# TRANSFORMATION OF PRODUCTION AND LABOR STRUCTURE IN THE ECONOMY OF CENTRAL JAVA PROVINCE

**Alfin Bahtiyar[1), Julianus Johnny Sarungu[2)**
[1]Faculty of Economics and Business, Sebelas Maret University
email: bahtiyaralfin@student.uns.ac.id
[2]Faculty of Economics and Business, Sebelas Maret University
Email: profdrjjsarungums@gmail.com

***ABSTRACT***

*The purpose of this study is: 1) Describe how much the contribution of the agricultural sector, manufacturing and services in the structure of production and employment 2) Describe the pattern of transformation of production structures in the economy 3) Describe the pattern of labor structure transformation in the economy, and 4) Describe the Base sectors in Central Java Province. This study uses data from the GDP and Labor in Central Java Province and Indonesia, which are grouped based on the agricultural sector, manufacturing and services. The analytical tool used in this study is Shift Share Analysis and Location Quotient (LQ) Analysis. The results of the analysis show that the production structure in 2010 - 2017, the agricultural, manufacturing, and services sector contribute positively to GDP. However, the contribution of the agricultural and manufacturing sectors is classified as weak, while the service sector is classified as strong. In the structure of labor, the contribution of the agricultural sector is also classified as weak, while the manufacturing sector and service sector are relatively strong in absorbing workers. The pattern of changes in production structure shows that the agricultural sector is negative. While the manufacturing sector and service sector always show positive values and tend to increase. The pattern of changes in the employment structure shows that the agricultural sector always decreases the number of workers. Whereas in the manufacturing sector tends to fluctuate, which in 2017 the value increases. Likewise with the service sector, which tends to fluctuate, and in 2017 there was the most significant increase in the number of workers. The agricultural and manufacturing sectors are the base sector and have comparative advantages in Central Java Province.*

*Keywords: Economic structure transformation, GDP, labor, agricultural sector, manufacturing sector, service sector, base sector*

## 1. INTRODUCTION

The development reflects a change to move forward towards better living conditions both materially and spiritually. In line with Professor Goulet's opinion, there are three main components of development which also the main goals that the community must achieve: sufficiency, self-esteem, and freedom (Todaro and Smith, 2008). The development process in a country cannot be separated from the role of local government. The local governments and their communities manage their resources by creating a partnership between local governments and the private sector to create new employment and stimulate economic growth in the area. (Tuandali et al., 2017). As is happening in Central Java which is currently trying to improve regional development by developing potential Natural Resources (SDA) and Human Resources (HR). The maximization of regional economic development requires a strategic assessment of the role of sectors related to economic problems due to the structural transformation from agricultural development to industrial development. (Prawira and Hamidi, 2013).

Chenery-Syrquin categorized the economic structure into three sectors: the Agricultural Sector, the Industrial Sector (manufacturing sector), and the Service Sector (Romli et al., 2016). The following data is the Labor distribution of Central Java based on the three sectors in the 2010 – 2017 period.

Figure 1 revealed a significant downward trend from 2010 at 35.53% to 2017 at 25.16%. Meanwhile, the contradictory condition occurs in the manufacturing sector, increasing from 25.29% in 2010 to its peak in 2017 by 30.40%. The Labor distribution in the service sector continues to fluctuate from year to year, while in 2017, it reaches 44.44%. The service sector also dominates the Labor distribution from the three sectors.
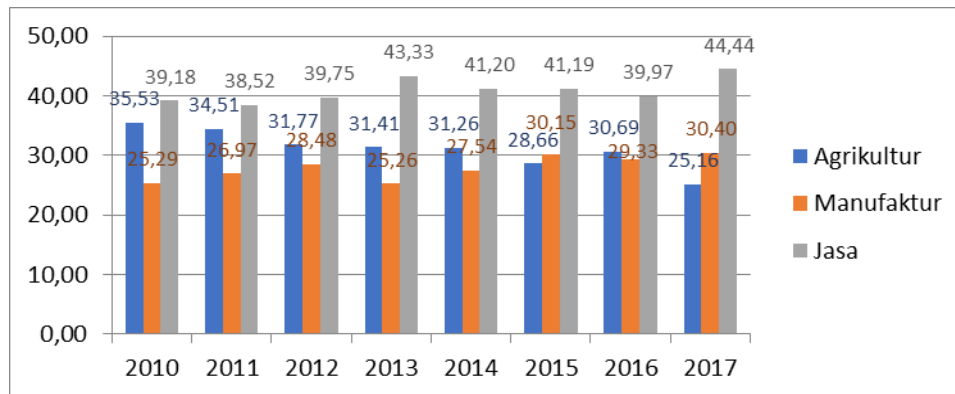
**Figure 1. Labor Distribution by Industrial Origin in Central Java, 2010 – 2017 (percent)**
Source: Central Java Statistic 2018 (processed)

Theoretically, the structural transformation will shift Labor from low-productivity sectors to high-productivity sectors (Yunisvita, 2011). However, Figure 2 shows that in Central Java, the fluctuation of the sectoral Labor distribution does not determine the level of productivity in each sector. Figure 2 showed Central Java GRDP distribution data is based on the three sectors of agriculture, manufacturing, and services in the 2010 – 2017 period.
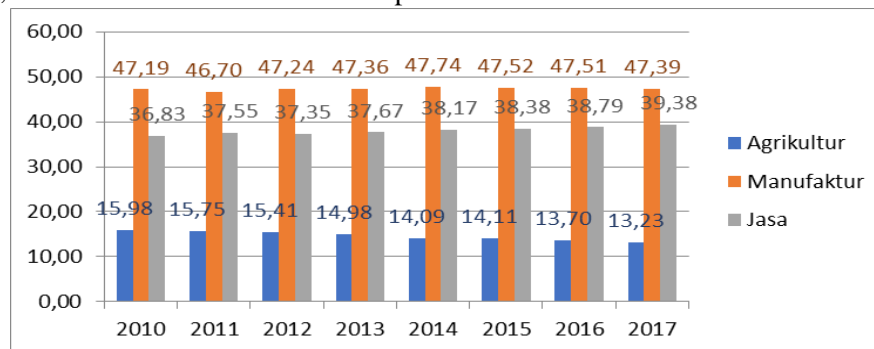


**Figure 2. The Distribution of GRDP at 2010 Constant Market Prices by Industrial Origin in Central Java, 2010 - 2017 (percent)**
Source: Central Java Statistics 2018 (processed)

The Gross Regional Domestic Product (GRDP) distribution of the agricultural sector showed a downward trend in 2010 - 2017 at 15.98% to 13.23%. Then the service sector from 2010 to 2017 showed a more positive trend, which 36.83% in 2010 and reached 39.38% in 2018. Meanwhile, the manufacturing sector tends to fluctuate. The manufacturing sector has the most significant contribution to GRDP even its growth rate decreased from 47.74% to 47.39% during 2014 - 2017. However, this data does not change the position of the manufacturing sector as the sector with the most significant contribution to GRDP compared to the agriculture sector and the service sector. It can be concluded that there is an unbalanced transformation because the distribution of Labor in the agricultural sector still absorbs much Labor and is even higher than in the manufacturing sector, where the productivity of the agricultural sector is still far below the other two sectors.

It can be concluded that there is an unbalanced transformation because the distribution of Labor in the agricultural sector still absorbs much Labor and is even higher than in the manufacturing sector, where the productivity of the agricultural sector is still far below the other two sectors.

Thus, the hypotheses of the current study are as follow: (1) The manufacturing and service sectors have the most significant contribution to the economy in Central Java Province; (2) There has been a transformation of the production structure in Central Java Province from the agricultural sector to the manufacturing and service sectors; (3) There is a transformation of the Labor structure in Central Java Province from the agricultural sector to the manufacturing and service sectors; and (4) There is a shift in the leading sector in Central Java Province.

## 2. RESEARCH METHOD

This study aims to discuss the transformation of the economic structure of the agricultural, manufacturing, and service sectors in Central Java from 2010 to 2017. This study employs quantitative research to test the structural change theories by utilizing the agricultural, manufacturing, and service sectors data in Central Java. The type of data used in this study is secondary data, research data obtained through intermediary media. The secondary data generated from the Central Java Provincial Statistics Agency and the Indonesian Central Statistics Agency were observed from the Central Java Province GRDP, Indonesian GDP, and the distribution of Labor in Central Java and Indonesia provinces based on employment from 2010 to 2017.

The primary method used in this research is the descriptive-analytical method, with shift-share analysis techniques and location quotient (LQ) analysis.

### 2.1. Shift Share Analysis

Shift Share analysis aims to determine the performance of regional economic productivity by comparing it with a broader area (regional or national) and affect growth through increased output. This analysis technique presents economic performance data over a certain period through three interrelated aspects:

(1) Regional economic growth (N) is measured by comparing the aggregate of sectoral employment opportunities with changes in the same sector in the other regional or national economy as a benchmark.

(2) Industry mix (M) is a proportional shift measured by comparing the relative change in the increase or decrease in the regional economy with the regional or national economy. This measurement allows determining whether the regional economy is concentrated in faster industries than the regional economy as a benchmark.

(3) Competitive advantage (C) is a differential shift to measure the competitiveness of regional industries with a regional or national economy as a benchmark. If the differential shift from a regional industry is positive, it can be concluded that the industry is more competitive than the benchmark economy in the same industry. (Arsyad, 2010).

According to Soepomo, as cited by Wiwekananda and Utama (2016), the equation form of the shift-share analysis and its components is as follows:

$$D_{ij} = N_{ij} + M_{ij} + C_{ij} \qquad (1)$$

Variable specification:

I    =    Observed economic sector
J    =    Central Java Province
$D_{ij}$  =    Sectoral Change of i in Central Java
$N_{ij}$  =    Sectoral Growth of i in Central Java
$M_{ij}$  =    Industrial mix of i in Central Java
$C_{ij}$  =    The competitive advantage of i sector in Central Java

This study utilized Labor and GRDP as variable and denoted by (y), then the equation is as follow:

$$D_{ij} = y^*_{ij} – y_{ij} \qquad (2)$$
$$N_{ij} = y_{ij} . rn \qquad (3)$$
$$M_{ij} = y_{ij} (rin - rn) \qquad (4)$$
$$C_{ij} = y_{ij} (rij - rin) \qquad (5)$$

Variable specification :

$y_{ij}$   =    Labor force / GRDP of i sector in Central Java at the early
              year of analysis
$y^*_{ij}$  =    Labor force / GRDP of i sector in Central Java at the end
              year of analysis
Rij   =    i sector growth in Central Java
N     =    Indonesia
Rin   =    i sector growth in Indonesia
Rn    =    The average growth of Labor / GDP in Indonesia

The components in the above equation are obtained from the following calculation:

$$rij = \frac{y*ij - yij}{yij} \qquad (6)$$

$$rin = \frac{y*in - yin}{yin} \qquad (7)$$

$$rn = \frac{y*n - yn}{yn} \qquad (8)$$

Variable specification:

yin   =   Labor / GDP of i sector in Indonesia at the beginning of the analysis year
y*in  =   Labor / GDP of i sector in Indonesia at the end of the analysis year
Yn    =   The total labor / GDP of all sectors in Indonesia at the beginning of the analysis year
y*n   =   The total labor / GDP of all sectors in Indonesia at the end of the analysis year

The value of the industrial mix component (Mij) and the regional market share (Cij) can show whether the robust or weak contribution of each sector in the national economy through the Ender classification, with the following provisions:

(1) The sector's contribution is very strong if the industry components mix and the regional market share is positive

(2) The sector's contribution is strong if the positive industry mix component exceeds the negative regional market share

(3) The sector's contribution is relatively strong if the positive regional market share component exceeds the negative industry mix

(4) The sector's contribution is relatively weak if the negative industry mix component exceeds the positive regional market share

(5) The contribution of the sector is weak if the negative regional market share component exceeds the positive industry mix

(6) The sector's contribution is very weak if the components of the industry mix and regional market share are negative

## 2.2. Location Quotient Analysis

The *Location Quotient* (LQ) is employed to identify the leading sector in a region. The formula of *Location Quotient* (LQ) is as follow:

$$LQ = \frac{Si/S}{Ni/N} \qquad (9)$$

LQ is *Location Quotient index;* Si is GRDP of i sector in Central Java Province; S is Central Java total GRDP; Ni is GDP of i sector in Indonesia; and N is the total GDP of Indonesia. The LQ categorization based on the equation formula above is as follow:

(1) LQ > 1 The business sector is categorized as the basic sector. It means that the production of sector i in a region can meet the needs in its region and can be exported out of the region.

(2) LQ < 1 The business sector will be categorized as a non-basic sector. It means that i sector in an area is still not able to fulfill its territory. Thus, imports from outside regions are needed.

(3) LQ = 1. The production of sector i is completely consumed.

Some of these criteria can help determine the regional economy's export capacity and self-sufficiency in a sector. It can be concluded that LQ analysis can be used to expand the shift-share analysis (Wiwekananda and Utama, 2016).

## 3. RESULTS AND DISCUSSION

### 3.1. The Contribution of Agriculture Sector, Manufacture Sector, and Service Sector in the Production Structure of Central Java Province

Shift share analysis aims to determine changes in the economic structure and observe the contribution of sectoral production to the economy of Central Java Province by comparing it to a broader area such as Indonesia as a benchmark. This analysis describes the variable change magnitude (D) in the Central Java Province, such as income or output and Labor which is calculated from 2010 to 2017 through the components of national growth (N), industry mix (M), and competitive advantage (C).

**Table 1. The Result of Shift Share Analysis of GRDP in Central Java Province, 2010 – 2017 (million rupiah)**

| Component | Sector | | |
|---|---|---|---|
| | Agriculture | Manufacturing | Service |
| Nij | 49.452.419 | 146.066.923 | 114.003.705 |
| Mij | -12.908.285 | -24.146.028 | 30.016.335 |
| Cij | -17.851.404 | 7.483.756 | -21.591.605 |
| **Dij** | **18.692.731** | **129.404.651** | **122.428.434** |
| Enders Categorization | 6 | 4 | 2 |

Source: Author's estimation

The results of the shift-share estimation of Central Java Province production in table 1 revealed that the agricultural sector for eight years shows a positive contribution to the GRDP of Central Java Province by 18.693 trillion rupiahs. However, the agricultural sector denotes a score of 6 in Enders categorization. The sector weakly contributes to GRDP due to the negative value of the market share component (C) and the industry mix (M). Furthermore, the manufacturing sector in the same year positively contribute to the GRDP in Central Java Province by 129.405 trillion rupiahs and is still relatively weak based on the enders category with a score of 4, because the negative industry mix component (M) exceeds the positive market share value (C). Meanwhile, the service sector also positively contributes to the GRDP in Central Java Province by 122.428 trillion rupiahs with the Enders category score of 1. It can be concluded that the service sector is classified as very strong in supporting GRDP due to the positive value of the market share component (C) and the industry mix (M).

### 3.2. The Contribution of Agriculture Sector, Manufacture Sector, and Service Sector in the Employment Structure in Central Java Province

The shift-share analysis in the employment structure is utilized to determine the contribution of the sectoral Labor to the economy of Central Java by comparing it with the broader region such as Indonesia as a benchmark. Table 2 showed the shift-share analysis of the Labor in Central Java Province from 2011 – 2017.

**Table 2. The result of Shift Share Analysis of Labor in Central Java, 2011-2017**

| Component | Sector | | |
|---|---|---|---|
| | Agriculture | Manufacture | Service |
| Nij | 665.145 | 473.547 | 733.564 |
| Mij | -1.419.213 | 678.927 | 937.865 |
| Cij | -538.468 | 73.985 | -228.125 |
| **Dij** | **-1.292.536** | **1.226.459** | **1.443.304** |
| Enders Categorization | 6 | 1 | 2 |

Source: Author's estimation

The shift-share estimation result of the Labor of Central Java in Table 2 showed that the agricultural sector in 2010 - 2017 experienced a decrease in the number of Labor by 1,292,536 Labor, with an enders category of 6 which means the agricultural sector is classified as very weak in absorbing Labor in Central Java Province because both the market share component (Cij) and the industry mix (Mij) are negative. In contrast, the manufacturing sector in the same year experienced an increase in the number of Labor by 1,226,459 Labor, with an enders category of 1 which means that the manufacturing sector is classified as very strong in absorbing Labor in Central Java Province because both market share (Cij) and industry mix (Mij) components are positive. The service sector also experienced an increase in the number of Labor by 1,443,304 Labor. However, the increase in the number of Labor was more than in the manufacturing sector, the enders category in the service sector was classified as strong with a score of 2 because the value the positive value of the industry mix component (Mij) exceeds the negative value of the market share (Cij).

### 3.3. The Production Structure Transformation Pattern in the Economy of Central Java Province

The shift-share analysis results in the production structure in Figure 3 show the changing pattern in economic performance (Dij) of the Gross Regional Domestic Product (GRDP) of Central Java Province from 2011 to 2017. The manufacturing sector has the most robust changes in economic performance with a (Dij) average value of 18.486 trillion rupiahs, followed by the service sector at 17.490 trillion rupiahs and the agriculture sector at 2.670 trillion rupiahs.
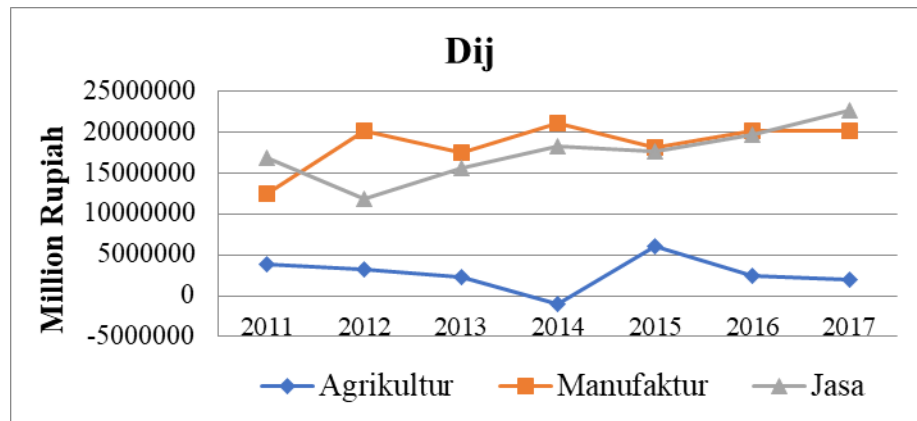


**Figure 1. The Changes Pattern in (Dij) Performance of GRDP of Central Java in 2011 – 2017 (million rupiahs)**
Source: Author's estimation

The agricultural sector continued to experience a decline in (Dij) value from 2011 to 2014, with the lowest point of -1.039 trillion rupiahs in 2014. It means that in 2014 the agricultural sector experienced a reduction in production output of 1.039 trillion rupiahs. The agricultural sector then experienced a significant increase in the following year by 6.033 trillion rupiahs even though the value decreased again in 2016 by 2.505 trillion rupiahs and in 2017 by 1.934 trillion rupiahs. Meanwhile, the manufacturing sector from 2011 to 2017 always produces a positive (Dij) value and increases. The (Dij) value was 12.375 trillion rupiahs in 2011, and it reached 20.075 trillion rupiahs in 2017. The service sector also showed a positive value of (Dij) and tended to increase. Although the average value (Dij) is still lower than the manufacturing sector, Figure 3 showed that the services sector in 2017 showed the highest value (Dij) compared to other sectors to 22.642 trillion rupiahs.

The changes in production output in the shift-share analysis are affected by several components: national GRDP growth (N), industry mix (M), and competitive advantage (C). The components description of the shift-share analysis in the agriculture, manufacturing, and service sectors are as follow:

(1) Agriculture Sector

The national growth component (Nij) always denotes a positive value in the agricultural sector. It means that the national GDP growth in the agricultural sector affects the increase in the GRDP of Central Java in the same sector, which the value (Nij) reached 5.540 trillion rupiahs until 2017. However, the opposite condition occurs in the other two components: industry mix (Mij) and competitive advantage (Cij).

**Table 3. Shift Share Analysis Result of GRDP of Central Java in Agriculture Sector, 2011 – 2017 (million rupiahs)**

| Year | Agriculture | | | |
| | Component | | | |
| | Nij | Mij | Cij | **Dij** |
|---|---|---|---|---|
| 2011 | 6.837.433 | -2.907.355 | -113.186 | **3.816.892** |
| 2012 | 6.045.157 | -1.303.191 | -1.594.596 | **3.147.370** |
| 2013 | 5.538.723 | -1.059.611 | -2.183.704 | **2.295.407** |
| 2014 | 5.446.953 | -833.910 | -5.651.773 | **-1.038.730** |

| 2015 | 4.493.881 | -446.509 | 1.985.547 | **6.032.918** |
| 2016 | 5.209.632 | -1.370.578 | -1.334.236 | **2.504.817** |
| 2017 | 5.539.200 | -1.031.804 | -2.573.341 | **1.934.055** |

Source: Author's estimation

Table 3 reveals that the industrial mix component (Mij) always shows a negative value. It means that the growth of the agricultural sector in Central Java is relatively slower than national growth in the same sector. Although there was an increase of the (Mij) value in 2015, which reached -446.509 billion rupiahs, the value fell again until 2017 by -1.032 trillion rupiahs. Competitive advantage (Cij) experienced the same condition that shows negative numbers from year to year. It means that the agricultural sector of Central Java Province has weak competitiveness compared to the national agricultural sector, which in 2017 reached -2.573 trillion rupiahs.

(2) Manufacturing Sector

The national growth component (Nij) also always denotes a positive value in the manufacturing sector. It means that the national GDP growth in the manufacturing sector affects the increase of GRDP of Central Java in the same sector. Table 4 shows the positive (Nij) value that reached 19.210 trillion rupiahs until 2017.

**Table 4. The Shift Share Analysis Result of Central Java Province in Manufacturing Sector, 2011 – 2017 (million rupiahs)**

| Year | Manufacturing | | |
| | Component | | |
| | Nij | Mij | Cij | **Dij** |
|---|---|---|---|---|
| 2011 | 20.195.629 | -1.520.638 | -6.299.992 | **12.374.999** |
| 2012 | 17.919.876 | -1.660.200 | 3.867.900 | **20.127.576** |
| 2013 | 16.979.996 | -2.798.167 | 3.326.710 | **17.508.539** |
| 2014 | 17.222.751 | -2.658.998 | 6.529.167 | **21.092.920** |
| 2015 | 15.225.509 | -4.299.050 | 7.199.490 | **18.125.950** |
| 2016 | 17.544.609 | -2.884.003 | 5.439.024 | **20.099.631** |
| 2017 | 19.209.898 | -2.704.744 | 3.569.882 | **20.075.037** |

Source: Author's estimation

In contrast, the industrial mix component (Mij) always denotes a negative value of -2.705 trillion rupiahs until 2017. It means that the industrial mix negatively affects the GRDP of Central Java in the manufacturing sector of 2.705 trillion rupiahs. The negative value also indicates that the manufacturing sector growth in Central Java is relatively slower than national growth in the same sector. However, the competitive advantage component (Cij) always reaches a positive number, which means that the manufacturing sector in Central Java has higher competitiveness compared to the national agriculture sector. The manufacturing sector in Central Java showed positive progress in the following years until at 3.570 trillion rupiahs in 2017, even though it had reached a negative value of -6.30 trillion rupiahs in 2011.

(3) Service Sector

The national growth component (Nij) in the service sector consistently providing a positive value until 2017 of 15.681 trillion rupiahs. It means that the national GDP growth in the service sector affects the increase in the GRDP of Central Java Province in the same sector by 15.681 trillion rupiahs. This condition aligns with the industrial mix component (Mij), although the figures tend to fluctuate always show positive value. It means that the growth of the service sector in Central Java Province is relatively faster than the national growth in the same sector. Meanwhile, the competitive advantage (Cij) component tends to increase by -2,455 trillion rupiahs from 2011 to a positive number of 4.011 trillion rupiahs in 2017. It means that the service sector of Central Java Province has strong competitiveness compared to the national agriculture sector.

**Table 5. The Shift Share Analysis Result of Central Java Province GRDP Service Sector, 2011 – 2017 (million rupiahs)**

| Year | Service | | | |
| --- | --- | --- | --- | --- |
| | Component | | | |
| | Nij | Mij | Cij | Dij |
| 2011 | 15.762.477 | 3.544.170 | -2.455.029 | **16.851.618** |
| 2012 | 14.406.853 | 2.397.301 | -5.004.114 | **11.800.040** |
| 2013 | 13.423.427 | 3.076.008 | -991.380 | **15.508.055** |
| 2014 | 13.698.757 | 2.770.531 | 1.780.555 | **18.249.843** |
| 2015 | 12.171.577 | 3.745.515 | 1.729.981 | **17.647.074** |
| 2016 | 14.169.994 | 3.367.265 | 2.192.555 | **19.729.814** |
| 2017 | 15.681.450 | 2.949.043 | 4.011.498 | **22.641.991** |

Source: Author's estimation

### 3.4. The Labor Structure Transformation Pattern of Central Java Province

The shift-share analysis results in the Labor structure are shown in the following graph.
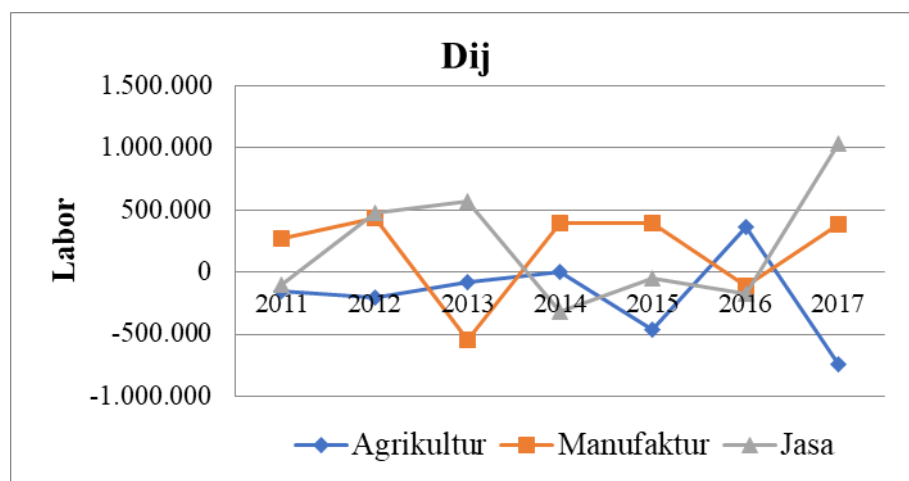


**Figure 4. The Labor Performance Transformation Pattern in Central Java Province, 2011 – 2017**
Source: Author's estimation

Figure 4 shows the pattern of economic performance (Dij) of sectoral labor in Central Java Province from 2011 – 2017, where the service sector has the most significant change in economic performance with an average value of (Dij) of 206,186 workers followed by the manufacturing sector as many as 175,208 workers and the agricultural sector with a value of -184,648 worker. The agriculture sector almost always experiences a negative (Dij) value. The lowest point occurred in 2017 by reaching -743,898. This condition means that in 2017 the agricultural sector experienced a reduction in the labor force of -743,898 workers. The (Dij) value in the manufacturing sector tends to fluctuate from 2011 to 2017. The 547,970 workers decrease the number of labor in 2013, and in 2016 it decreased by 112,013 workers. Then in 2017, the value (Dij) increased by 381,881. The same with the service sector, the value (Dij) tends to fluctuate. The most significant increase in labor occurred in 2017 by 1,037,555 workers even though the value (Dij) has always shown a negative value in the last three years. Changes in the number of Labor in the shift-share analysis are affected by several components: national growth (N), industry mix (M), and competitive advantage (C). The following is a description of the components of the shift-share analysis of labor in the agriculture, manufacturing, and service sectors:

(1) Agricultural Sector

In the agricultural sector, the component of national labor growth (Nij) from 2012 to 2017 always shows a positive value. It means that the national Labor growth in the agricultural sector affects the increase in the number of labor in Central Java in the same sector, which the value of (Nij) reached

111,724 labor until 2017. On the other hand, the opposite condition occurs in the other two components: industry mix (Mij) and competitive advantage (Cij). Based on table 6, the industrial mix component (Mij) always denotes a negative value. It means that the labor growth in the agricultural sector of Central Java is relatively slower than the national Labor growth in the same sector. Even though there was an increase at -61,019 people in 2013, the Labor growth still decreases by -359,452 until 2017.

**Table 6. Shift Share analysis of Labor on Agriculture Sector in Central Java 2011 – 2017 (Labor)**

| Year | Agriculture | | | |
|------|-------------|---|---|---|
| | Component | | | |
| | Nij | Mij | Cij | **Dij** |
| 2011 | -41.081 | -284.673 | 169.450 | **-156.304** |
| 2012 | 258.663 | -188.570 | -278.165 | **-208.071** |
| 2013 | 11.961 | -61.019 | -29.709 | **-78.767** |
| 2014 | 85.654 | -118.265 | 33.210 | **599** |
| 2015 | 8.629 | -171.232 | -301.676 | **-464.279** |
| 2016 | 147.370 | -144.633 | 355.447 | **358.184** |
| 2017 | 111.724 | -359.452 | -496.170 | **-743.898** |

Source: Author's estimation

Competitive advantage (Cij) experienced fluctuation. The Cij showed a negative number until 2017, which reached -496,170 Labor and was the lowest point from previous years even though it had reached a positive value. It means that the agricultural sector of Central Java Province has weak competitiveness compared to the agricultural sector nationally.

(2) Manufacturing Sector

The component of national Labor growth (Nij) in the manufacturing sector showed a positive value in the 2012 – 2017 period. It means that the national Labor in the manufacturing sector affects the increasing number of Labor in Central Java in the same sector. Table 7 shows that the value of (Nij) is positive at 106,772 in 2017.

**Table 7. The result of Shift Share Analysis of Labor in Manufacturing Sector in Central Java, 2011-2017 (Labor)**

| Year | Manufacture | | | |
|------|-------------|---|---|---|
| | Component | | | |
| | Nij | Mij | Cij | **Dij** |
| 2011 | -29.247 | 329.341 | -30.923 | **269.171** |
| 2012 | 202.177 | 148.346 | 89.385 | **439.908** |
| 2013 | 10.721 | -268.705 | -289.986 | **-547.970** |
| 2014 | 68.872 | 161.402 | 167.490 | **397.764** |
| 2015 | 7.601 | 144.946 | 245.171 | **397.718** |
| 2016 | 155.053 | -99.686 | -167.380 | **-112.013** |
| 2017 | 106.772 | 194.792 | 80.317 | **381.881** |

Source: Author's estimation

The industrial mix component (Mij) shows a fluctuating value. Although it had decreased in 2016 by -99,686, it experienced an increase in 2017 by 194,792. It means that the industrial mix positively affects the number of Labor in the Central Java Province in the manufacturing sector by 194,792 Labor. A positive value indicates that the growth of the Labor in the manufacturing sector of Central Java Province is relatively faster than the growth of the national Labor in the same sector. The competitive advantage component (Cij) also tends to show a fluctuating value.

Although it had decreased by -167,380 in 2016, it increased in 2017 by 80,317. This positive number means that the manufacturing sector Labor in Central Java Province has strong competitiveness compared to the national manufacturing sector Labor.

(3) Service Sector

The service sector is the same as the component of national labor growth (Nij) in other sectors, by consistently provides a positive value (Nij) until 2017 of 145,500 Labor. It means that the growth of the national Labor in the service sector affects the increasing number of Labor in Central Java in the same sector by 145,500 Labor. This condition is in line with the industrial mix component (Mij), which although the numbers tend to fluctuate, they always show positive numbers. It means that the growth of the service sector labor in Central Java Province is relatively faster than the growth of the national labor in the same sector. While the component of competitive advantage (Cij) tends to fluctuate, there has been a significant increase in 2017 with a positive (Cij) value of 693,983 people, which means that the service sector labor in Central Java Province has strong competitiveness compared to the service sector labor nationally.

**Table 8. The result of Shift Share Analysis of Labor in Service Sector in Central Java, 2011-2017 (Labor)**

| Year | Service | | | |
|------|---------|---------|---------|---------|
| | Component | | | |
| | Nij | Mij | Cij | **Dij** |
| 2011 | -45.306 | 51.562 | -105.805 | **-99.549** |
| 2012 | 288.721 | 75.592 | 112.480 | **476.793** |
| 2013 | 14.965 | 249.923 | 300.414 | **565.302** |
| 2014 | 118.162 | 656 | -436.459 | **-317.641** |
| 2015 | 11.373 | 68.761 | -129.113 | **-48.979** |
| 2016 | 211.844 | 216.602 | -598.623 | **-170.177** |
| 2017 | 145.500 | 198.072 | 693.983 | **1.037.555** |

Source: Author's estimation

**3.5. Basic Sector in Central Java**

Location Quotient (LQ) analysis is able to discover the basis sector in Central Java in 2010 – 2017 based on the contribution of agricultural, manufacturing, and service sectors to the Gross Regional Domestic Product (GRDP) of Central Java. The LQ estimation results are shown in Table 9.

**Table 9. Location Quotient (LQ) Result of Central Java PDRB, 2010 - 2017**

| Year | Sector | | |
|------|-------------|-------------|-------------|
| | Agriculture | Manufacture | Service |
| 2010 | 1,116857901 | 1,074212035 | 0,881910594 |
| 2011 | 1,132214717 | 1,068216472 | 0,886185968 |
| 2012 | 1,12083784 | 1,086173765 | 0,873483143 |
| 2013 | 1,099743578 | 1,097727835 | 0,871085491 |
| 2014 | 1,042310933 | 1,114881955 | 0,874212959 |
| 2015 | 1,047778233 | 1,122257592 | 0,868321016 |
| 2016 | 1,029297014 | 1,130346212 | 0,868571087 |
| 2017 | 1,002620302 | 1,134572017 | 0,874435497 |
| Average | 1,073957565 | 1,103548485 | 0,874775719 |

Source: Author's estimation

Table 9 revealed that the agriculture sector and the manufacturing sector denote LQ value more than 1 (<1), with an average value of the agriculture sector is 1.074 and the manufacturing sector is 1.104. Thus, the two sectors had a comparative advantage during 2010 – 2017. The results of these two sectors can supply their regions and export outside other regions.

The service sector shows an average LQ value of 0.875 from 2010 to 2017. It means that the service sector is a non-basic sector. This means that this sector requires imports from other areas due to its inability to supply their regions.

## 4. CONCLUSIONS

The shift-share and location quotient (LQ) analysis of Central Java from 2010 to 2017 provide conclusions as follow:

(1) The agricultural sector contributes to GDRP positively in the production structure. The Enders categorization of the contribution showed the value of 6, which is classified as very weak. The manufacturing sector also made a positive contribution to GRDP and was classified as relatively weak based on the enders category with a score of 4. Meanwhile, the service sector positively contributes to GRDP and strongly supports GRDP because it has the value of 1 in the Enders category.

(2) The agricultural sector experienced a decrease in the number of Labor in the Labor structure. It is classified as very weak in absorbing Labor with the enders categorization of 6. There is an increase in the number of Labor in the enders 1 category in the manufacturing sector, which means the manufacturing sector is classified as very strong in absorb Labor. The service sector experienced an increase in the number of Labor, with a relatively strong contribution in the enders category with a score of 2 .

(3) The changes pattern in the production structure perceived from changes in economic performance (Dij) GRDP shows the fluctuation of the production results of the three sectors. The value (Dij) continued to show a negative number in the agricultural sector, which increased until 2017 with a positive value (Dij). Meanwhile, the manufacturing sector tends to increase and show a positive (Dij) value. The service sector also tends to increase and show a positive (Dij) value.

(4) The changes pattern in the Labor structure shows that the agricultural sector almost always experiences a reduction in the number of Labor with a negative (Dij) value. Meanwhile, the value of (Dij) in the manufacturing sector tends to fluctuate. The Labor is decreased in 2013 and 2016, but then in 2017, the value of (Dij) increased again. The value of (Dij) also tends to fluctuate, with the most significant increase in the Labor in 2017.

(5) The agriculture sector and the manufacturing sector are basic-sector. These two sectors also have a comparative advantage because they have an LQ value of more than 1 (>1 ). Meanwhile, the service sector is a non-basic sector because it has an LQ value of less than 1 ( < 1 ).

The estimation results revealed some suggestions for the Central Java government to develop and improve the economy's structure. The suggestions are as follows:

(1) Local governments are expected to utilize the agriculture and manufacturing sectors as the leading sectors in Central Java to attract new foreign investors. One alternative development strategy in creating harmony between agriculture and industry is agro-industry, such as the textile industry, the food, and beverage industry, the medical industry, etc. The agricultural sector is expected to exploit the domestic wealth and increase gross added value in Central Java by developing the agro-industry sector.

(2) Local governments are expected to increase subsidies in the agricultural sector to support the role of this sector in providing food and jobs for the Labor to anticipate economic imbalances because, in recent years, the existence of the agricultural sector has declined.

(3) In the non-base sector, local governments are expected to facilitate through supporting facilities and infrastructure to support the service and trade sector in Central Java continues to experience promising progress from year to year. The tourism sector showed that the number of foreign tourists and domestic business continues to increase. The number of hotel accommodation businesses and restaurant/restaurant businesses is also increasing.

## 5. REFERENCES

Arsyad, L. (2010). *Ekonomi Pembangunan*. Yogyakarta: UPP STIM YKPN.

Badan Pusat Statistik Jawa Tengah. (2018). *Penduduk Berumur 15 Tahun KeAtas yang Bekerja Selama Seminggu yang Lalu Menurut Lapangan Pekerjaan Utama dan Jenis Kelamin di Provinsi Jawa Tengah 2010-2017*. Retrieved from www.jateng.bps.go.id.

Badan Pusat Statistik Jawa Tengah. (2018). *Produk Domestik Regional Bruto (PDRB) Menurut Lapangan Usaha Jawa Tengah 2010-2017*. Semarang: BPS Jawa Tengah.

Badan Pusat Statistik Indonesia. (2018). *Penduduk 15 Tahun KeAtas yang Bekerja Menurut Lapangan Pekerjaan Utama 2010-2017*. Retrieved from https://www.bps.go.id.

Badan Pusat Statistik Indonesia. 2018. *Produk Domestik Bruto Triwulanan 2010-2018*. Jakarta: BPS.

Jhingan, M. L. (2004). *Ekonomi Pembangunan dan Perencanaan: Edisi 1, Cetakan 10*. Jakarta: PT. Raja Grafindo Persada.

Ma'mun, D. & Irwansyah, S. (2013). Analisis Pergeseran StrukturEkonomi dan Identifikasi Sektor Potensial Wilayah Pengembangan (Studi Kasus di Kabupaten Bekasi, Provinsi Jawa Barat). *Jurnal Social Economic of Agriculture, 2*(1), 7-28.

Prawira, Y. & Hamidi, W. (2013). Transformasi StrukturEkonomi Kabupaten Siak Tahun 2001-2010. *Jurnal Ekonomi Universitas Riau, 21*(1), 1-21.

Romli, M. S., Hutagaol, M. P., & Priyarsono, D. S. (2016). Transformasi Struktural: Faktor-Faktor dan Pengaruhnya terhadap Disparitas Pendapatan di Madura. *Jurnal Ekonomi dan Kebijakan Pembangunan,* 5(1): 25-44.

Setyowati, N. (2012). Analisis Peran Sektor Pertanian di Kabupaten Sukoharjo. *SEPA*, *8*(2), 51-182.

Todaro, M. P. & Smith, S. C. (2008). *Pembangunan Ekonomi Jilid 1 Edisi Kesembilan*. Jakarta: Erlangga.

Tuandali, D. F. N., Engka, D. S. M., & Wauran, P. C. (2017). Analisis Pergeseran Truktur Ekonomi dan Sektor Unggulan Kabupaten Halmahera Utara Provinsi Maluku Utara Periode 2010 - 2014. *Jurnal Berkala Ilmiah Efisiensi, 17*(1), 87-99.

Wiwekananda, I. B. P. & Utama, I. M. S. (2016). TransformasiStruktur Ekonomi dan Sektor Unggulan di Kabupaten Buleleng Periode 2008-2013. *Jurnal Ekonomi Kuantitatif Terapan, 9*(2), 37-45.

Yunisvita. (2011). Transformasi StrukturKetenagakerjaan dan Pertumbuhan Ekonomi Sumatera Selatan. *Jurnal Ekonomi Pembangunan, 9*(2), 90-99.