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Analysis of the Shifts of Potential and Leading Sectors in Kaimana Regency Economy in the Period of 2010–2015

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Abstract

Economic growth is one important indicator that is generally used to measure the success of a region's development. It can also reflect the economic development of a region from year to year. The changes in economic growth can be derived from the shifts of its driving sectors. This study aimed to identify and to analyze the leading sectors in the economy of Kaimana Regency. Using 2010 as the base year, this study analyzed the data of Gross Regional Domestic Product (GRDP) of both Kaimana Regency and Papua Barat Province in the period from 2010 to 2015. Shift-share analysis, Static Location Quotient (SLQ), and Dinamic Location Quotient (DLQ) were methods applied to indicate changes in each sector, as well as to determine which sectors were potential sectors and leading sectors in the Kaimana Regency economy. The results showed that, between 2010 and 2015, Kaimana Regency have not had a notably leading sector in its economy. However, there were several sectors that can be emerged as potential sectors, which are expected to grow faster in the following years. These sectors included 1) agriculture, forestry and fishery; 2) electricity and gas; 3) construction; 4) trade, wholesale, retail and automotive reparations; 5) accommodation and food services; 6) information and communication; 7) public administration, defence, and compulsory social activity; and 8) other services.

Keywords: shift-share analysis, economic growth, growth of sectors, regional economy

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1. Introduction

Development programs conducted by local government are always expected to drive regional economic growth. The success of development activities, that are more orientated on the achievement of sectoral targets, can be indicated by the contributions of every sector to the establishment of annual Gross Regional Domestic Product (GRDP).

Therefore, a positif growth would describe an increase in economy, whereas a negative growth would indicate a decrease in economy. Furthermore, economic growth also relates to the changes in development focuses, from which goals and directions of development programs planned to be implemented by a local government can be determined by analysing initially the growth of economic sectors.

One of the purposes of economic development is to increase people prosperity. Increasing regional economic growth could be one alternative solution to achieve this goal. Economic growth level would increase when there is acceleration in one or more economic sectors' expansions. This means that particular sector that its contribution occures an accelerated expansion, compared to other sectors, might be considered as the leading sector in the economy. Moreover, regarding the achievement of people prosperity, development policies should focus on strategies associated with creating positive impacts on economic growth, increasing household income, and creating job opportunities. In addition, an analysis of leading sectors of a region could be a feasible consideration for local governments to implement strategic actions regarding the future development planning.

According to the 2010 GRDP of Papua Barat province, the agricultural sector plays a significant role in the economy structure after processing industry and mining and quarrying. The share of agricultural sector in GRDP reaches IDR 4,889.56 billions (11.28%). However, the contribution of agricultural sector declined at approximately 10.47% in 2015. Moreover, processing industry and mining and quarrying are the first and second sector that have the highest contribution. These sectors contributed about IDR 13.524.271,16 and IDR 11.220.366,15 billions (32,70% and 27,13%) to the economy in 2010, and have stable decline in the following years until 2015. Furthermore, GRDP at current price between regencies in Papua Barat province is also various. Bintuni and Sorong Regency were the two regions that have highest outputs of sectors. However, based on regions economic growth, Sorong City shows highest growth between 2010 and 2015 (14,41%), followed by Fakfak Regency, with an approximately 11,88% in average (Statistic, 2016). Other regencies have fluctuative growths during the similar period, but Raja Ampat has experienced the lower economy growth within this period.

This research focuses on analysing the shifts of economic sectors in Kaimana Regency for several considerations. The first reason is that Kaimana is officialy established as the new outonomous region in 2010. This condition makes Kaimana Regency needs to reposition its own economic sectors with a relatively new patterns. The other consideration is that since the establishment of the regency, studies related to structural changes in Kaimana economy are rarely conducted. Therefore, deeper

evaluations in terms of leading and potential sectors would be critical inputs for Kaimana authority in planning its future ecenomic development.

This research attempts to address the two important questions, including 1) how the shifts of basic economic sectors in Kaimana Regency, and 2) which potential sectors would be strategically developed to support Kaimana's economy growth. Therefore, the main objectives of this research are to analyse the shifts of economic sectors in the GRDP of Kaimana Regency, and to identify the leading and potential sectors in Kaimana economy.

2. Literature Review and Research Framework

According to Statistic (2010), Gross Regional Domestic Product (GRDP) at the provincial level describes the ability of a region to create outputs (added value) in the certain period. To calculate the GRDP, there are two approches, namely sectoral method and expenditure method. These two methods similarly provide data composistion of value added outputs, detailed by the related sources of economic activities (sectoral) and by the components of spending values. GRDP, calculated with sectoral method provides an accumulation of the whole gross value added, that are possibly created from various production activities in all sectors in economy structure. On the other hand, GRDP calculated using the expenditure approach explains how the value added that has been created is utilized.

GRDP can also become an indicator to measure macroeconomic performance of a region. This provides information of economy structure of a region, details of sectoral shares and their shifts, and indicates the annual rate of growth, both as an individual sector and as a total. Due to the fact that economic growth can be utilised to evaluate development pregresses and results, strategies planned to be implemented should be directed in digging available potentials that could drive economic growth and regional development [10].

This analysis is necessary to identify position of a local economy, compared to an economy in the higher regional level. The result of the analysis will also describe posistions of sectors in GRDP structure, in which each sector can be classified into advanced and rapidly growing sectors, potential or still growing sectors, relatively underdeveloped sectors, and depressed growth sectors. This classification can be a basic consideration for local government in determining related development policies.

Regional economic activities, according to the theory of base economy, are classified into two sectors, namely base sector and non-base sector. This classification is important in terms of identifying regional economic activities related to export and non-export products, and determining annual growth rate of base sectors. The growth of several base sectors would comprehensively drive regional development. Meanwhile, non-base sectors would become consequences of the development activities. Goods and services produced in base sectors for exporting would not only result in regional revenues, but also stimulate regional consumption and investment. The increasing regional revenues are then expected to have positive impacts on the demand of both base sectors and non-base sectors. Therefore, investment in non-base sectors would be stimulated as well.

Shift Share method is used to analyse the change of economic structure of a region, using an economy structure of a higher level administrative authority as a reference. The change of economy structure can possibly occur due to several reasons, as followed; 1) national economy is growing and has effect on regional economy growth, 2) there is a proportional shift that results in a relative change (increase/decrease) of sectoral performance in regency level, compared to the provincial level, and 3) there is a differential shift that indicates level of competitiveness of a certain sector in regency level, compared to the provincial level. Proportional shift is also mentioned as mix industry effect, whereas differential shift, if having a positive value, indicates that the related sector is more competitive in regency level than in provincial level, otherwise if having a negative value, meaning that the related sector is less competitive in regency level, compared to the provincial level. Differential shift is also known as competitive advantage effect. According to Tarigan (2005), national share is related to understand the shift of national economy and its impacts on the shift of regional economy structure, proportional shift associates with the growth of gross value added of a related sector compared to the total value of the sector in national lavel, and differential shift or competitive position defines the difference of economic growth of a related region compared to the gross value added of similar sector at national level.

Location Quotient (LQ) is applied to evaluate which sectors in GRDP that are classified into base sectors and non-base sectors. There are two approaches in LQ analysis: Dinamic Location Quotient (DLQ) and Static Location Quotient (SLQ) [15, 19]. DLQ (also called as LQ) shows a comparison of the contribution of a related sector at regional economy and the contribution of the similar sector at provincial level. LQ value is bigger that 1 means that sectoral contribution at regency is more dominant than the same sectoral contribution at provincial level, and also indicated that production surplus of

the related sector occures in regional level. Otherwise, if LQ value is less than 1, it indicates that the contribution of a certain sector is less dominant that the same sectoral contribution at provincial level. Furthermore, LQ value can be basic consideration for local government to determine potential sectors to be developed.

SLQ analysis classifies economic sectors into export oriented sectors and non export oriented sectors. The asumption behind this analysis is that if a region is more specialised than other regions, then the region has a capability to export its products outside (closed economy). According to Widodo (2006), SLQ menthod will assist classifying relatively inefficient economic activities of regions, focusing on substitution goods or potential imported goods, with expanding potential export, and providing an indicator of industry that need to be further developed.

The formula that can be used to calculate SLQ is as followed:

$$SLQ = \frac{K_{ij}/K_j}{P_{ij}/P_j}$$

where:

K_{ij} = GRDP i^{th} sector in j^{th} region (regency)

K_j = GRDP total of j^{th} region (regency)

P_{ij} = GRDP i^{th} sector in provincial level (province)

P_j = GRDP total of province (province)

Under condition that:

$SLQ > 1$ j^{th} region is more specialised in producing i^{th} sector, compared to i^{th} sector in provincial level.

$SLQ = 1$ j^{th} region and province are equal regarding specialisation level in producing i^{th} sector.

$SLQ < 1$ j^{th} region is less specialised in producing i^{th} sector, compared to i^{th} sector in provincial level.

Rahayu (2014), using data of GRDP in the period of 2007 to 2010, has indentified the leading sectors and analysed the changes of economic sectors in Sorong Regency. The findings revealed that mining sector was the leading sector in Sorong economy. The other research conducted by Tarida, Res, et.al (2015) also attempted to identify the leading sectors and the changes of economy structure in Kepulauan Meranti regency in the period of 2008-2012. Using shift share and Location Quatient analysis, this study listed agriculture, manufacture, gas and water, trade and commerce, and hotel and restaurant, are the leading sectors in the GRDP (calculated including oil and gas). However, if data analysed without oil and gas, only agriculture, manufacture, and

hotel and restaurant, appeared as the leading sectors in Kepulauan Meranti regency. This research also highlighted that the changes of economy structure in the region were signalled by the decrease of agriculture contribution, meanwhile secondary dan tertiary sectors showed increasing contributions in the economy of Kepulauan Meranti Regency. Furthermore, by adding specialization indext to the similar methods used by Tarida, Res, et.al (2015), Hidayat and Rianti (2017) has identified the leading sectors and formulated strategies related to regional development in Kepulauan Meranti regency from 2008-2012 and 2011-2015. In addition, from 2008-2012, this research highlighted sectors such as; agriculture, forestry and fishery; gas and electricity; and accommodation and food services. But, from 2011 and 2015, the following research highlighted transportation and warehousing; agriculture, forestry and fishery, and manufacture as the leading sectors in the regency.

Other research using LQ and shift-share analysis has conducted by Fretes (2017) in Papua Province. Similar research include Mangilaleng et al (2015) in Minahasa Selatan regency and Choidi et al (2015) in Kayong Utara regency. Using data of GRDP between 2004 and 2013, study of Mangelaleng et al (2015) revealed that sectors such as mining, agriculture, construction, and manufacture were the leading sectors. Moreover, using LQ and shift-share analysis, Basuki (2018) also conclude that the leading sector in Sleman regency is the construction sector, followed by transportation and warehousing, and real estate sectors.

In addition, analysing GRDP data from 2007 to 2011, Choidi et al (2015) suggested that agriculture sector was the leading sector, which has biggest contribution to the region GRDP, followed by electricity, gas and water, mining, services, and manufacture. Hariyanto (2016) concludes that agriculture was the leading sector before being shifted by industrial, services and trade sectors. Therefore, despite the fact that agriculture sector had generally become the leading sector in many cases, each regency had have their own economy structures driven by importantly potential sectors.

Based on the literature review and previous studies provided above, the research framework can be depicted as shown in Figure 1.

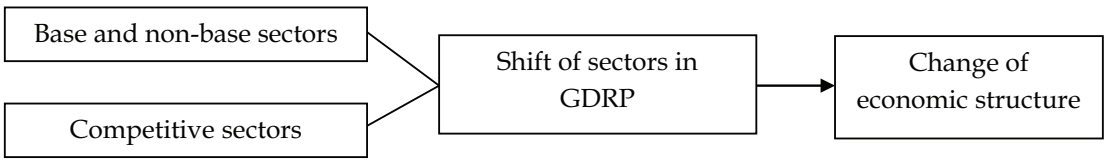

Figure 1: Research Framework.

3. Research Methods

Data used in this research is secondary data, gathered from both Papua Barat Statistic Board and Kaimana Regency Statistic Board. The data consisted of annual GRDP, from 2010 to 2015.

Data was then analysed using Shift Share and Location Quotient analyses. The formula set of Shift Share analysis includes:

1. Real impact of regional economic growth: $D_{ij} = N_{ij} + M_{ij} + C_{ij}$
2. Influence of economic growth of regency: $N_{ij} = E_{ij} x\ R_n$
3. Proportional shift: $M_{ij} = E_{ij} x\ (R_{in} - R_n)$
4. Influence of competitive advantages: $C_{ij} = E_{ij} x\ (R_{ij} - R_{in})$

where:

E_{ij} = GRDP of ith sector in regency

R_{ij} = Growth rate of ith sector in regency

R_{in} = Growth rate of ith sector in province

R_n = Growth rate GRDP in province

The concept of economic bases explains how an economic sector and its basic activities can meet the needs of domestic market, as well as other markets outside. Therefore, quantitative and qualitative approaches were also applied together with Location Quotient (LQ) and Static Location Quotient (SLQ). The general formula of LQ and SLQ that can be applied in determining leading economic sectors is as followed:

$$\text{LQ or SLQ} = \frac{\text{(GDRP sector i regency/total GDRP regency)}}{\text{(GDRP sector i province/total GDRP province)}}$$

If LQ > 1 indicates that the sector is base and potential, whereas LQ < 1, it means not the base sector. Thus, the higher the LQ value of a sector, the more competitive advantage of the regency on a related sector.

The sectoral trends in a region will be compared with the average LQ of the related sector to evaluate weither there is a change in the sectoral contribution or not in a period of time. In this study, the analysis will be limited to period from 2010 to 2015 (short term). The data obtained are presented based on descriptive statistical method to show the result of percentage, average and frequency. Descriptive statistics describes the phenomenon or characteristics of the data including the characteristics of its distribution [12].

4. Results and Discussion

4.1. Economic growth of Kaimana regency

The trends of sectoral growth rate in Kaimana economy showed that several sectors had experienced important changes during the period (2010-2015). In spite of the fact that the trend of Kaimana economy was comprehensively growing, there were some sectors having significant changes, such as construction and financial services and insurance. For instance, in 2011-2012 the growth rate of construction sector reached 14,37% in average, and declined to just over 11,02% in 2014-2015. During the same period, financial services and insurance sector had experienced a fluctuative trend, with an average growth rate of 12.92%.

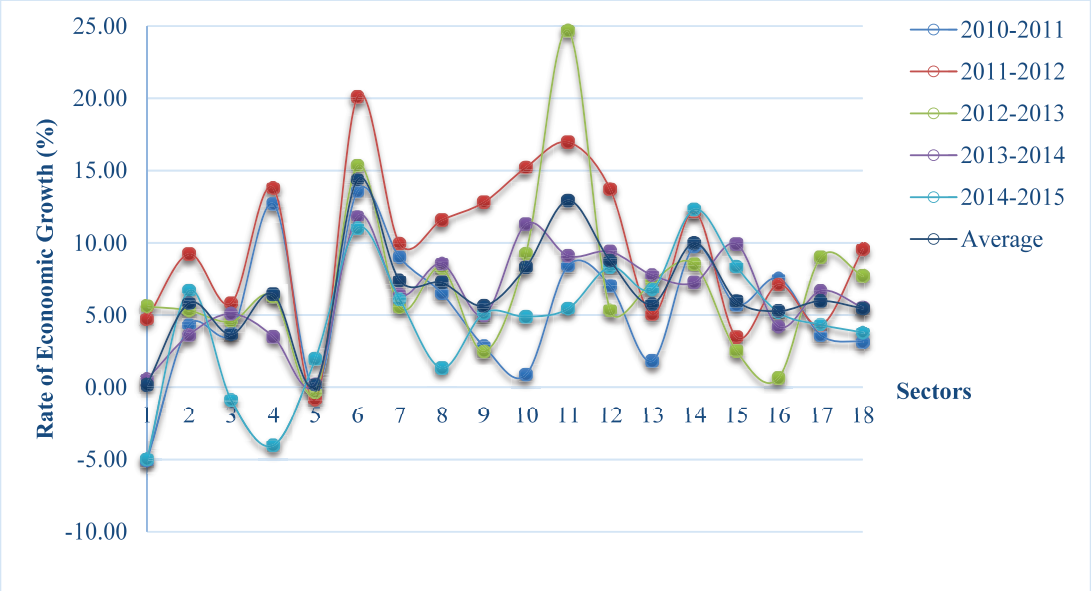

Figure 2: Economic Growth Rate of Kaimana Regency 2011-2015. Where: (1) Agriculture, Forestry, and Fishery, (2) Mining and quarrying, (3) Processing industry, (4) Procurement of electricity and gas, (5) Water supply, waste management, waste, and recycling, (6) Construction, (7) Wholesales and retail, automobile and motorcycle repairs, (8) Transportation and warehousing, (9) Provision of accommodation and drinking, (10) Information and communication, (11) Financial services and insurance, (12) Real Estate, (13) Company services, (14) Public administration, defense, and compulsory social security, (15) Educational services, (16) Health services and social activities, (17) Other services, (18) Gross Regional Domestic Product (GRDP). *Source: processed data, 2018.*

Besides, another sector experiencing a positive growth during the period of 2010-2015 was the other services. However, despite having a positive trend, this sector progress was considerably slow. Other sectors such as agriculture, processing industry, and electricity and gas had experienced negative growth during the same period, especially between 2014 and 2015. In fact, the average growth rate of agricultural sector reached about 0.17% during the period.

Considering the growth rate during the period of analysis, it can be highlghted that construction and financial services and insurance were the sectors having the highest growth rate in Kaimana regency. Figure 2 provides the details of the growth rate of the whole sectors in Kaimana economy.

4.2. Base and non-base sectors

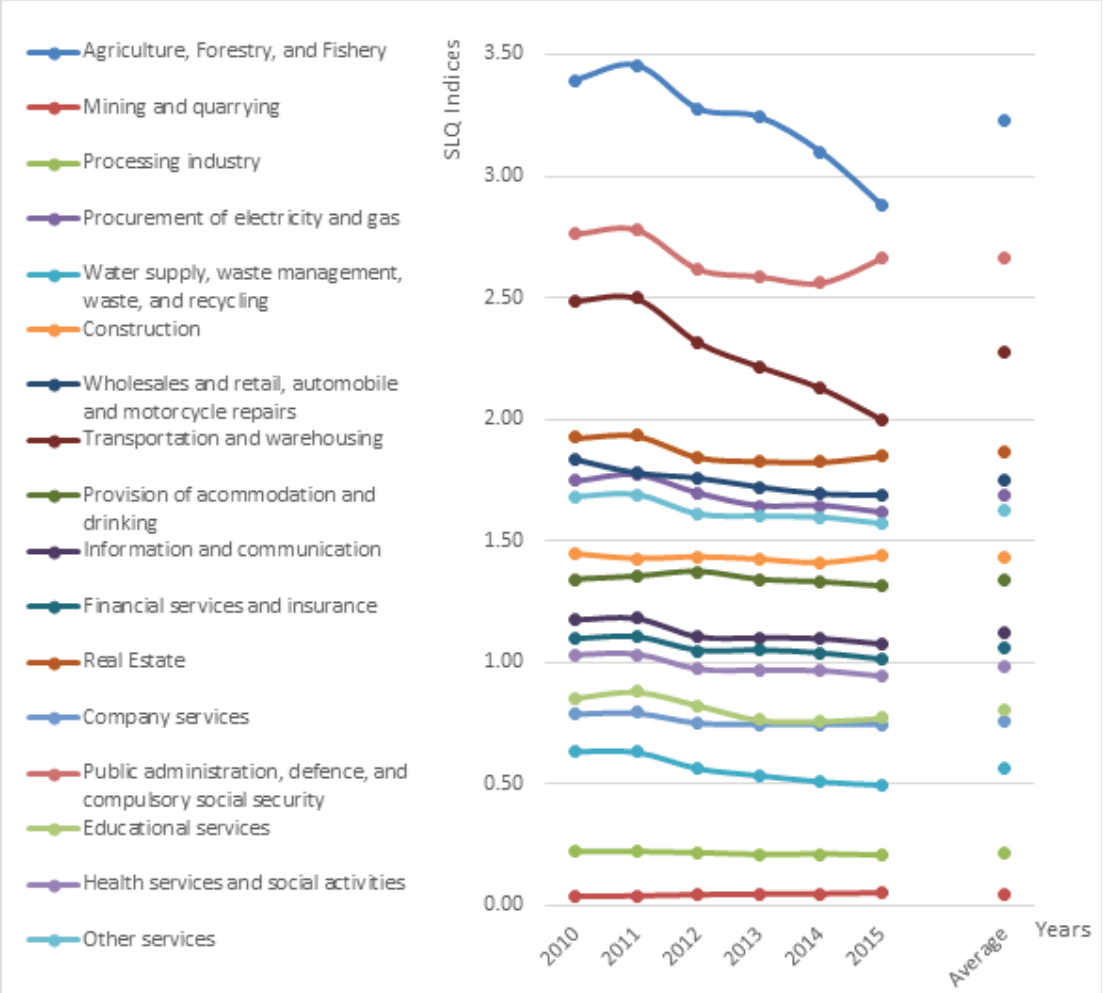

Figure 3: SLQ Results of Sectoral Shifts in Kaimana Regency 2010-2015. *Source: processed data, 2018.*

Figure 3 provides information regarding SLQ results of sectoral shifts in the Kaimana economy from 2010 to 2015. Sectors with LQ value bigger than 1 were classified into base sectors, while sectors with LQ value less than 1 were categorised into non-base sectores.

Based on the SLQ results, there were three main sectors that were classified as base sectors; agriculture, forestry and fishery; public administration, defence and compulsory social security; and, transportation and warehousing. These sectors had SLQ index

at above 2.00. Nevertheless, these sectors experienced a markedly declining trend in 2015.

In the contrary, sectors categorised as non-base sectors were represented by health services and social activities; educational services; company services; water supply, waste management, waste and recycling; processing industry; and, mining and quarrying. This implies that Kaimana regency have not had enough capability to compete to other regencies in Papua Barat yet, particularly in the areas such as mining and quarrying, owing to the fact that these sectors had very low SLQ values during the period 2010-2015.

Meanwhile, other sectors, such as agriculture, forestry and fishery; public administration, defence and compulsory social security; and, transportation and warehousing are clssified as base sectors. This implies that these sectors contribute the biggest shares in Kaimana's GRDP. During 2010–2015, there were shifts of LQ indeces, especially for the three main base sectors, whereas other base sectors relatively remained stable.

4.3. Potentials of GRDP sectoral growth

In order to determine potential sectors in Kaimana's GRDP, DLQ analysis was applied. The result of the analysis is shown in Figure 4. Potential sectors that had experienced significant change were agriculture in general. Declining trend of this sector occurred in 2013, and reaches its lowest point in 2015. In addition, the average DLQ index of this sector during the period 2010-2015 was positive.

Even though other sectors showed their fluctuations during the period of analysis, the DLQ values, however, were still positive. Therefore, it can be summarised that all sectors in the Kaimana economy had necessary potentials as the rapidly growing sectors during the period (2010-2015), except for six sectors; mining and quarrying; water supply, waste management, waste, and recycling; transportation and warehousing; financial services and insurance; company services; and health services and social activities. These sectors had experienced slow growths, with the average DLQ indeces less than 1. The DLQ values for these sectors were vary from 0.29 to 0.99. In 2014-2015, sector that had the highest potential to be developed was the procurement of electricity and gas.

The result of DLQ analysis can lead to the classification base and non-base sectors that also have possibility to be rapidly growing sectors, as well as relatively slower growing sectors. The detail of the classification is shown in Table 1. Processing industry;

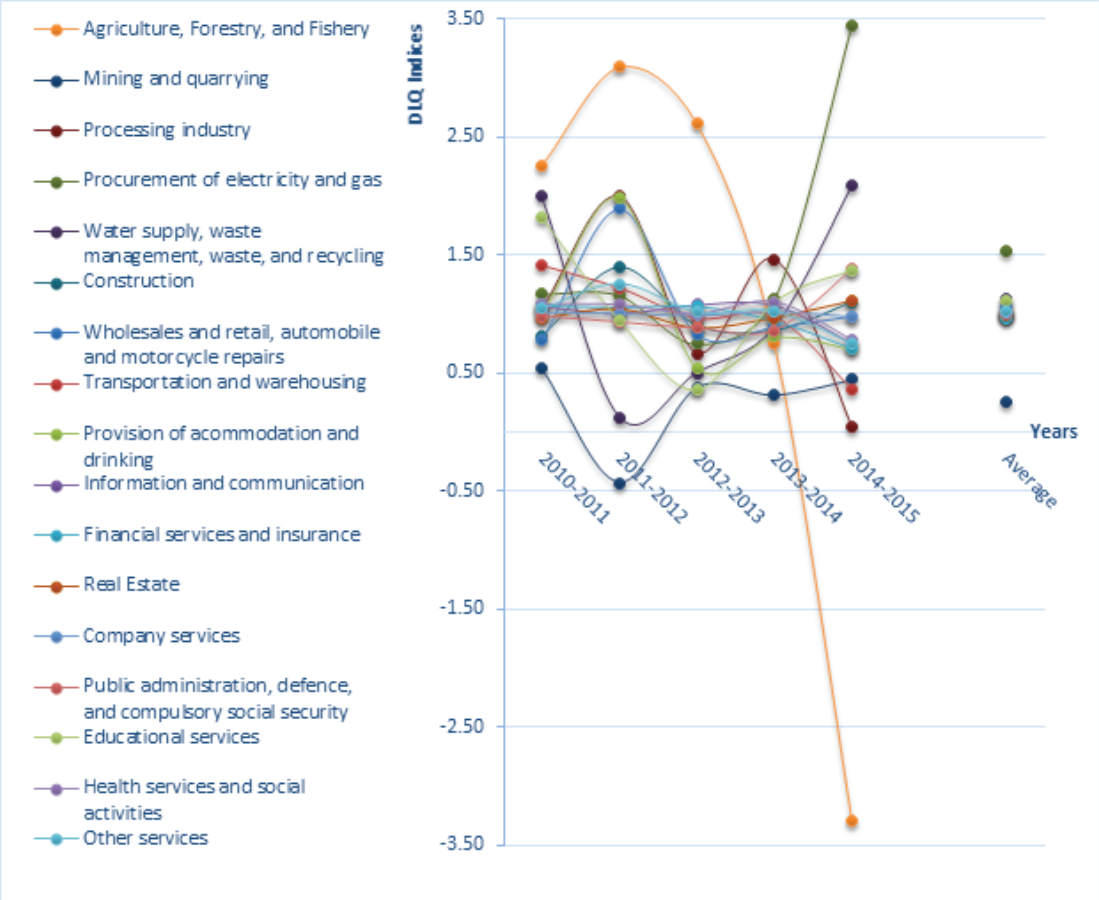

Figure 4: LQ Result of Sectoral Shifts in Kaimana Regency 2010-2015. *Source: processed data, 2018.*

water supply, waste management, waste, and recycling; company services; educational services; and, health services and social activities were non-base sectors, but had been better growing sectors, campared to others, in the period 2010-2015. In contrast, mining and quarrying in Kaimana regency have not been the specialised sector, due to the limitation of natural resources or access. Moreover, there were three base sectors that need to be taken into account by the Kaimana government, owing to the fact that these sectors had grew slower than other sectors. These sectors included transportation and warehousing; financial services and insurance; and, real estate sector.

4.4. Changes of economy structure

Shift Share analysis result indicated that in the period of 2010-2015, Kaimana regency had experienced an increase of absolute value at IDR 65.69 billions, meaning that economy performances progressively worked in that period. The whole sectors had

Table 1: Sectoral classification of Kaimana GRDP 2010-2015 based on LQ and SLQ values.

Criteria	Rapid Growth (DLQi>1	Slow Growth (DLQi<1)
Base sectors (SLQ>1)	· Agriculture, forestry, and fishery	· Transportation and warehousing
	· Procurement of electricity and gas	· Financial services and insurance
	· Construction	· Real Estate
	· Wholesales and retail, automobile and motorcycle repair	
	· Provision of accomodation and drinking	
	· Information and communication	
	· Public administration, defence, and compulsory social security	
	· Other services	
Non-base sectors (SLQ<1)	· Processing industry	· Mining and quarrying
	· Water supply, waste management, waste, and recycling	
	· Company services	
	· Health services and social activities	
	· Educational services	
Source: processed data, 2018		

important contribution to the GRDP, with construction as the basic sector and public administration, defence, and compulsory social security as non-basic sector.

The finding also highlighted that competitive sectors in Kaimana regency during the period of anaysis consisted of construction; public administration, defence, and compulsory social security; mining and quarrying; real estate; accomodation and food service activities. In different region, Basuki (2018) has done similar research and concluded that construction is the leading sector in that regency. Meanwhile, the competitiveness of other sectors had significant decreases, in particular in agriculture, forestry and fishery.

Furthermore, almost all sectors in Kaimana economy provided poositive industry-mix impacts, with the highest output value produced by construction sector, followed by public administration, defence, and compulsory social security sector. There were four sectors had negative industry-mix, namely; 1) agriculture, forestry, and fishery, 2) mining and quarying, 3) manufacturing, and 4) water supply, waste management, and recycling. This negative result mean that these sectors has lower sectoral performance compared to other sectors.

The effect of economic growth in the provincial level on economy in Kaimana regency resulted in positive rate in each economic sector, with an output total of IDR

65.69 billions. Furthermore, considering the pattern of annually sectoral contributions, it can be simply concluded that both Kaimana regency and Papua Barat province had similar pattterns in terms of sectoral contribution to the GRDP.

Table 2: Result of Shift-Share Analysis of Kaimana Economy 2010-2015.

No.	Economic sector	Growth (R)			Component (IDR million)			
		Rn	Rin	Rij	Nij	Mij	Cij	Dij
1	Agriculture, Forestry, and Fishery		0.02	0.00	22,798.88	(11,006.27)	(10,268.54)	1,524.07
2	Mining and quarrying		0.00	0.06	700.71	(693.85)	832.94	839.80
3	Processing industry		0.04	0.04	4,576.25	(464.80)	(608.49)	3,502.96
4	Procurement of electricity and gas		0.07	0.06	39.47	16.76	(4.02)	52.21
5	Water supply, waste management, waste, and recycling		0.04	0.00	41.24	(4.54)	(33.83)	2.88
6	Construction		0.13	0.14	9,267.23	**15,714.61**	**1,960.81**	26,942.65
7	Wholesales and retail, automobile and motorcycle repairs		0.08	0.07	6,318.17	4,222.32	(978.02)	9,562.47
8	Transportation and warehousing		0.11	0.07	3,057.74	3,708.93	(2,233.82)	4,532.85
9	Provision of acommodation and drinking		0.05	0.06	440.50	7.96	63.32	511.78
10	Information and communication		0.09	0.08	1,140.55	983.20	(192.37)	1,931.38
11	Financial services and insurance		0.14	0.13	837.66	1,468.41	(113.29)	2,192.79
12	Real Estate		0.08	0.09	1,236.37	901.90	69.15	2,207.43
13	Company services		0.06	0.06	50.67	11.18	(1.74)	60.11
14	Public administration, defence, and compulsory social security		0.10	0.10	13,236.44	12,741.46	916.65	26,894.55
15	Educational services		0.07	0.06	1,205.39	538.80	(259.93)	1,484.26
16	Health services and social activities		0.06	0.05	475.35	74.85	(64.99)	485.21
17	Other services		0.06	0.06	268.07	56.80	(16.86)	308.00
	TOTAL	0.05	0.05	0.06	65,690.71	-	14,590.69	80,281.40

Source: processed data, 2018

5. Conclusions and Recommendation

5.1. Conclusions

Findings of this study lead to some conclusion highlighted as followed:

1. Based on the LQ and the shift share analysis, base sectors in Kaimana economy are construction; and, public administration, defence and compulsory sosial security. These sectors perform highest value as proportional-shift and also differential shift sectors. On the other hand, mining and quarrying revealed as the lowest growth sector and non-base sector in Kaimana.

2. Potential sectors that are needed to be developed as growth-supported sectors in Kaimana regency include agriculture, forestry, and fishery; procurement of electricity and gas; construction; wholesales and retail, automobile and motorcycle repair; provision of accomodation and drinking; information and communication; public administration, defence, and compulsory social security; and other services.

5.2. Recommendations

The results of this study have some implications to be recommended:

1. Local government of Kaimana needs to formulate appropriate policies in terms of planning development strategies and programs based on its leading and potential economic sectors.

2. For further research, it is needed to add some advanced analysis instruments, as well as extending period of analysis, so that shift trends can be accurately analysed.

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