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Research Article – Economics

A comparasion of the leading sectors contibuting to economic growth before and after the economic crisis in East Kalimantan: An econometrical approach

Sudarlan S.E.,* Achmad Rudzali, Khairil Akbar
Accounting Department, State Polytechnic of Samarinda, Samarinda, East Kalimantan, Indonesia

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*Corresponding author (E-mail: sudarlan@polnes.ac.id)

Abstract

East Kalimantan province is not only rich in the natural resources of mining, but also in agriculture. The objective of this research is to know the extent of the contribution of the main sector's like agriculture, mining, industry and trade sectors before and after the occurrence of the economic crisis in East Kalimantan. The results of this study indicate that (a). Almost all of the independent variables used, namely agriculture, mining, industry and trade sectors have insignificant impact on the growth of per capita income before and after the economic crisis, except for an agriculture sector, (b). The agriculture sector has a positive influence and significantly to the growth of per capita income before the economic crisis, but after the economic crisis it was not significant impact on the growth of income per capita.

Keywords: Economic growth, agriculture, mining, industry and trade sectors

Introduction

The advantage of Indonesia compared to other countries in the world that are a lot natural wealth, condition of the season that all year long is always illuminated by the sun that causes the land to become fertile and vegetation may develop properly, unlike to countries that have four seasons, however with this rich of natural resources and if not offset by good management would cause scarcity. An agriculture sector including gardening, forestry and fisheries is a natural resource that is rare and only found in a few countries which have sunshine all year round including Indonesia. Forest products are exported to some neighboring countries without first being processed causing Indonesia forest reserves quickly depleted and scarce. In the agricultural sector is to be the main sector on the Government of the New Order with organizations of rice, but in its development of this sector could not offset its population while diminishing farmland. Like other sectors in the agricultural sector, the mining sector has also become the leading sector in several provinces such as Riau, South Sumatra, East Kalimantan and Papua Provinces. Where the contribution of Gross Domestic Product (GDP) to four provinces above 50% (Statistical Agency, 2010).

The positive impacts of the mining sector are: (a) contribute to the improvement of education and population growth in Obuasi (Mensah, 2011:62), (b) and with the international mining industry, developing countries will be able to build an regime of mining sector based on economic equality, mutual benefit and equitably (Tawiah and Baah, 2011:1), (c) the availability of jobs where 30 percent of arrivals to find work (Addei and Kwadjose, 2011:103), d). Technology transferred particularly in mining (Pourush and Thanai, 2012:9). However, the mining sector also has negatively affected on health and the environment, the increasing number of sufferers pain breathing (Addei and Kwadjose, 2011:5), coal mining causes damage to the environment through soil degradation, destruction of forests, water and air pollution, noise and loss of wildlife habitat (Gurdeep Sing, 2008:22).

In the industrial sector either manufacturing or processing industries of petroleum and natural gas become a substitute for the agricultural sector which was hard pressed by the population for housing. In the industrial sector of the New Order Government that Indonesia would be an “Asian Tiger” like China, Japan and Korea, however due to the economic crisis in 1997 caused Indonesia slumped into a state that required the help of foreigners like the International Monetary Fund (IMF), or other donor countries. The trade sector including the hotel and restaurant is the follow-up of the third sector, it means that this sector supported by other sectors such as tourism, agriculture, mining and industry sectors.

East Kalimantan province as one of the largest producers of natural resources in Indonesia that rely on mining and oil and gas processing industry is expected to encourage the growth of per capita income and lower levels of poverty is both directly and indirectly. These considerations were necessary given the natural resources owned by the East Kalimantan cannot be updated so that necessary anticipative steps to support other sectors which can be used as its driving force in boosting economic growth and decrease poverty in East Kalimantan.

Research Methodology

Types and sources of Data

The study uses secondary data in the form of time series and in the annual covers 1983 – 1996 and 2001 - 2014 and data cross-sectional to 9 districts/cities in East Kalimantan, because the necessary data in this research is the macroeconomic that include such as:

a. Data of percentage of the growth in GDP and population of district/city as an indicator of the growth of per capita income, GDP of mining and excavation sector, as

Table 1. The estimation model of economic growth prior to economic crisis

Variable	Coefficient	Std. Error	t-Statistic	Probability
Constant	-392,7300	351,3952	-1,1176	0,2962
Agr	27,3512	13,0576	2,0947	0,0695
Mng	3,1705	4,0102	0,7906	0,4520
Ind	4,4240	5,5414	0,7984	0,4477
Trade	-9,6080	7,4765	-1,2851	0,2347
R^2	0,4742	Mean dependent var		14,1154
Adjusted R^2	0,2114	S.D. dependent var		41,2761
F-statistic	1,8040	Durbin-Watson stat		2,5355
Prob(F-statistic)	0,2214			

Source: Data Processing; ϖ Hypothesis testing

well as the industrial sector for the 9 districts/cities in East Kalimantan province.

b. Data of percentage of the agriculture and the trade, hotel and restaurant sector for 9 districts/cities in East Kalimantan. The data obtained using the methods of the library search. These data are expected to be obtained either through the Website of the Central Board of Statistics of East Kalimantan Province.

Data Collection Methods

Data collection methods in this study by using methods of the library search. Then the data are grouped into a group that is tailored to the needs of the data processing. Whereas the processing of data is carried out by using two software, namely Ms. Excel and Eviews version 6 for parameter estimation, statistical testing and validation testing of the model.

Formulation of the Research Model

The formulation of the research model could be seen in this figure:

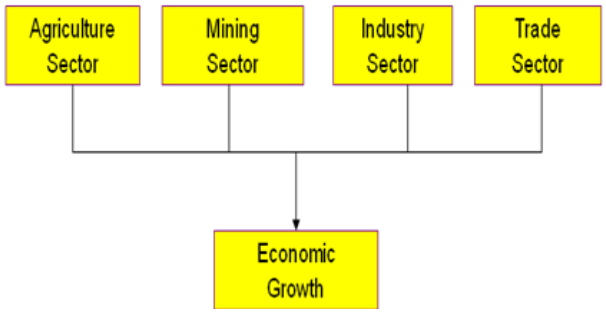

Figure 1. The formulation of the research model

In this research would be used by multiple linear regression equation models using regression ordinary least square (OLS) to see a direct relationship between the agricultural, the mining, the industry and trade, hotel and restaurant sector to economic growth. In this model, economic growth is treated as an endogenous variable, while the percentage of agriculture, mining, industry and trade sectors are treated as exogenous variables. The structural equation model so that it is used in this research is:

Growth = f (Agr, Mng, Ind, Trade) .....(1)

It is assumed that all variables in the above structural equations have a relationship that is linear, and then the form of the equation can be formulated such that the linear regression models qualify. So the equation becomes:

$$Growth_t = \alpha_0 + \alpha_1 Agr_t + \alpha_2 Mng_t + \alpha_3 Ind_t + \alpha_4 Trade_t + \mu_1 \quad \ldots\ldots. (2)$$

Where:

Growth = percentage of GDP per capita growth according to the district/city
Agr = percentage of GDP the agricultural sector according to the district/city
Mng = percentage of GDP according to the mining sector according to the district/city
Ind = percentage of GDP according to industry sector according to the district/city
Trade = percentage of GDP the trade, hotel and restaurant sector, according to the district/city
t = time, where t = 1983 – 1996 and 2001 – 2014
α_1 - α_4 = estimation parameter
α_0, γ_0 = *intercept*
μ_1 = *Error terms*

Table 2. Multicolinierity Test of Growth Prior To Economic Crisis

Independent Variables	Adjusted R^2	VIF	TOC
Agr	-0,19540	0,8365	1,1954
Mng	0,78870	4,7325	0,2113
Ind	-0,87348	0,5338	1,8735
Trade	0,75187	4,0301	0,2481

Source: Data Processing

Analysis

The equation model of economic growth prior to economic crisis

In the equation of economic growth in this study using per capita income growth prior to economic crisis affected by variable agriculture, mining, industry and trade sectors. The results of the estimation of the growth model as shown in table 1.

a. t-test

The t-test results shows that all independent variables namely variables used agriculture, mining, industry and trade have t-*counted* is smaller than the t-table (2.358) on the significance of one percent and only one variable is agriculture (Agr) has a value of (2.0947) above the t-table (1.658) on the significance of the five percent which means that most of the independent variables do not affect on the growth of per capita income.

b. F-test

The F-test results show the number of the figure which 1.8040 under F-table (2.47) with significance of one per cent. Thus it can be concluded that all the variables used such as the agricultural, the mining, the industrial and the trade sectors variables have no effect on the variable growth of per capita income in East Kalimantan.

Table 3. The estimation model of economic growth after economic crisis

Variable	Coefficient	Std. Error	t-Statistic	Probability
Constant	32,9293	18,68554	1,762285	0,0827
Agr	-0,6166	0,366651	-1,681753	0,0974
Mng	-0,1729	0,207411	-0,833535	0,4076
Ind	0,2819	0,611723	0,460886	0,6464
Trade	-1,6570	0,926869	-1,787709	0,0785
R^2	0,1149	Mean dependent var		3,576429
Adjusted R	0,060384	S.D. dependent var		22,55901
F-statistic	2,108567	Durbin-Watson stat		1,505941
Prob(F-statistic)	0,089762			

Source: Data Processing; ϖ Hypothesis testing

c. R^2-test

R^2-test used to change the dependent variable variation (growth) due to variations independent variable changes (agricultural, mining, industry and trade sectors), test results showed a number of R^2 is 0.2114. This means that the independent variables have an effect on the dependent variable (Growth) of 21.14 percent, while the rest of 78.86 percent caused by factors outside the model.

d. Multicollinierity-test

The methods used to find out whether there is mutual correlation among independent variables by the way know the variance inflation factor (VIF). The general rule used to know of any multicollinierity if the VIF > 10, then this means that the occurrence of high multicollinierity fellow variables exogenous.

The equation model of economic growth after the economic crisis.

In the equation of growth in this study using per capita income growth after the economic crisis affected by variable agriculture, mining, industry and trade sectors. The results of the estimation of the growth model as shown in table 3.

a. t-test

The t-test results shows that all independent variables namely variables used agriculture, mining, industry and trade sectors after the economic crisis has t-test is smaller than the t-table (2.358) on the significance of one percent and t-table (1.658) on the significance of the five percent which means that all independent variables (Agr, Mng, Ind. and Trade) did not have any affect on the growth of the per capita income.

b. F-test

The F-test is used to see the influence of the independent variables to a dependent variable simultaneously. The F-test results indicate the number of 2.108567 in which the figure is under F-table (2.47) at a rate of one per cent significance. Thus it can be concluded that the variables of the agricultural, the mining, the industrial and the trade sectors variables have no effect on the variable growth of per capita income in East Kalimantan.

c. R^2-test

R^2 test used to find out the dependent variable changes variations (growth) due to the variations of independent variable changes (agricultural, mining, industry and trade sectors), test results showed a number of R^2 is 0.060384. This means that the independent variables have an effect on the dependent variable (YP) of 6.04 percent, while the rest of 93.96 percent caused by factors outside the model.

d. Multicollinierity test

The methods used to find out whether there is mutual correlation among independent variables by the way know the variance inflation factor (VIF). The general rule used to know of any multicollinierity if the VIF > 10, then this means that the occurrence of high multicollinierity fellow variables exogenous.

Table 4. Multicolinierity Test of growth after the economic crisis

Independent Variable	Adjusted R^2	VIF	TOC
Agr	-0,19540	0,83654	1,19540
Mng	-0,87348	0,53377	1,87348
Ind	0,78870	4,73252	0,21130
Trade	0,751869	4,03013	0,24813

Source: Data Processing

Comparison of the economic growth equation models before and after the economic crisis.

The coefficient and the probability of independent variables such as agriculture, mining, industry and trade sectors before and after the economic crisis in East Kalimantan shows as follows:

Table 5. Comparison of growth equations before and after the economic crisis

Variable	Coefficient		Probability	
	Before crisis	After crisis	Before crisis	After crisis
Agr	27,3512	-0,6166	0,2962	0,0974
Mng	3,1705	-0,1729	0,0695	0,4076
Ind	4,4240	0,2819	0,4520	0,6464
Trade	-9,6080	-1,6570	0,4477	0,0785
R^2	0,4742	0,1149		

Source: Data Processing

From table 5 shows that the coefficients of the independent variables (agriculture, mining, industry and trade) are not much different between before and after the economic crisis hit Indonesia and East Kalimantan. Almost all of the independent variables are not significantly affect on economic growth measured from growth of per capita income, unless the variable has a positive influence on mining sector with 10 percent significance level affects economic growth prior to the economic crisis in East Kalimantan.

Discussion

A comparison of the agricultural, mining, industry and trading sectors to economic growth before and after the economic crisis

The three of the four independent variables used in this study i.e., the agriculture, industry and trade sectors do not have significant influences both one percent, five percent and ten percent to the growth of income per capita, the only an agriculture sector variable has a positive influence and with five percent significance level before the economic crisis in East Kalimantan.

The important findings in this research is that the agriculture sector has a positive influence of 27,3512 to per capita income growth prior to economic crisis, which means that the growing of the agriculture sector amounted to one percent would increase the per capita income districts/cities in East Kalimantan amounting to 27,35 per cent, this is in accordance with the opinion of Himani (2014) and Sertoglu et al (2017), that the agricultural sector had a positive influence to the economic growth in Nigeria and similarly to the opinion of Omorogiuwa, et al (2014) stating that the role of agricultural economics can be encourage the whole economy in Nigeria. In contrast to the opinion of the Uma et al (2013) that the agricultural sector did not have significant influence to the economic wealth of Nigeria.

The mining sector had a positive influence but not significant before and after the economic crisis, it is contrary to Mensah (2011:10-11), Connolly and Orsmond (2011:47) and Tawiah and Baah (2011:7), and Pourush Thanai, (2012:8) with case studies in Ghana, Australia and India that positively impact mining to economic growth, education and development and transfer of new technologies especially in the field of mining, but also contrary to the opinion of Ahmad Komarulzaman and Armida S, Alisyahbana (2006) as well as Sudarlan et al (2015)) that the mining sector had negatively impact on regional and economic growth in Indonesia. The industry sector in East Kalimantan is an industry that is derived from the natural resources in the form of petroleum and natural gas has a positive coefficient value and not significantly to economic growth both before and after the economic crisis in the East Kalimantan. The trade sector has a negative coefficient before the economic crisis and statistically not significant to economic growth in East Kalimantan, but after the economic crisis, the trade sector has a negative coefficient and with ten percent significance level, this does not fit the opinion of Yakubu (2014) that international trade has a positive and significant influence to economic growth in Nigeria, likewise the opinion of Sun and Heshmati (2010) that international trade has a positive influence and significantly to economic growth in China.

Conclusion

Based on the results of the discussion which had been expressed earlier, can be summed up into a few things:

a. The agriculture sector variable has positive influence to the increasing of per capita income growth only prior to the economic crisis in East Kalimantan. But after the economic crisis this sector did not have any impact on the per capita income growth.

b. The mining, industry and trade variables have no effect on the growth of per capita income both before and after the economic crisis in East Kalimantan.

c. There are no significant differences occurred the influence of major sectors such as agriculture, mining, industry and trade sectors both before and after the economic crisis in East Kalimantan.

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