Analysis of the Structure of Economic Growth in the Fisheries Sector Study Case at Bogor District Indonesia

Dinda Aulia Febrisya[1*], Achmad Rizal[1], Yuli Andriani[1] and Asep Agus Handaka Suryana[1]

[1]Department of Fisheries, Faculty of Fisheries and Marine Science, Universitas Padjadjaran, Bandung Sumedang Highway KM 21, Jatinangor 45363, Indonesia.

Authors' contributions

Article Information

Original Research Article

ABSTRACT

This study aims to analyze the theory of economic growth and analyze the growth rate of the fisheries sector in the Bogor District based on a comparison of the total gross regional domestic production (GRDP) of cities and provinces. The research began in January 2021 until April 2021. The research method was carried out by survey methods collected both through decision surveys which were then analyzed quantitatively and presented descriptively. This research data comes from secondary data. The data was generated from interviews with the Department of Fisheries and Livestock staff in Bogor District, BPS Bogor District, BPS West Java Province, and Bappeda Bogor District. Data analysis included Shift Share Analysis and Location Quotient Analysis. Based on research conducted on the Analysis of the Economic Growth Structure of the Fisheries Sector in the Bogor District, it can be concluded that the Fisheries Sector is a primary sector in the Bogor District with an LQ value of 1.2712. The results show the growth value of the net shift in the production of the fisheries sector in Bogor District with an average from 2015-2019 of - 1.331.821,44. The fisheries sector shows a PB value <0, meaning that the fisheries sector in Bogor District has a slow growth rate.

Corresponding author: Email: dindafebrisya@gmail.com;

1. INTRODUCTION

Economic growth is an indicator that is used to actual economic performance in a specific region. The rate of economic growth is calculated based on changes in Gross Regional Domestic Product (GRDP) at constant prices for the year related to the previous year. Economic growth can be viewed as the increase in the number of goods and services produced by all fields of economic activity in an area during a certain time [1].

Regional economic growth can be seen through the development of Gross Regional Domestic Product for the regional section. A region will receive income from the region's production, which is called GRDP. Economic growth will be experienced by a region, as the Gross Regional Domestic Product in the region is increasing. If the economic growth rate is negative, it means that the economy shows a decrease. On the contrary, if the economic growth rate is positive, economic activity has increased [2].

The base sector, which is the leading sector, is an economic sector in a region that has played a significant role in the economic development of the belated region. It could be examined by looking at the indicators, with immense growth and mass employment. The fisheries sector is critical and potential in the national and regional economic growth, both in terms of income and labor absorption [3].

The number of economic growth of Bogor District in 2019 is 5.89%. It shows a decrease in the economic growth of 0.18%, compared to 2018 [4]. According to the 2019 Bogor District Fisheries and Livestock Service, fishery production continues to increase every year.

The location quotient analysis is an indirect measurement method that aims to trace which sectors are the basis or non-base sectors in a region using the Gross Regional Domestic Product as an indicator of regional growth.

Shift-share analysis was first introduced by Perloff [5]. This analysis is used to assess the economic growth of a region with a more comprehensive regional economic growth, where the performance of the sectors in the study area is compared with the performance of the national economic sectors [6].

2. MATERIALS AND METHODS

2.1 Time and Place

This research was conducted in the District of Bogor, West Java Province, Indonesia, and implemented in January – April 2021.

2.2 Types and Data Sources

This research was carried out by using the survey method. The survey method is one part of the descriptive research method, which purpose is to create a description of a situation or an event [7]. This method will explain the results of quantitative data.

Secondary data were obtained from existing sources. Secondary data used includes the form of time series data for the past five years, namely 2015-2019, various statistical data, and data related to economic growth in the fisheries sector obtained from the Department of Fisheries and Livestock in Bogor District, BPS Bogor District, BPS West Java Province and Bappeda Bogor District.

2.3 Data Analysis Methods

Data processing and analysis in this research were carried out by using Microsoft Excel 2019.The data analysis used in this research is descriptive quantitative, while the analysis used is the Shift Share analysis and the Location Quotient (LQ) analysis.

2.4 Location Quotient (LQ) Analysis

The general formula for the Location Quotient equation is as follows [8]:

$$LQ_{IJ} = \frac{X_{ij}/X_{i.}}{X_{.j}/X_{..}}$$

Note :

Lqij : LQ value in Bogor District
Xij : GDRP of the fisheries sector in Bogor District
Xi: GDRP of all sectors in Bogor District
X.j: GDRP of the fisheries sector in West Java Province
X.: GDRP of all sectors in West Java Province

2.5 Shift Share Analysis

A. Changes in the production of the fishery sector in the district or province are formulated [9]:

$$\Delta Yij = Y'ij - Yij$$

Note :

ΔYij: Changes in fisheries sector production in regencies or provinces

Y'ij : Production from the fisheries sector in the district or province at the end of the analysis

Yij : Production from the fisheries sector in the district or province in the base year of the analysis

B. Percentage of change in GRDP is formulated [9]:

$$\Delta Yij = \frac{(Y'ij - Yij)}{Yij} \times 100\%$$

Note :

ΔYij: Changes in fisheries sector production in regencies or provinces

Y'ij: Production from the fisheries sector in the district or province at the end of the analysis

Yij: Production from the fisheries sector in the district or province in the base year of the analysis

C. Calculating the ratio of indicators of economic activity where the production ratio is used to see the comparison of production from the fisheries sector in a certain area.

1. Calculating the ratio ri [9]

$$ri = \frac{Y'ij - Yij}{Yij}$$

Note:

Y'ij: Production from the fisheries sector in the district at the end of the analysis

Yij: Production from the fisheries sector in the district in the base year of the analysis

2. Calculating the ratio Ri [9]

$$Ri = \frac{Y'i - Yi}{Yi}$$

Note:

Y'i: Production from the provincial fishery sector at the end of the analysis

Yi: Production from the provincial fishery sector in the base year of the analysis

3. Calculating the ratio Ra [9]

$$Ra = \frac{Y'_- - Y_-}{Y_-}$$

Note :

Y'_: Provincial fishery sector production at the end of the analysis

Y_: Provincial fishery sector production in the base year of the analysis

D. Calculating the components of growth

1. Share Components (KPP) [9]

$$KPPij = Ra\,(Yij)$$

Note :
KPPij : Provincial growth component in the fisheries sector for the region
Yij : Production from the fisheries sector for the region in the base year of the analysis
Ra : Provincial production ratio

2. Mix Components (PP) [9]

$$PPij = (Ri - Ra)\,Yij$$

Note :
PPij : Proportional growth component for the fisheries sector for the region
Yij : Production from the fisheries sector for the region in the base year of the analysis
Ri : Ratio of provincial production from provincial fisheries sector
Ra : Provincial production rasio

3. Competitive Components (PPW) [9]

$$PPWij = (ri - Ra)\,Yij$$

Note :

PPWij: Regional share growth component for the fisheries sector for the region in the base year of the analysis

Yij: Production from the fisheries sector for the region in the base year of the analysis

ri: The production ratio of the district fisheries sector

Ra: Provincial production ratio

4. Net Shift [9]

$$PBij = PPij + PPWij$$

Note :

PBij: The net shift of the fisheries sector in the region
PPij: Component of District Fishery Sector Proportional Growth
PPWij: Component of Regional Share Growth in the district fisheries sector

3. RESULTS AND DISCUSSION

Bogor District is one of the districts located in West Java Province, which has enormous potential for fishery resources and can be optimally utilized for fisheries, cultivation, fish processing, and aquamarine tourism business. Bogor District has great economic opportunities due to the geographical position and full support from the local government. Based on a geographical point of view, the Bogor District area is located in a favorable position due to its climate conditions, and the location allows the creation of a good and strategic position, role and relationship with other regions.

Astronomically Bogor District is located between 6 19' North latitude and 6 47' South latitude and between 106 01'‒ 107 103' East longitude. In terms of geographic position, Bogor District has boundaries as follows: North – Depok City; South – Sukabumi Regency; West –Lebak Regency Banten Province; East –Purwakarta Regency; Northeast – Bekasi Regency; Southeast – Cianjur Regency; and Inside – Bogor City [10].

3.1 General Economic Condition

Based on constant prices, the GRDPvalue of Bogor District in 2019 has increased compared to 2018. This increase was influenced by the boost of production in all business fields free from the effects of inflation. The value of GRDPBogor District in 2019 at constant prices reached 154,073.42 billion rupiahs [11].

This figure increased by 9,240.76 billion from 144,832.66 billion rupiahs in 2018. This number shows that during 2019 there was an economic growth of 5.89%, slower than the previous year's economic growth, which reached 6.07%.

The fisheries subsector in Bogor District is the base sector indicated by LQ>1 (1.2712). This number shows that the fisheries sector is a primary sector in Bogor District because, based on interviews with several Bogor District Fisheries and Livestock Service staff, Bogor District has many fisheries production and always increases every year from 2015 to 2019.Table 1 shows the results of the Location Quotient analysis calculation.

3.2 Growth Rate and Role of Fisheries Sector

There are three components of growth in the Shift Share analysis: the share component, the mix component, and the competitive component. The first is the share component which explains that regional growth is compared to following national growth [12].

Table 2 shows that the fishery sector in Bogor District has fluctuated from year to year. Like Bogor District, the percentage of changes in West Java's GRDP has been acculturative and has decreased from year to year but has increased again in 2019.

The percentage of changes in the GRDP of West Java Province in the final year of the analysis was more significant than the fisheries sector in Bogor District, due to the coverage of West Java Province, which was very broad, alongside the contribution of the marine fishing sector. Meanwhile, Bogor District only covers the freshwater fish cultivation sector.

Table 1. Results of LQ analysis in the fisheries sector for 2015 – 2019

Season	LQ Value
2013	1,3009
2014	1,2364
2015	1,2789
2016	1,2954
2017	1,2446

Table 2. Changes in the GRDP of the Fisheries Sector in Bogor and West Java Regencies at Constant Prices 2015 - 2019

Season	(ΔYi)	Percentage Change (%)	(ΔYj)	Percentage Change (%)
2015/2016	0,05	0,00	532,69	5,02
2016/2017	104,47	7,42	353,25	3,17
2017/2018	35,23	2,33	113,86	0,99
2018/2019	30,52	1,97	562,31	4,85

Note : ΔYi= Bogor District; ΔYj= West Java Province

The fisheries sector in Bogor District has decreased from 2017/2018 to 2018/2019. The value of GRDPin the fisheries sector in Bogor District has decreased; according to the results of interviews, the government has been very supportive towards the fisheries sector in Bogor District, but the region experienced a decrease in GRDP due to natural factors such as climate changes unstable weather and flooding.

As for the fisheries sector, West Java Province experienced a decrease from 2015/2016 - 2017/2018 but increased again in the final year of the analysis, namely 2018/2019. The percentage change in Bogor District in 2016/2017 is more significant than the percentage change in West Java Province, while in 2018/2019, West Java Province has a higher percentage value than Bogor District.

The GRDP growth comparison is described by the ratio stated by ri, Ri, and Ra. ri for district fishery sector ratio, Ri to provincial fishery sector ratio, and overall provincial growth expressed in Ra.

Table 3 shows that the growth rate of the fisheries sector in Bogor District and West Java Province could be stated to have a progressive growth rate, indicated by a positive ratio value. The value of Ra is the value of the GRDP growth obtained, based on the calculation of the total difference in provincial GDP in the final year of the analysis divided by the total GRDP of the province in the base year of the analysis.

Ra value is a value that indicates the reference growth. The value of Ri is obtained from the calculation of the GRDP of West Java Province in the fisheries sector at the end of the analysis with the GRDP of West Java Province in the base year of the analysis divided by the GRDP of West Java Province in the base year of the analysis.

Based on the reference value (Ra), only the Ri value in 2015/2016 is in line with the reference value (Ra); in 2016/2017, the value of Ri decreased from the reference value. Then, in 2017/2018 and 2018/2019, the Ri value increased, but the Ri value decreased slightly lower than the reference value.

Furthermore, the ri value is obtained from the calculation of the difference between the GRDP of the fisheries sector in Bogor District in the final year of the analysis and the GRDP of the fisheries sector in Bogor District in the base year of the analysis divided by the GRDP of Bogor District in the base year of the analysis.

The GRDP ratio of Bogor District and the GRDP ratio of West Java Province viewed based on the reference value, the growth of West Java Province is growing bigger. This value happened because West Java Province is very broad, alongside the contribution of the marine fishing sector.

3.2.1 Share components

The Provincial Growth Component or Share Component is a component of economic growth that explains the increase in GRDP at the provincial level to the district/city level [13]. The value of the share component is obtained from the product of the GRDPof Bogor District in the base year of analysis with the value of Ra. Table 4 shows the value of the provincial growth component or share component.

The value of KPP in the fisheries sector in Bogor District and West Java Province shows a positive value. The sector with a positive KPP value means that the sector has a regional level of economic growth resulting in growth in Bogor District experiencing positive growth.

3.2.2 Mix components

The second component in the shift-share analysis is the mix component, which is the component that explains the relative speed of regional growth compared to regional growth [14].

Table 3. GDP ratio in the fisheries Sector in Bogor district and West Java Province, 2015 – 2019

Season	ri	Ri	Ra
2015/2016	0,070	1,22	1
2016/2017	0,138	0,89	1,1
2017/2018	0,141	0,94	1,1
2018/2019	0,152	0,94	1,1

Note: ri= GRDP ratio of fisheries sector in Bogor District; Ri = GRDP ratio of fisheries sector in West Java Province; Ra = GRDP ratio of the province

Table 4. Share Components of the Fishery Sector of Bogor District and West Java Province in 2015 – 2019

Season	KPP
2015/2016	1.280.890,19
2016/2017	1.358.973,90
2017/2018	1.425.789,46
2018/2019	1.507.122,58

Table 5. Mix components of the fishery sector of Bogor district and West Java Province in 2015 – 2019

Season	PP
2015/2016	-1.212.515,6
2016/2017	-1.291.843,7
2017/2018	-1.348.908,8
2018/2019	-1.434.979,4

Note: PP = proportional growth

Table 5 shows the PP of the fisheries sector's contribution to the province. Based on the PP of the fishery sector from year to year, it contributes negatively, showing that from year to year, the growth rate is decreasing.

The data shows that Bogor District has negative growth with PP <0, so it can be concluded that the growth rate of the Bogor District's fisheries sector from year to year is slower than that of West Java province. This value happened because the amount of fishery production in Bogor District is much lower than the amount of fishery production in West Java.

The value of the GRDP of fisheries in West Java Province has a more developed value than the reference value compared to the GRDP ratio value of Bogor District, which may also lead to negative growth in the fisheries sector in Bogor District from year to year.

3.2.3 Competitive components

Competitive component is a component that shows that a region has advantages over the national level [15].

Table 6 shows that the competitive component has an average value of -9,758.51. This number

shows that, in general, based on the development of the last five years, namely 2015 to 2019, the fisheries sector in Bogor District has less competitiveness in the fisheries sector than the regional fisheries sector in West Java Province. The phenomenon happened because the growth in the amount of production in Bogor District is less competitive with other regions in West Java Province.

Fig. 1 shows the development of Share Components (KPP), Mix Components (PP), and Competitive Components (PPW).

KPP in the fisheries sector in Bogor Regency shows a positive increase of up to 1,507,122.58 in 2018/2019. The PPW fishery sector in Bogor Regency has made a negative contribution with the growth rate decreasing to -1,434,979.43 in 2018/2019, while for PPW in the fisheries sector, Bogor Regency has less competitiveness in West Java Province with a decrease of up to -22,263.10 in 2018 / 2019.

3.2.4 Net shift in the fisheries sector

The net shift value is generated from the sum of Proportional Growth (PP) and Regional Share Growth (PPW) in the fisheries sector. If the PB

value> 0 indicates, the fishery sector is a progressive (advanced) sector, while the PB value <0 indicates the fishery sector is a slow sector.

Table 7 shows the net shift value of the fisheries sector in Bogor District with an average from 2015-2019 of -1,331,820.44. The fisheries sector shows PB value <0, meaning that the fisheries sector in Bogor District has a slow growth rate. Based on the results of interviews, the development of fisheries sector production tends to increase from year to year. The fisheries sector in Bogor District also has superior commodities to market but compared to other sectors, the fisheries sector does not show a progressive (advanced) sector.

In analyzing the structure of economic growth in the fisheries sector in Bogor District, the fisheries sector must be a priority for the government to get more attention. For the economic targets could be achieved, the local government should form a policy to support and facilitate the fisheries sector by adding more cultivated land, adding more bureau of the fish market, and distributing raw materials from external places more quickly is necessary so that the fisheries sector in Bogor District grows rapidly, as like any other sectors in Bogor District.

Table 6. Competitive components of the fisheries sector, 2015 – 2019

Season	PPW
2015/2016	-4.564,72
2016/2017	-9.654,40
2017/2018	-2.551,81
2018/2019	-22.263,10
Average	-9758,51

Note: PPW = Regional Share Growth

Table 7. Net shift in the fisheries sector in bogor district

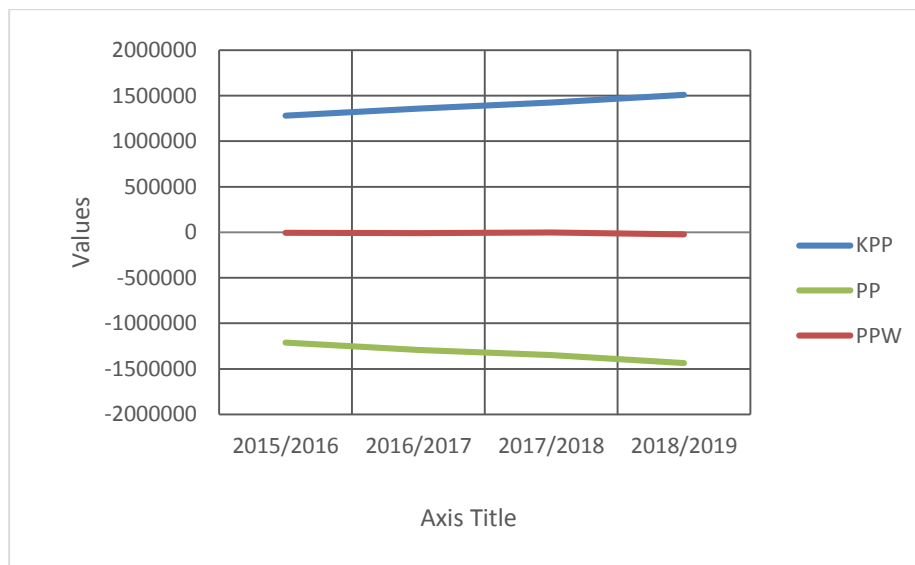| Season	Net Shift
2015/2016	-1.217.080,37
2016/2017	-1.301.498,16
2017/2018	-1.351.460,70
2018/2019	-1.457.242,54
Average	-1.331.820,44

Fig. 1. Trends in the Value of Share Components (KPP), Mix Components (PP), Competitive Components (PPW)

4. CONCLUSION

Based on research conducted on the Analysis of the Economic Growth Structure of the Fisheries Sector in Bogor District, it can be concluded as follows;

The fishery sector in Bogor District has an LQ value> 1, namely 1.2712. This shows that the fisheries sector is a primary sector in Bogor District. The amount of fishery production in Bogor District meets the needs of its area.

The growth rate of the fisheries sector in Bogor District from 2015 to 2019 has a net shift value with an average value of -1,331,820.44, meaning that the fisheries sector in Bogor District tends to has a slow growth rate.According to the results of interviews with the Department of Fisheries and Livestock staff in Bogor District, the factors that influence the slow rate of economic growth in the fisheries sector are the increase in fish feed prices and natural factors, namely rainfall, which causes flooding.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Central Statistic Agency. Bogor Regency in Figures. Bogor : Prima;2018.
2. Arsyad, Linconin. Economic Development. Yogyakarta : STIE YKPN;2010.
3. Rizal A, Suryana AAH, Herawati H, Lantun PD, Izza MA. Regional Perspectives Build Competitiveness for Indonesian Fisheries Sector in The Global and Autonomous Regime. Int. J. Agric. Env. Res. 2017;3 (6);4368-4388.
4. Central Statistic Agency. Bogor Regency in Figures. Bogor;2018.
5. Perloff HS, et al. Regions, resources and economic growth. Baltimore: Johns Hopkins University Press;1960.
6. Asmiani, Nur. Analysis of Linkage and Multiplier Effects in the Mining Sector in the Kolaka Regency. Mining Engineering Faculty of Industrial Technology, Muslim University of Indonesia : Makassar;2016.
7. Nazir. Research Methods. Jakarta: GhaliaIndonesia; 2005.
8. Rizal A, NurruhwatiI, Khan A. Economic Contribution of Southern West Java Province Marine Fisheries, World Scientific News. 2019;119;204-217.
9. Ghufron, M. 2008. Sector Based Regional Development Analysis Featured in Lamongan Regency, East Java Province. Bogor Agricultural University Press; 2008.
10. Central Statistic Agency. Bogor Regency in Figures. Bogor : Statistic of Bogor Regency ; 2020.
11. Central Statistic Agency. Bogor Regency in Figures. Bogor : Sumber Cahaya ; 2019.
12. Nugroho, Iwan, Rokhmin. Regional Development: Economic, Social and Environmental Perspectives.Jakarta: LP3ES ; 2017.
13. Rizal A, Kusumartono FX, Zaida Z. Analysis of Fisheries Sector Contribution in Nabire District of W,est Papua Province, World Scientific News. 2019;133;71-84.
14. Rizal A, Andriani Y, Kusumartono FX. A Strategic Environmental Assessment for Southern Coastal of West Java Province, Indonesia. World Scientific News. 2019;137;88-209.
15. A Rizal, Y Dhahiyat, Zahidah, Y Andriani, AA Handaka, A Sahidin. The economic and social benefits of an aquaponic system for the integrated production of fish and water plants, IOP Conference Series: Earth and Environmental Science. 2018; 137 (1) ;012098.