ECONOMIC STRUCTURE ON GROSS REGIONAL DOMESTIC PRODUCT GROWTH: STUDY CASES IN INDONESIA

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ABSTRACT

This research aims to examine the economic structure models to the gross regional domestic product (GRDP), also establish the necessary economic policy. In addition, this study also aims to measure and compare the total elasticity of entire economic sectors as well as the total of productivity and elasticity sector of each sector. The method used is explanatory-exploratory research. Subjects in this study is the Bengkulu province, Indonesia. Data used in the measurement of research variables are secondary data in the form of time series data between the years 1983 to 2016 (34 years old). Hypotheses test were analyzed using multiple linear regression analysis. The results shows that the economic structure models simultaneously affect the gross regional domestic product (GRDP) growth. Partially, gross regional domestic product (GRDP) is positively influenced by the contribution of the industrial sector, The financial and leasing sector and services sector.

KEY WORDS

Economic structure, regional economic growth (GDP), total elasticity, sector productivity total, elasticity.

Bengkulu Province that stretches along the ± 500 km traversed by the Mediterranean magmatic pathway that produces various kinds of minerals, especially coal and silver. Limestone (reef) growth in the region has resulted in dropout of gas (crude oil) in the fore-arch basin with a high content. Another potential that can be empowered is the geothermal energy that appears on the fault line like in Rejang Lebong district and South Bengkulu district which has a great potential to be used as a power plant. Geothermal energy contained in some areas such as Bukit Daun with 250 MWE, Tambang Sawah 400 MWE, and Gedang Hulu Lais with 500 MWE. In addition, the potential energy that can also be empowered is the water energy contained in Rejang Lebong with 15 locations and a total capacity of 20,772 KW, North Bengkulu district with 25 locations and a total capacity of 3,031 KW and South Bengkulu regency with 19 locations and a total capacity of 11,603 KW.

In agriculture sector, horticulture subsector has considerable opportunities to be developed in Bengkulu Province because of its vast land potential and the marketing opportunities that still open. Since 2002 fiscal year, there have been widely implemented agribusiness development projects, such as mangosteen in Bengkulu City, citrus in South Bengkulu, durian in North Bengkulu, and vegetables in Rejang Lebong.

For the plantation subsector, the prime plantation crops of Bengkulu province include coffee, rubber, and palm oil. Bengkulu province also has the advantage in the fisheries subsector sea because of its strategic location on the west coast of Sumatra facing the Indian Ocean with a long coastline of 500 km², wide territorial sea of 53,000 km², and extensive Exclusive Economic Zone (EEZ) with 685.000 km², which is rich in variety of flora and fauna of the sea.

From its various natural resources potential in Bengkulu Province, not all the potential have been truly empowered, whether it is caused by transportation barriers, lack of investment and also lack of proper development policies. When compared to other provinces, Bengkulu Province has a low income per capita. Although the income per capita increased from 3,074 million rupiah per individual become 4,335 million rupiah per individual in a year, but when compared to the national income per capita in 2007, which amounted to

17.58 million rupiah, income per capita of Bengkulu province relatively still far from the expected.

Over the last ten years (1998-2007), the economic condition of Bengkulu province has increased with the Gross Regional Domestic Product (GRDP) reached 7.01 trillion rupiah in 2007 from the previous year amounted to 4,58 trillion rupiah in 1998. The GRDP growth in Bengkulu from years 2007-2015 can be seen in the following figure.

Figure 1 – The Development of Gross Regional Domestic Product in Bengkulu province, 2007-2016 (in million Rupiah). Source: BPS Bengkulu Province (2016, Processed).

Note: (1) Agriculture; (2) Mining and Excavation; (3) Manufacturing; (4) Electricity, Gas and Water; (5) Buildings; (6) Trade, Hotels and Restaurants; (7) Transportation and Communications; (8) Finance, Leasing and Business Services; (9) Services.

In its economyic structure, the GRDP of Bengkulu province is still dominated by the contribution of the agricultural sector; trade, hotels and restaurants sector; services sector; as well as the transportation and communications sector. The agricultural sector still dominates the other sectors with an average contribution of 35.91%. Followed by trade, hotels and restaurants sector for 18.45%; the services sector amounted to 17.07%; and the transportation and communication sector amounted to 12.08%.

Throughout the years of 1998-2007, the average GRDP growth in the Bengkulu Province reached 4.86% which increased from only amounted 2.88% in 1998 to 6.03% in 2007. Out of the nine sectors of economy, the transportation and communications have a negative average growth of GRDP amounting to -1.23% caused by the sharp decline in GRDP growth in 2003 (-40.58%). The highest GRDP growth experienced by the agricultural sector, which amounted to 7.93%. As for trade, hotels and restaurants sector as well as the services sector experiencing growth in GRDP consecutively 7.51% and 3.22%. There are three (3) sectors experienced a higher growth from services sector, the mining and excavating sector (6.40%), buildings (5.14%), and manufacturing (3.29%). This suggests the efforts of local governments to strengthen the role of these three sectors in its economic structure. GRDP growth in the Bengkulu province, wether for all economic sectors and also for each sector can be seen in the following table.

GRDP growth is measured as the ratio of change in the GRDP to the GRDP of the previous year, both from each sector or wholly

Out of GRDP growth by an average of 4.86%, the highest contribution given by the agricultural sector with a contribution of 2.75% (56.60% of the GRDP growth of 4.86%). Followed by trade, hotels and restaurants sector with a contribution amounting to 1.35% (27.73% of the GRDP growth of 4.86%). The services sector has contributed 0.53% (10.87% of the GRDP growth of 4.86%). Other sectors are still relatively low in contribution or it ranges below 0.2%. From the nine sectors of the economy, the sector of electricity, gas and water supply as well as transportation and communications sector had a negative contribution to GRDP growth, which is in order equal to -0.02% (-0.45% of the GRDP growth of 4.86%) and -0.35% (-7.19% of GRDP growth of 4.86%).

Table 1 – Growth of Gross Regional Domestic Product (GRDP) in Bengkulu province, 2007-2015

Year	Economic sector									Total
	1	2	3	4	5	6	7	8	9	
2007	5.95%	15.94%	1.94%	14.80%	1.50%	2.84%	-0.76%	-0.62%	-0.02%	2.88%
2008	5.69%	0.54%	6.10%	7.40%	7.71%	1.44%	-0.18%	12.83%	3.16%	3.92%
2009	4.01%	5.26%	5.22%	5.07%	2.25%	6.54%	4.54%	2.69%	1.56%	4.03%
2010	4.44%	4.52%	5.43%	7.79%	3.55%	5.49%	4.22%	3.88%	2.84%	4.32%
2011	28.55%	4.95%	-7.70%	-59.08%	7.99%	27.69%	-40.58%	-19.63%	-3.13%	5.39%
2012	5.52%	6.88%	5.76%	4.11%	4.10%	5.35%	5.38%	6.84%	4.44%	5.36%
2013	5.82%	7.17%	1.72%	6.94%	5.35%	4.48%	6.47%	7.85%	7.49%	5.82%
2014	5.73%	6.56%	5.38%	6.20%	5.92%	6.83%	4.62%	5.39%	6.31%	5.95%
2015	5.65%	5.79%	5.81%	8.02%	7.85%	6.94%	5.23%	4.79%	6.30%	6.03%
Average	7.93%	6.40%	3.29%	0.14%	5.14%	7.51%	-1.23%	2.67%	3.22%	4.86%

Source: BPS Bengkulu Province (2008, Processed).

Note: (1) Agriculture; (2) Mining and Excavating; (3) Manufacturing; (4) Electricity, Gas and Water; (5) Building; (6) Trade, Hotels and Restaurants; (7) Transportation and Communications; (8) Finance, Leasing and Business Services; (9) Services.

THEORETICAL REVIEW

A high and sustainable economic growth is the main condition for increasing welfare. Long-term economic development is expected to bring fundamental changes in the economic structures that trigger economic growth. As stated by Arthur Lewis (1954 in Chenery, 1979: 5), development is expressed as a change or transition from traditional production form and economic behavior to the modern. Lewis (in Chenery and Srinivasan, 1993: 36), also identified economic growth as a result of the transition can be achieved through the establishment of agricultural surpluses, the strengthening of the exchange rate, and an increase in savings. Lewis in his theory of the *Dual Economy* (Amit Bhaduri in Ha-Joon Chang, 2003: 222), suggesting that the change of economy behavior that is traditional to the modern is based on differences in production methods. Dual Economy Model analyzes the development process through the interaction between the traditional sector (represented by the farm) and the modern sector (represented by the industry), each of which has a principally different behavior. The behavior of the modern sector can in principle be based on neoclassical economics, while the behavior of the traditional sectors is based on classical economics (Hayami, 2001: 82). In neoclassical economics, the wage rate of industrial sector is hypothesized limited by the function of the marginal productivity of labor (MPL). Whereas in classical economics, the wage rate of agricultural sector expressed institutionally as subsistence level. Interaction of the two sectors is based on the generated surplus labor from the agricultural sector.

The change or transition as a characteristic of development is also stated by Todaro (1998 in Agus Alwafier, 2008) who defines economic development as a multidimensional process that includes changes in structure, life attitudes and institutions, in addition to increasing economic growth, reducing inequality in distribution and poverty eradication.

In the perspective of employment, Srinivasan (in Chenery and Srinivasan, 1993: 7) argues that development can also be expressed as a transfer of labor from agriculture to industry and services. Transfers that occur and the factors that influence an object that deeply analyzed in various development studies. In the process of structural change in developing countries, Amit Bhaduri (in Ha-Joon Chang, 2003: 220), states that the transfer of labor from the agricultural sector to non-agricultural sector will increase overall labor productivity and increase per capita income.

According to Chenery (1979: 5), changes in economic structure or structural transformation must be declared by the accumulation of capital, both physical and human, as well as the transformation of economic structures, both the structure of demand, production, trade, and employment. Transition should be expressed as levels or conditions necessary for sustainability and increase in income and social welfare (Chenery, 1979: 6). These purposes vary between countries that depend on social goals and the ability of a country in production and trade. The process that forms a transition encompasses changes in all economic functions, both the increase in production capacity that is measured by the

accumulation of capital and labor skills, the transformation of the use of resources, and the socio-economic process.

Usage factor transformation can be divided into three (3) components, namely: 1) a change in the proportion of overall factor through the accumulation of physical capital and skills; 2) the reallocation of these factors between sectors of production in a variety of proportions; and 3) increased productivity or total factor productivity between sectors. Total factor productivity (TFP) is defined as the impact of all factors affecting output but not explicitly indicated as a factor of production. TPF measure the efficiency of production inputs combined with the output produced (Miles & Scott, 2005: 49).

Studies on the effect of changes in economic structure towards the economic growth made by Yotopoulos and Nugent (1976: 293). This study is intended to establish a development strategy of economic sectors through the formulation of the type or pattern of sectoral changes that are needed to boost economic growth. The choice of strategy in question is balanced or unbalanced sectoral change. Yotopoulos and Nugent defines sectoral pattern changes as the elasticity of the contribution (share) of economic sectors on the income. There are two main schools of thought regarding economic growth (from the US / production side), namely the classical and modern theories, and between these two theories, the Neo Classical theory and the Keynesian theory. The rationale of the classical theory is economic development is based on a liberal system, in which economic growth is driven by a passion for maximum profits. If profits increase, savings will increase, and investment will also increase. This will increase the stock of existing capital. The scale of production increases and increases the demand for labor, so that the level of wages also increases. Then when the demand for labor increases, it will increase the supply of labor, which in turn will reduce the level of productivity and profits. This is due to the enactment of additional diminishing returns due to the limited number of natural resources, such as land area. From this process resulted in production, labor demand and wage rates decreased. According to classical theory, in these conditions the economy experiences a degree of saturation or a stationary state. This is a situation where the economy is mature, established and society is prosperous, but without further development.

METHODS OF RESEARCH

The analytical method used in testing the hypothesis is Regression Analysis. Structural equation that shows a causative relationship between variables is as follows:

$$\ln Y_j = a_j + b_{1j} \ln X_{1j} + b_{2j} \ln X_{2j} + b_{3j} \ln X_{3j} + b_{4j} \ln X_{4j} + b_{5j} \ln X_{5j} + b_{6j} \ln X_{6j} + b_{7j} \ln X_{7j} + b_{8j} \ln X_{8j} + b_{9j} \ln X_{9j} + e_j$$

Where: Y = GDP growth; X_1 = Agriculture Sector Contribution; X_2 = Mining and Excavating Sector Contribution; X_3 = Industrial Sector Contribution; X_4 = Building Sector Contribution; X_5 = Electricity and Water Sector Contribution; X_6 = Transportation and Communication Sector Contribution; X_7 = Trade and Hotel; X_8 = Finance, Leasing and Business Services Sector Contribution; X_9 = Services Sector Contribution; e = Error / residue / error.

Effects of Changes in Economic Structure to the GRDP growth shows that the model has fulfilled classical assumptions required, namely: have normal distribution, there are no multicollinearity, autocorrelation and heteroscedasticity. Consideration of the need to test the classical assumption in regression analysis model is to avoid bias that makes the results of the regression does not have the ability to estimate properly (When we do estimates, there will be no big a difference between a plan with a realization) or it is BLUE (best linear Unbiased Estimator).

RESULT AND DISCUSSION

Effects of Changes in Economic Structure of the GRDP Growth, regression with E-views 6:

$$\ln(Y) = f(\ln(x_1, x_2, x_3, x_4, x_5, x_6, c_7, x_8, x_9))$$

Table 3 – Dependent Variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	49.76194	60.10834	0.827871	0.4227
Ln(X1)	-3.243042	8.479366	-0.382463	0.7083
Ln(X2)	-0.190983	0.401816	-0.475300	0.6425
Ln(X3)	1.161083	1.138234	1.020074	0.3263
Ln(X4)	-0.751132	1.818870	-0.412966	0.6864
Ln(X5)	-1.286334	1.426421	-0.901791	0.3836
Ln(X6)	-11.10308	6.495822	-1.709265	0.1111
Ln(X7)	-4.425680	3.092647	-1.431033	0.1760
Ln(X8)	0.942930	2.676075	0.352356	0.7302
Ln(X9)	1.745363	2.115875	0.824889	0.4243
R-squared	0.717467	Mean dependent var		2.030175
Adjusted R-squared	0.521867	S.D. dependent var		0.554971
S.E. of regression	0.383747	Akaike info criterion		1.221351
Sum squared resid	1.914398	Schwarz criterion		1.715045
Log likelihood	-4.045541	Hannan-Quinn criter.		1.345514
F-statistic	3.668035	Durbin-Watson stat		2.236083
Prob(F-statistic)	0.017011			

$$\text{Ln } Y = 49.762 - 3.243 \text{ Ln } X_{11} - 0.191 \text{ Ln } X_{21} + 1.161 \text{ Ln } X_{31} - 0.751 \text{ Ln } X_{41} - 1.286 \text{ Ln}$$

$$X_{51} - 11.103 \text{ Ln } X_{61} - 4.426 \text{ Ln } X_{71} + 0.943 \text{ Ln } X_{81} + 1.745 \text{ Ln } X_{91} + e_1$$

The results of the significance test showed that F_{count} is greater than the $F_{\text{table}} = 2.714$ (F_{table} value at the error level of 5% and degrees of freedom $db_1 = k = 9$, $db_2 = n - k - 1 = 13$) indicated that changes in economic structures has significant and simultaneous effect on GRDP growth with error level of 5%. Thus, H_0 is rejected and the alternative hypothesis is accepted, research on the influence of the Economic Structural Change simultaneously to the GRDP growth is accepted. The magnitude of the effect, in other words also show large variations in the GRDP growth which can be explained by all the causing variables simultaneously, amounting to $R^2 = 71.7\%$. (According to feasibility studies of Prof. Yuyun models in the book, it is stated that the R^2 value must be greater than 0.5), the rest of variation, as big as 28.3%, or $1 - R^2$, described by other factors that not examined.

Table 4 – Partial Test Results Effect of Changes in Economic Structure against the GDP growth

Effect of Partial	bi	t_{hitung}	Decision
Agriculture Sector Contribution (X1)	-3.243	-0.382 ^{ns}	H_0 is accepted, alternative hypothesis (H_a) is rejected
Mining and Excavating Sector Contribution (X2)	-0.191	-0.475 ^{ns}	H_0 is accepted, alternative hypothesis (H_a) is rejected
Industrial Sector Contribution (X3)	1.161	1.020 ^{ns}	H_0 is accepted, alternative hypothesis (H_a) is rejected
Building Sector Contribution (X4)	-0.751	-0.413 ^{ns}	H_0 is accepted, alternative hypothesis (H_a) is rejected
Electricity and Water Sector Contribution (X5)	-1.286	-0.902 ^{ns}	H_0 is accepted, alternative hypothesis (H_a) is rejected
Transportation and Communications Sector Contribution (X6)	-11.103	-1.709 ^{ns}	H_0 is accepted, alternative hypothesis (H_a) is rejected
Trade and Hotels Sector Contribution (X7)	-4.426	-1.431 ^{ns}	H_0 is accepted, alternative hypothesis (H_a) is rejected
Finance, Leasing and Business Services Sector Contribution (X8)	0.943	0.352 ^{ns}	H_0 is accepted, alternative hypothesis (H_a) is rejected
Services Sector Contribution (X9)	1.745	0.825 ^{ns}	H_0 is accepted, alternative hypothesis (H_a) is rejected

Note: $t_{\text{table}} = t_{0.05(13)} = 1.771$ (t_{table} value at 5% of type 1-sided test and $db = n - k - 1 = 13$; b_i = regression coefficient, $r_{YX_i.X_k}$ = partial correlation coefficient, ^{ns} = non-significant, * = significant).

The above table shows that partially, only contribution of sector III, VIII and IX only that has positive effect partially on the GRDP growth, although not significant within the error level of 5%, while the contribution of other sectors shows negative direction and it is also not

significant. The positive influence of Sector III, VIII and IX Contributions to the GRDP growth indicates that when the contribution of sector III, VIII and IX are higher, though the contribution of other sectors remains, it is capable of pushing the region to produce higher GRDP growth. These results indicate that the sector III, VIII and IX play important role in generating higher GRDP growth.

Based on the analysis as described above, the dominant variable in the model are the contributions of Sector III, VIII and IX compared to the other sectors contribution that constructively affect the GRDP growth. Out of the nine sectors examined, contribution of sector III has a more significant degree of influence. This indicates that the Contribution of Sector III is the most powerful driving force in supporting the improvement of the GRDP growth. Nevertheless, the simultaneous influence between sectors suggests that the increased contribution of all sectors that constructive (positive influence direction) have more ability to improve the higher the GRDP growth.

As for the economic policies taken in accordance with the results of this study are as follows:

1. In order to increase the GRDP growth, either by encouraging the growth of the sector through increased higher investment participation of Bengkulu province government in the development as well as various regulations that are conducive for growth between economic sectors;
2. As a solution model for increasing the GRDP growth, the model test results show that efforts to increase the GRDP growth can be done through the efforts of increasing economic sectors contributions that proved to have a positive influence direction simultaneously. The relevant development policies in increasing GRDP growth are the development of industrial sector, financial and leasing sector as well as the development of the services sector. Nevertheless, the study results are still not significantly shows that its effectiveness needs to be improved;
3. By looking at the data processing result, it that can be explained that partially each economic sector has no significant influence on the GRDP, but simultaneously that all sectors of the economy have a significant influence on to the GDP. Besides the above purpose, the study also want to note the share of each sector of the economy to Total GRDP is as follows:

$$\frac{\text{GRDP of Agriculture} = \text{The GRDP IN 1998}}{\text{GRDP Total GRDP YEAR 2016}}$$

$$\frac{\text{GRDP of Mining and Excavating} = \text{The GRDP IN 1998}}{\text{GRDP Total GRDP YEAR 2016}}$$

$$\frac{\text{GRDP of Industrials} = \text{The GRDP IN 1998}}{\text{GRDP Total GRDP YEAR 2016}}$$

$$\frac{\text{GRDP of Building} = \text{The GRDP IN 1998}}{\text{GRDP Total GRDP YEAR 2016}}$$

$$\frac{\text{GRDP of Electricity and Water} = \text{The GRDP IN 1998}}{\text{GRDP Total GRDP YEAR 2016}}$$

$$\frac{\text{GRDP of Transportation and Communications} = \text{The GRDP IN 1998}}{\text{GRDP Total GRDP YEAR 2016}}$$

$$\frac{\text{GRDP of Trade and Hotel} = \text{The GDP IN 1998}}{\text{GRDP Total GRDP YEAR 2016}}$$

$$\frac{\text{GRDP Financial and Leasing} = \text{The GRDP IN 1998}}{\text{GRDP Total GRDP YEAR 2016}}$$

$$\frac{\text{GRDP of Services} = \text{The GRDP IN 1998}}{\text{GRDP Total GRDP YEAR 2016}}$$

CONCLUSION

Economic Structure changes simultaneously affecting the GRDP growth. Partially, the GRDP growth is positively influenced by the contribution of the industrial sector (III), the financial and leasing sector (VIII) and the services sector (IX). Increasing contribution of these sectors has the ability to increase the GRDP growth become higher.

Government of Bengkulu Provinceneeded to increase the contribution of the industrial sector (III), the financial and leasing sector (VIII) and the services sector (IX), particularly in order to increase the GRDP growth, either by encouraging the growth of the sectors through increased higher investment participation of Bengkulu province government in the development as well as various regulations that are conducive to growth between each economic sectors.

As a solutionsmodel for increasing the GRDP growth, the model test results show that efforts to increase the GRDP growth can be done through the efforts of increasing the economic sectors contribution that proved to have a positive influence direction simultaneously.

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