

Impact analysis of leading sub sector on basic sector to regional income in Siak Regency, Riau Province

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Abstract. During this time Siak regency only known as oil producing regency in Riau province, but based on the vision of spatial planning Siak's regency in 2031 there was a shift from petroleum towards to other sectors such as agribusiness, agroindustry and tourism. The purpose of this study was to identify the sector base, the leading subsectors and shift with their characteristics and to identify the leading subsectors development priority. The method used in this research consisted of the method of Location Quotient (LQ, Shift Share, and Overlay method). The research results were used Location Quotient (LQ) to identify sector's base in Siak regency based on the document of PDRB. The sector's refers to the constant prices year of 2000 were mining and quarrying sector (2.25). The sector's base using document of PDRB at constant prices 2000 without oil and gas sector was the agricultural sector with a value of LQ was 2,45. The leading sub sector in the Siak regency with mining and quarrying sector was oil and gas (1.02) and leading sub sector without oil and gas sector was the plantation sector (1.48) and forestry sector (1.73). Overlay analysis results shown that agriculture sector as a sector base and plantation and forestry as a leading sub sector has positive value and categorize as progressive and competitiveness. Because of that, this leading sub sector gets high priority to developing.

1. Introduction

One of the objectives in regional development is the improvement of economic development. The economic development is progress where the local government and the community manage the available resources and form a partnership patterns between local government, the private sector in creating jobs and stimulating economic activities in the region [1]. The increasing of economic development is one of the development's objectives that became an important indication of the success of economic development related to real income and income per capita, take into an account of population increase and fundamental development of the economic structure that can be felt by publics [2].

The important indication to know the economic condition within a certain period based on the amount of Gross Regional Domestic Product or Produk Domestik Regional Bruto (PDRB) that using constant price. [3] explain that PDRB is the indicator to manage the extent of the success of the local government in utilizing available resources and can be used as the main material of planning and decision making. Commonly, PDRB consists of nine business field such as agriculture sector, mining and quarrying sector, manufacturing industry sector, electricity, gas and water supply sector,



construction sector, trade, hotel and restaurant sector, transport and communication sector, the sector of finance dwelling and business service, and service sector. In other hand, Sukirno in [3], explains that based on business field, the economic sectors in Indonesia's economy divided into three main classes, that is:

Prime sector, consists of the agriculture sector and their subsectors and mining and quarrying sector. Secondary sector, consists of manufacturing industry sector, electricity, gas and water supply sector and construction sector. Tertiary Sector, consists of trade, hotel and restaurant sector, transport and communication sector, the sector of finance dwelling and business service, and others services sectors.

Siak Regency is one of regency that located in Riau province. Siak regency has nine business field that been used as a benchmark for development and income's enhancement. Based on Kabupaten Siak Dalam Angka 2013, Siak regency has a number of populations amount of 491,967 inhabitants. Total revenue of Siak regency in 2013 was 57,515,706.73 (in a million rupiahs). Based on the spatial vision of Siak regency in 2031 that focus on regional development is agribusiness, agroindustry and tourism sector, but it is inversely proportional to the data of Gross Regional Domestic Product or Produk Domestik Regional Bruto (PDRB), that explains the mining and quarrying sector was a sector base in Siak regency. That sector has the biggest amount of income is about 22,935,980.50 (in a million rupiahs).

Refers to nine of business fields in Siak regency, there is no information about the sector base and the leading sub sector. That means yet of the nine business field have known the level of competitiveness, growth values and contributions. With the information of the sector base and the leading sub sector, it can determine the potential sector in the region, development priority and development policy. So the purpose of this research was to identify the sector base, the leading subsectors and shift with their characteristics and to identify the leading subsectors development priority.

2. Methodology

The method in this research was used deductive approach, that means this research objective was to examine the hypothesis with validating the theory or examine application the theory in the certain condition [4]. The data type in this research was secondary data. Secondary data are the sources of research data that was obtained by researcher indirect with intermediaries. Deeper, [4] explained that the secondary data commonly in the form of evidence, notes or historical reports that have been archived and has been published or not. In this research, the secondary data was obtained from Badan Pusat Statistik Kabupaten Siak and Badan Pusat Statistik Provinsi Riau. Analysis techniques were used quantitative analysis with using Location Quotients method, Shift-Share method and Overlay method. For further explanation, the following below explains the research methods, that is :

2.1 Location Quotients (LQ) Method

Location Quotients (LQ) method was used to determine the sector base and the leading sub-sector. This method was a model to help show the potential sector in the region. In this research divided in two parts, first determine LQ using Gross Regional Domestic Product or Produk Domestik Regional Bruto (PDRB) without mining and quarrying sector based on constant price year of 2000. The second is LQ analysis with mining and quarrying sector based on constant price year of 2000. The Location Quotients (LQ) equation is as follows [1]:

$$LQ = \frac{v_i/v_t}{V_i/V_t} \times \frac{v_i/V_i}{v_t/V_t} \quad (1)$$

Remarks :

v_i = the income/revenue from i sector in Siak regency

v_t = the total income/revenue in Siak regency

V_i = the income from i sector in Riau Province

V_t = the total income of sectors in Riau Province

The Criteria :

$LQ = 1$, means the domestic products in the regional have been consumed personally.

$LQ > 1$, means the sector in the regional is sector base that can export the commodity into other.

$LQ < 1$, means the sector in the regional is a non-base sector and had a trend to import from other.

2.2 Shift Share Method

Shift share analysis is one of analysis technique in regional economic science that has objective to determine the main factors that influence and determine economic growth and sector base in a region. The shift share assumptions are sector growth in the region has an equivalent value with reference region. The Shift Share method was used to determine competitiveness, contribution and economic growth in the leading sub sector in Siak regency. The shift share analysis equation is as follows [7]:

$$SSA = \overset{(a)}{\left[\frac{X_{..(t1)}}{X_{..(t0)}} - 1 \right]} + \overset{(b)}{\left[\frac{X_{i(t1)}}{X_{i(t0)}} - \frac{X_{..(t1)}}{X_{..(t0)}} \right]} + \overset{(c)}{\left[\frac{X_{ij(t1)}}{X_{ij(t0)}} - \frac{X_{i(t1)}}{X_{i(t0)}} \right]} \quad (2)$$

Rema:

a = Economic Growth

b = Proportional Shift

c = Differential Shift

X = Total of Riau Gross Regional Domestic Product in national total.

X_i = Number of Riau Gross Regional Domestic Product in i sector in national total.

X_{ij} = Number of Riau Gross Regional Domestic Product in sector i in region.

T_1 = The Final Year

t_0 = The Starting Year

Interpretation:

Economic Growth = National Economic Growth

Proportional Shift (b) = if the results have positive value means the sector growth faster than national economic and vise versa.

Differential Shift (c) = If the results have positive value means the region has strong competitiveness and vise versa.

The identification of economic growth in the region also can use the addition between Proportional shift and Differential shift (b+c) that we called net shift (d). If the proportional shift (b) and differential shift (c) have been compared, the characteristic of the shift can be categorized into four types, such as type I (fast growing), type II (Highly potential), type III (Developing) and type IV (Depressed) (table 1).

Table 1. Relative Position of Leading Sub Sector

Differential Shift (c)	Proportional shift (b)	
	Positive (+)	Negative (-)
Positive (+)	TYPE I (Fast Growing)	TYPE II (Highly Potential)
Negative (-)	TYPE III (Developing)	TYPE IV (Depressed)

2.3 Overlay Method

Overlay method is the analysis that the addition of LQ values with Shift Share values and has the objective to determine the sector will be the choice in determining development priorities. Overlay method divides the economic activities into four categories, namely :

1. **Dominant and Progressive;** if the growth (LQ) and contribution (Shift Share) have positive value, then the sector was dominant and need get high priority in development.
2. **Dominant and Unprogressive;** if the growth (LQ) has a positive value while the contribution (Shift Share) has negative value, that means the sector have been developed so need attention to increase the contribution to Gross Regional Domestic Product.
3. **Not Dominant and Progressive;** if the growth (LQ) has negative value while the contribution (Shift Share) has positive value, then the sector has declined, so the growth needs to be pushed up.
4. **Not Dominant and Nonprogressive;** if the growth (LQ) and contribution (Shift Share) have negative value, means the sector was not potential to be developed.

3. Results and Discussion

3.1. Location Quotients (LQ) Analysis

LQ analysis was used to determine sector base and leading sub sector in Siak regency. Firstly, LQ was used to determine sector base based on Gross Regional Domestic Product Series Data from 2009-2013 with Mining and Quarrying Sector using the constant price year of 2000. The result (Table. 2) shown that the agriculture sector has LQ value > 1 (with the mean value is 2,45) that means the agriculture sector became sector base in Siak regency. The LQ value of the agriculture sector has an increasing trend from 2009-2012 and has been declining in 2013.

Table 2. LQ Value without Mining and Quarrying Sector
Using The Constant Price year of 2000

No	Business Field	Location Quotient (LQ) Value					Mean
		2009	2010	2011	2012	2013	
1	Agriculture sector	2.30	2.35	2.40	2.60	2.60	2.45
2	Electricity, gas and water supply sector	0.10	0.11	0.11	0.12	0.13	0.11
3	Construction sector	0.33	0.42	0.48	0.54	0.51	0.46
4	Trade, hotel and restaurant sector	0.32	0.32	0.32	0.30	0.33	0.32
5	Transport and communication sector	0.22	0.22	0.23	0.24	0.25	0.23

No	Business Field	Location Quotient (LQ) Value					Mean
		2009	2010	2011	2012	2013	
6	The sector of finance dwelling and business service	0.33	0.31	0.29	0.27	0.26	0.29
7	Service sector	0.57	0.55	0.54	0.54	0.54	0.55
	Total	4.17	4.28	4.37	4.61	4.62	4.41

Source: Results Analysis. 2016

Based on LQ analysis with mining and quarrying sector based on constant price year of 2000 the mining and quarrying sector has $LQ > 1$ (Table 3). Mining and quarrying sector have LQ with the mean value is 2.25. That means the mining and quarrying sector had become sector base in Siak Regency.

Table 3. LQ Value with Mining and Quarrying Sector
Using The Constant Price year of 2000

No	Business Field	Location Quotient (LQ) Value					Mean
		2009	2010	2011	2012	2013	
1	Agriculture sector	0.19	0.26	0.30	0.33	0.38	0.29
2	Mining and Quarrying	2.34	2.20	2.18	2.27	2.24	2.25
3	Manufacturing Industry	1.24	1.62	1.80	2.00	2.22	1.78
4	Electricity, gas and water supply sector	0.01	0.01	0.01	0.02	0.02	0.01
5	Construction sector	0.03	0.05	0.06	0.07	0.07	0.06
6	Trade, hotel and restaurant sector	0.03	0.03	0.04	0.04	0.05	0.04
7	Transport and communication sector	0.02	0.02	0.03	0.03	0.04	0.03
8	The sector of finance dwelling and business service	0.03	0.03	0.04	0.03	0.04	0.03
9	Service sector	0.05	0.06	0.07	0.07	0.08	0.07
	Total	3.94	4.28	4.53	4.86	5.14	4.55

Source : Results Analysis. 2016

After determining the sector base, the next step was determined leading sub sector using LQ method. Based on table 2, the agricultural sector has become sector base. In the agriculture sector, plantation and forestry have become the leading sub sector. While, the mining and quarrying sector, the oil and gas have become the leading sub sector. The LQ analysis in this step shown that plantation, forestry and oil and gas have become the leading sub sector because have LQ value > 1 (Table 4).

Table 4. LQ Value in Sub Sector using The Constant Price year of 2000

No	Business Field	Location Quotient (LQ) Value					Mean
		2009	2010	2011	2012	2013	
1	Plantation	1.48	1.49	1.46	1.50	1.48	1.48
2	Forestry	1.60	1.63	1.78	1.81	1.85	1.73
3	Oil and Gas	1.01	1.01	1.02	1.02	1.02	1.02

Source: Results Analysis. 2016

3.2. Shift Share Analysis

Shift share method was used to determine competitiveness, contribution and economic growth in sub sector. Based on LQ analysis without mining and quarrying sector, produced that plantation (1.48) and forestry (1.73) become the leading sub sector. The plantation sector has included into type I (fast growing) and the forestry sector includes into type III (developing). The results of shift share analysis in the plantation and forestry is as follows :

Table 5. Shift Share Analysis in Plantation and Forestry Sub Sector

No	Plantation	Remarks	Forestry	Remarks
b	+0.193	This sector growth faster than the reference economic	-0.236	This sector has slow growth compare the reference economic growth
c	+0.111	This sector has high competitiveness	+0.149	This sector has high competitiveness
d	+0.35	This sector showed the progressive growth.	+0.087	This sector showed the unprogressive growth.

Source: Results Analysis. 2016

Based on LQ analysis included mining and quarrying sector put oil and gas (1.02) become the leading sub sector. Based on the shift share analysis, the oil and gas sub sector has a negative value on proportional shift (b) and differential shift (c). The results shown that oil and gas included into type IV (Depressed). The results of shift share analysis in the plantation and forestry is as follows :

Table 6. Shift Share Analysis in Oil and Gas Sub Sector

No	Oil and Gas	Remarks
b	-0.043	This sector has slow growth compare the reference economic growth
c	-0.243	This sector has low competitiveness
d	0.286	This sector shown the unprogressive growth.

Source: Results Analysis. 2016

3.3. Overlay Analysis

The overlay analysis objective is to determine the development priority regarding the sector base, leading sub sector and sub sector contribution. Overlay analysis on sub sector of plantation and forestry and oil and gas is as follows:

Table 7. Overlay Analysis

No	Sub Sector	LQ (mean)	a	b	c	SSA
1	Plantation	+1.48	0.146	0.193	0.111	+0.45
2	Forestry	+1.73	0.146	-0.236	0.149	+0.059
3	Oil and Gas	+1.02	0.052	-0.043	-0.243	-0.234

Source: Results Analysis. 2016

Based on table 10, shown that LQ and SSA value of plantation and forestry has a positive value. That means the development of plantation and forestry categorized as dominant and progressive and then need to get high priority to developing from the government of Siak Regency. It is strengthened by the vision of Siak regency in 2031, where the focus of development are agribusiness sector.

agroindustry sector and tourism sector. It is completely different with sub sector of oil and gas. This sub sector has negative value on LQ and shift share analysis. so it categorized as not dominant and not progressive. That means the sub sector of oil and gas is not a potential sub sector and not worth to develop. The reason of oil and gas sub sector has a negative value because oil and gas are not renewable resources with high-cost production and high technology so this sub sector has decreased trend.

4. Conclusion

So the conclusion of this paper is drawn as follows:

1. Based on LQ analysis using Gross Regional Domestic Product Series Data from 2009-2013 without mining and quarrying sector. the agriculture sector has become sector base with plantation and forestry as a leading sub sector.
2. Based on LQ analysis using Gross Regional Domestic Product Series Data from 2009-2013 with mining and quarrying sector. mining and quarrying have become sector base with oil and gas as a leading sub sector.
3. Refers to shift share analysis. agriculture sector with their leading sub sector has a positive value. while the mining and quarrying sector with oil and gas as a leading sub sector has negative value.
4. Based on overlay analysis. Siak regency can change their focus of economic development from mining and quarrying sector into the agriculture sector.

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