	0.0	355	89	89	-
Basic chemical product	7,187	2,307	0.0	799	799	621	-
Synthetic resins and synthetic rubber	11,358	2,130	0.0	799	621	621	-
Chemical fabric	21,562	3,461	0.1	1,420	710	1,331	-
Fertilizer and pesticide	28,128	6,655	0.1	2,396	2,928	1,242	-
Medicine and cosmetics	37,178	17,391	0.1	5,856	6,300	1,242	3,993
Other chemical product	32,742	7,365	0.1	3,461	2,307	1,331	355
Plastic product	162,910	51,198	0.7	27,240	15,173	7,365	1,420
Rubber product	12,156	3,727	0.1	2,484	444	710	89
Glass product	29,370	14,374	0.1	5,235	5,324	3,815	89
China and clay product	10,736	3,993	0.1	2,041	1,242	532	89
Cement and concrete product	3,017	887	0.0	355	355	89	-
Other non-metal ore product	8,962	2,396	0.1	1,331	532	444	89
Pig iron and steel	39,663	6,921	0.0	1,863	3,727	1,331	89
The first steel product	91,748	20,231	0.1	4,703	11,358	3,904	177
Non-metal ore and the first product	10,027	1,597	0.0	799	0	444	-
Metal product	68,234	21,917	0.5	11,269	7,542	2,662	444
Machine and device for general purpose	4,348	1,242	0.0	799	177	89	89
Machine and device for special purpose	13,398	3,549	0.1	1,952	799	532	266
Electric machine and device	41,615	9,849	0.2	5,945	2,307	1,331	266
Electrical component	9,051	2,041	0.0	799	444	887	-
Vision, audio and telecommunication device	62,289	11,535	0.1	3,106	5,501	1,420	1,508
Computer and business machine	27,240	5,413	0.0	3,106	799	710	710
Home appliance	3,283	887	0.0	355	89	89	266
Precision instruments	4,880	1,331	0.0	710	266	266	177
Automobiles	271,074	67,258	1.3	47,915	4,348	14,020	1,065
Ships	621	177	0.0	177	-	-	-
Other transportation equipment	4,791	1,154	0.0	532	177	177	177
Furniture	10,648	1,863	0.0	1,065	177	177	177
Other manufacturing product	37,001	13,487	0.5	8,341	1,775	1,065	2,307
Electrical power	158,296	94,676	0.3	16,327	36,291	37,178	4,969
Gas and water work	90,594	48,891	0.3	16,948	11,890	21,473	-1,331
Architecture and construction	75,333	34,605	1.0	21,207	6,744	1,952	4,703

Table 8: Continue

Sector name	Production induction	Added value induction	Employment induction	Wage induction	Operating surplus	Depreciation of fixed capital	Net production tax
Civil engineering and special construction	-	-	0.0	-	-	-	-
Wholesale and retail	1,957,409	1,190,949	88.4	488,465	610,382	77,817	14,286
Restaurant and lodging	12,427,950	4,963,620	431.8	2,339,130	1,263,443	227,063	1,133,895
Land transportation	3,037,799	1,465,927	47.3	1,006,477	385,448	164,419	-90,328
Marine and air transportations	2,307	355	0.0	89	177	89	-
Transportation-related service	37,622	25,200	0.3	10,204	7,098	7,453	444
Communication	168,767	82,520	0.7	21,384	25,377	28,039	7,808
Broadcasting	142,946	64,330	0.9	40,284	10,914	12,689	532
Finance and insurance	343,390	193,168	3.1	82,875	90,240	10,382	9,672
Real estate	842,413	645,785	2.2	36,557	402,396	114,108	92,635
Research facilities	8,784	6,034	0.1	4,791	-	1,154	89
Other business-related service	94,676	59,184	0.8	36,025	19,876	2,662	710
Other business service	119,787	88,465	3.2	54,126	25,909	6,300	2,041
Public administration and national defense	74,357	54,481	0.8	33,984	-	20,497	-
Education	14,108	11,446	0.3	9,849	710	887	-
Medicine and public health	46,761	25,377	0.5	18,634	3,638	2,839	266
Welfare	-	-	0.0	-	-	-	-
Hygienic service	85,803	50,754	1.3	42,325	5,058	4,170	-799
Publishing and culture service	75,155	38,509	1.5	28,305	1,952	6,566	1,686
Amusement service	2,399,290	1,350,754	52.8	530,257	408,341	106,300	305,856
Social groups	10,559	5,501	0.4	4,348	-	799	266
Other service	66,903	31,588	2.4	14,818	10,204	1,420	5,146
Others	3,102,484	-	0.0	-	-	-	-
Total	30,050,133	12,034,339	721,9	5,240,994	4,193,434	1,016,504	1,583,496

DISCUSSION

The results of the analysis are as follows: First, in an attempt to objectively estimate all the expenses, it was assessed that $21,399,290 was spent by the delegations and visitors (parents and cheering squad) and $1,137,533 was spent on the tournament operation. Second, the ripple effect of the tournament was estimated at a total of $30,049,689; the value-added inducement was $12,034,605 and the employment inducement was 772 people. Third, of the value-added inducement, the compensation of employees, the operating surplus, the depreciation of fixed capital and the net taxes on production was estimated at $5,927,240, $5,241,348, $1,016,858 and $1,583,850, respectively.

In addition, since the average stay was 10.3 days for the delegations and 5.9 days for the visitors, the tournament can be deemed successful in terms of the length of stay. As Crompton (1995) pointed out, this event is a successful example in that it lengthened the stay, which directly affects total consumption and it implemented an encouraging strategy of consumption for a large number of visitors, maximizing the economic ripple effect. Also, the fact that $1,137,533 of tournament operating cost created $20,797,692 expenditure, which is more than eighteen-fold, is remarkable for a small-size regional city.

Although, the data for the delegations is enough for the research objective, as it was done through direct surveys based on the register, the data for the visitors might have been overestimated as the number of visitors was provided by Gyeongju. This research was not utterly independent in that the visitor information was not estimated scientifically enough. For this reason, Burgan and Mules (1992) claimed that ordinary visitors who are event participants should be excluded in their report, "Economic Impact of a Sporting Event." Despite such efforts for objectivity, many reports that analyze ripple effects are suspected of over calculating the impact by overestimating the expenditure variables. Therefore, a stricter standard should be implemented in estimating input variables. The analysis done in this study implies that the expansion of the implementation of SLQ (which is an indirect method of tabulating the inter-regional-industry relations table) needs to be based on the corresponding regional inter-industry relations table not the national inter-industry relations table and in order to maintain an objective view of the expenses of the consumers input, industries should be selected considering the expense of actual participants rather than potential participants using a direct survey method, not indirect method.

CONCLUSION

This research has analyzed the industrial structure of a region, via a regional inter-industry relation model, to assess the ripple effects of a nationwide sports event organized by local authorities (based on the 2005 regional inter-industry relation table, Bank of Korea, using SLQ. To achieve the goal, the ripple effects of a youth soccer tournament, held in Gyeongju in 2012, were

analyzed. The delegations and visitors were chosen to be the population of the research in an attempt to avoid any omission and the sampling size was 636 in total, consisting of 186 delegations of 186 schools and 450 visitors; of them, 175 delegations (94.0%) and 415 visitors (92.7%) were included. 590 people (88.6%) in total participated in the survey and invalid surveys or those carelessly written were excluded. The final sample consisted of 145 delegations (82.8%) and 378 visitors (91.0%) a total of 532 people (88.6%).

The estimation of the ripple effect is summarized that the tournament has contributed $30,049,689 to the regional economy; the value added amounts to $12,034,605 with induced employment of approximately 722. The value added consists of the wages of the employees, the business surplus, the consumption of fixed capital and the net production cost. The delegations stayed for an average of 10.3 days, while the families and cheering squads stayed for an average of 5.9 days. Hence, the tournament is regarded as a successful sporting event for lengthening the average stay of the visitors.

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