

## **The Effect of Local Universities on the Local Economy : Based on Industry Linkage Analysis**

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### **Abstract**

*We analyzed the effect of local college students' economic activities on the local economy. The analysis method was an industry-related analysis based on data obtained from a survey. As a result of the analysis, local university students were found to be sensitive to price when consuming due to insufficient living infrastructure around local universities. In addition, as a result of analyzing the impact of local college students' consumption expenditures on the local economy, especially local income, using a regional industry correlation table, the total income generated was KRW 130.6 billion (direct and indirect income effects KRW 90.9 billion, induced income effects KRW 39.6 billion), and the number of people induced to be employed was KRW 130.6 billion. It was estimated that there were 2,145 people per year. We examined the effect of local college students' economic activities on the local economy through quantitative analysis. This is a contribution point of the study as evidence supporting the maintenance and necessity of local universities, and suggests that the government and local governments should take active interest and efforts in fostering local universities.*

**Keywords:** *Economic Activities of Local College Students, Effect on Local Economy, Consumption Expenditures of Local College Students, Industry Correlation Analysis*

### **1. Introduction**

In rural areas, the closure of universities is becoming a reality amidst a population cliff crisis. This reduces the dynamism of the local community and has a very negative impact on the local economy, further aggravating the outflow of local talent. The number of local governments at risk of population extinction announced by the Ministry of the Interior and Safety in 2021 is 89, with Jeonnam and Gyeongbuk having the largest number at 16 each, and Gangwon at 12. Population movement further accelerates local extinction. Looking at the trend of changes in the population ratio of non-metropolitan areas compared to the metropolitan area, local youth are concentrated in the metropolitan area, local areas are hollowing out, and population decline pressure is

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intensifying due to a severe low birth rate, accelerating the disappearance of local areas.

Studies on the impact of universities on the local economy has previously been introduced in various studies [1-5]. [1] modified [6] factory location model and calculated the regional income creation effect according to university location by dividing it into direct, indirect income effect and induced income effect. Afterwards [2] and others used [1]. Related analyzes were performed based on the research analysis. [3] analyzed the economic effect on the area where Claymont University is located based on a consumption pattern survey of university members and estimated that the direct and indirect economic effect exceeds \$10 million per year, and the direct expenditure effect and the resulting. [4] analyzed the regional economic ripple effect of universities through the case of German universities, and [5] analyzed the impact of regional national universities on the regional economy. This study is different in that it analyzed the impact of universities in a certain region on the local economy under the special situation of COVID-19, rather than the simple impact of a specific university on the local economy.

Against this background, this study seeks to analyze the effect of the economic activities of college students in the western Jeollanam-do region on the local economy in the era of COVID-19. Here, local universities in the western part of Jeollanam-do refer to universities located in Mokpo-si, Muan-gun, and Yeongam-gun. The analysis method was an industry-related analysis conducted through a survey.

## **2. Reality and Diagnosis of Local Universities**

### **2.1 Crisis at Local Universities**

In a situation where the low birth rate and aging population are rapidly progressing, the metropolitan area is sucking in the young population like a 'black hole.' University admission and employment are major factors in the large-scale outflow of young people from rural areas. So-called prestigious universities and good jobs are concentrated in the metropolitan area, including Seoul, so university applicants and jobs are flocking to universities in the metropolitan area. Due to this vicious cycle, local regions worry about their survival due to population outflow, which hinders balanced regional development. The fundamental cause of local disappearance is seen as youth employment and education issues, and regional revitalization policies are needed through fostering local industries and local universities.

Local universities are a key resource that supports the educational capacity of a region [7]. If a local university collapses, there is a high possibility that a domino effect will occur where the educational power of the region will deteriorate and ultimately the region will collapse. The decline of local universities not only worsens local educational power, but is also closely related to regional competitiveness and the quality of life of local residents. Looking at regional universities from an economic perspective, there is a correlation between the number of universities located in metropolitan local governments and the gross regional product (GDP) per capita, and the number of regional universities is correlated with personal income per capita [7]. In other words, the decline of local universities can be a precursor phenomenon that can predict the decline of a region, or it can be a ripple effect that occurs in the process of a region disappearing. In addition, the collapse of local universities means that the balance of the higher education ecosystem is broken and diversity is damaged. Furthermore, if local universities fail to play their role or disappear, this will accelerate the phenomenon of regional educational hollowing out. The crisis at local universities has a significant impact on the regions where universities are located, so local governments must also actively support local universities to increase the recruitment rate of new students and improve educational conditions.

## 2.2 Local University Status

As of 2020, there are a total of 327 schools in Korea, including 191 general universities and 136 junior colleges. The number of students in general universities is 1,981,003, 621,772 in junior colleges, and 352,957 in other universities such as the College of Communication and Technology and cyber universities, for a total of 2,955,732 students. Looking at the status of universities based on region, out of a total of 191 universities, 71 schools (37.2%) are located in the metropolitan area, and 120 schools (62.8%) are located in non-metropolitan areas. There are 38 universities located in Seoul, followed by 30 in Gyeonggi-do, 19 in Gyeongbuk, 13 in South Chungcheong, 12 in Busan, 11 each in North Chungcheong Province and 11 in Daejeon, and 10 each in Jeonnam, Gwangju, and South Gyeongsang Province. In terms of junior colleges, out of a total of 136 colleges, 43 (31.6%) are located in the metropolitan area, and 93 (68.4%) are located in non-metropolitan areas.

Universities in Jeollanam-do include 11 general universities, 9 junior colleges, 2 polytechnic colleges, and 1 in-house college. By establishment type, there are 4 national, 1 public, and 18 private universities. By region, there are 3 in Naju, 3 in Mokpo, 4 in Suncheon, 2 in Yeosu, 1 in Damyang, 1 in Gokseong, 3 in Gwangyang, 1 in Yeonggwang, and 1 in Muan. 3. Two Yeongam schools are located.

## 3. Survey

### 3.1 Investigation Overview

In order to analyze the effect of local universities on the local economy, a survey was conducted on university students attending universities in the western part of Jeollanam-do to analyze the economic activities and consumption patterns of local university students. The data used in this analysis were published statistical data [8-12]. We analyzed the economic activities and consumption patterns that universities have on the local community through consumption expenditures and residence status in university areas among university students attending six universities located in the western part of Jeollanam-do. The survey was conducted online using Google Forms with the cooperation of professors working at local universities. The survey period was conducted for one week from September 7 to 13, 2021.

Looking at the characteristics of the respondents, a total of 357 participants responded to the survey, with 188 men (52.7%) and 169 women (47.3%) responding. 153 people responded that their year of birth was '1998~2000', 144 people responded that their year of birth was 'after 2001', and respondents born after 1998 accounted for 83.2% of the total respondents.

### 3.2 Results

First, we investigated the level of awareness of the price level of the university area attended compared to other regions for each consumption item. In order to check the level of awareness of the price level, the results of the price level survey divided into consumption items such as eating out, housing, medical/healthcare, transportation, cultural life. Regarding the cost of eating out, 111 people perceived the price level in the university area as 'expensive' compared to other areas, and 63 people perceived it as 'not expensive.' There were more students who felt that the price level of eating out in the school area was high. Regarding the cost of eating out around the university, it is believed that students feel burdened by the cost of eating out due to insufficient infrastructure such as restaurants and stores. There was a high perception that housing, transportation, and cultural living expenses, excluding medical/health expenses, were more expensive in

university areas than in other areas.

Next, in order to investigate the average monthly consumption expenditure of college students, respondents were divided into food and beverage expenses, cultural life expenses, clothing/miscellaneous expenses, savings, medical/health expenses, communication expenses, and transportation expenses. Among consumer expenditures, food and beverage expenses were identified as the main consumption expenditure item, followed by cultural living expenses, clothing/miscellaneous expenses, communication expenses, and transportation expenses.

Next, we investigated the housing patterns and costs of college students through a survey on their housing patterns. Regarding the housing type of college students, 133 college students lived in dormitories, accounting for 37.3% of the total, followed by owning, renting, and other with the largest number of respondents. The number of college students living in dormitories and rents that incur monthly housing expenses was found to be 193, accounting for 54.1% of the total.

As a result of a survey on the monthly housing expenses of college students living in dormitories or monthly rentals, the number of respondents who spent an average monthly housing cost of 'more than 300,000 won to less than 400,000 won' was 61, accounting for 32.4% of the total. In addition, as a result of a survey of college students living in a jeonse lease, the jeonse deposit status was 'more than 30 million won to less than 50 million won' with 4 people, or 33.3% of the total. Lastly, the respondent's place of residence before entering university was 'Jeolla-do outside the university location' with 130 respondents, accounting for 36.4% of the total, followed by 'university location' with 57 respondents. In order to check the economic activities of university students in the university area during their vacation period, we asked them whether they reside in the university area during their vacation period. As a result, 198 respondents (55.5%) responded that they 'sometimes reside' during the vacation period and 'they do not reside permanently'. There were many respondents in that order. In addition, regarding the main residence during the vacation period, 34.5% of the total respondents said they lived in 'Jeolla-do outside the university location', followed by 'Gwangju Metropolitan City' and 'University location' in that order.

## 4. Analysis of Economic Activity Effects

### 4.1 Analysis Model

The regional industry linkage table is an input-output table created by dividing the country into regional economic units and reflecting the characteristics of inter-regional migration and regional industrial structure. This study analyzed it using the 2015 regional industry linkage table announced in July 2020. The analysis process investigated the consumption expenditures of university students occurring within the university location area, and based on this, applied an industry-related analysis model to estimate direct and indirect regional economic effects. Looking at the contents of the analysis model, it is largely divided into direct and indirect income effects, induced income effects, and employment inducement effects. Direct and indirect income effects are the added value generated as final demand in the Jeonnam region increases due to college students' consumption expenditures, and are calculated using the following equation. Here, the added value induction coefficient ( $\widehat{A}_v \cdot (I - A^d)^{-1}$ ) was used by reclassifying the product items in the Jeonnam Regional Industry Association Table (2015, middle classification) according to the survey expenditure items.

$$Y_{DID} = (\widehat{A}_v \cdot (I - A^d)^{-1}) \cdot E_d \quad (1)$$

In Equation (1),  $Y_{DID}$ : Direct and indirect effects,  $\widehat{A}_v$  : Diagonal matrix of value added rates by product,  $I$ : identity matrix,  $A^d$ : Jeonnam region input coefficient matrix,  $E_d$ : Expenditures by item for college students in the western Jeollanam-do region.

The induced income effect is the increase in added value caused by the additional labor income of local residents as a direct and indirect effect, resulting in an increase in household expenses, and is calculated using the following equation. Here, in order to endogenize the additional income effect when calculating the induced effect, an input coefficient matrix is used in which the employee compensation rate (employee compensation/value-added system) is added to the row of the input coefficient matrix.

$$Y_{KD} = (\widehat{A}_v \cdot (I - A^{d'})^{-1}) \cdot E_d - Y_{DID} \quad (2)$$

In Equation (2),  $Y_{KD}$  : induced income effect,  $A^{d'}$  : Adjusted Jeonnam region input coefficient matrix.

The employment inducement effect refers to the increase in the number of employed people resulting from final demand expenditure in the region, and is calculated using the following equation. It is estimated using the 2015 Jeonnam Regional Industry Linkage Table middle classification and the employment inducement coefficient for each item.

$$EMP = (\widehat{A}_e \cdot (I - A^{d'})^{-1}) \cdot E_d \quad (3)$$

In Equation (3),  $EMP$  : Employment inducement effect,  $A_e$ : Diagonal matrix of employment coefficients.

#### 4.2. Conditions for Applying the Analysis Model

First, college student consumption expenditures were recalculated to set conditions for application to the model. In other words, the amount of consumption expenditure must be adjusted to apply the survey results to the analysis model. Housing costs were calculated by excluding errors, omissions, and cases where there were no actual housing costs among college students surveyed.

As a result of estimating monthly housing costs focusing on dormitory and monthly rent residents, 14 of the students living in the university area are living in dormitories or monthly rent, costing 314.3 thousand won per person, and for valid college students including self-commuting students, per person. It is 100.0 thousand won. From this result, it can be estimated that the average monthly housing cost for students living in the university area is 100.0 thousand won per person, regardless of residence type.

The cost of using online shopping malls should be excluded as it does not directly affect the final demand in the area where the university is located. This includes food and beverage costs and clothing and miscellaneous goods costs. As a result of calculating the online usage rate using the total sales amount of food and beverage costs and clothing and miscellaneous goods costs and the online sales amount, the average value from the first to third quarters of 2021 was applied to this analysis.

Since college students are in their 20s, the proportion of online users by age and average monthly purchase frequency were used to calculate the online proportion of people in their 20s compared to the total. The ratio of people in their 20s to be applied to this analysis was estimated to be 1.506, the average of the calculated ratios in 2019 and 2020.

When calculating the proportion of college students spending within the area in the area where the university is located, considering online use, food and beverage expenses are 71.4% and clothing and miscellaneous goods expenses are 45.2%.

Looking at the amount of consumption expenditure that directly affects the final demand in the area where the university is located, per college student, those living in the area where the university is located are 580,000 won per month, those living in the Jeonnam area outside the university area are 600,000 won, those living in the Gwangju area are 620,000 won, and For residents of other areas, it is 740,000 won. The average consumption expenditure per college student, adjusted according to residence, is 640,000 won per month, and by item, housing expenses are 200,000 won, food and beverage expenses are 130,000 won, cultural expenses are 130,000 won, clothing and miscellaneous expenses are 60,000 won, health and medical expenses are 50,000 won, and transportation expenses are 80,000 won. It's 10,000 won. The average total spending per college student, including online, is 830,000 won per month.

The consumer expenditure items in the survey were reclassified to match the product classification in the industry-related table.

In order to calculate the period of time that college students live in the area where the college is located, we analyzed where they live during vacation, and each college student resides for an average of 9.3 months.

#### **4. 3 Analysis Results**

First, looking at the income aspect, it is as follows. As a result of analyzing the results of the survey by applying them to the Jeonnam Regional Industry Linkage Table (2015), the annual amount is calculated by multiplying KRW 5,966,000 per person per year for university students in the western part of Jeollanam-do and KRW 642,000 per month by the number of months of residence (9.3 months).

It is estimated that consumption expenditure will contribute to generating income of 5,782,000 won per year per college student in the region. It is estimated that KRW 4,027,000 will be generated due to an increase in regional production and added value due to consumption expenditure, and that the generated income will lead to an increase in household consumption expenditure of local residents, resulting in an induced income effect of KRW 1,755,000. When applied to 22,582 students at universities in the western part of Jeollanam-do in 2020, the annual consumption expenditure is KRW 134.7 billion and the total income creation effect is KRW 130.6 billion.

Next, looking at the employment aspect, the scale of employment creation in the western Jeollanam-do region due to college students' consumption expenditures can be estimated at 2,145 people per year (per billion). Looking at the major categories in the industry-related table, 507 people were in restaurants and lodging services, 482 in arts, sports, and leisure-related services, and 428 in wholesale/retail and product brokerage services.

**Table 1. Number of people induced to be employed by each item**

(unit: person/KRW 1 billion)

Item	Employment inducement number	Item	Employment inducement number
Agriculture, forestry and fisheries products	77.2	Water supply, waste disposal and recycling services	5.4
Mine products	0.1	Erection	6.4
Food and beverage	24.8	Wholesale, retail and product brokerage services	427.9
Textiles and leather products	0.2	Transportation service	119.3
Wood and paper, printing	0.8	Restaurants and lodging services	507.1
Coal and petroleum products	0.2	Information and communication and broadcasting services	6.5
Chemicals	1.2	Financial and insurance services	21.8
Non-metallic mineral products	0.7	Real estate service	135.9
Primary metal products	0.1	Professional, scientific and technical services	4.2
Metal processing products	0.7	Business support service	44.1
Computers, electronics and optical equipment	0.0	Public administration, national defense and social security	1.2
Electrical equipment	0.1	Education service	1.0
Machinery and equipment	0.1	Health and social services	250.3
Transportation equipment	0.1	Arts, sports and leisure services	481.8
Other manufacturing products	1.3	Other services	17.9
Manufacturing and industrial equipment repair	4.2	Etc.	0.0
Power, gas and steam	2.0	All sectors	2,144.6

## 5. Conclusion

We looked at the impact of local college students' economic activities on the local economy, especially local income, in order to suggest the maintenance and necessity of local universities and their active role. For this purpose, a survey was conducted on 357 college students in the western region of Jeollanam-do, and an industry-related analysis was conducted based on the data obtained through this. As a result of the analysis, local university students generated 130.6 billion won in direct income to revitalize the local economy, and separately generated 90.9 billion won in indirect income. The annual employment effect due to local college students' consumption in the region is 2,145 people. The implications of these research results for the central government and local governments are that investing resources at a meaningful level to foster local universities

that create enormous direct or indirect economic effects maximizes the efficiency of resource allocation. am. Our study is different from previous studies in that it analyzed the impact of universities in a certain region on the local economy.

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