The Role Of The Natural Resource Sector And Government Spending For Education Towards Poverty Reduction In East Kalimantan

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Abstract: East Kalimantan Province is one of the rich provinces in natural resources such as coal mining, oil and gas. Utilization of the natural resources is expected to be used optimally to improve the welfare of the community. The purpose of this research is to find out how big the influence of natural resources sector which the consist of mining and quarrying sector and processing industry sector and government expenditure for education against poverty alleviation in East Kalimantan Province. This research uses explanatory method with time-series and cross-section data and applying multiple regression model with Ordinary Least Square (OLS) method. The results of this study show that (a) the natural resource sector and government spending on education have no effect on per capita income growth, (b) economic growth as measured by per capita income growth positively affects on poverty and government spending on education is not significantly influential to poverty reduction, and (c) the natural resource sector has no significant effect on the poverty headcount in East Kalimantan.

A. Background

The number of poor population in the province of East Kalimantan's relatively poor residents in particular fluctuatively in urban areas, whereas in rural areas the number of poor population tends to decline in spite of the poor population in rural remains a contributor to the largest poverty particularly in the province of East Kalimantan.

Table 1. *Percentage of poverty headcount in East Kalimantan from 2002 to 2015.*

Year	Poverty Headcount
2002	13,38
2003	13,03
2004	11,47
2005	20,27
2006	8,79
2007	11,16
2008	8,39
2009	8,20
2010	8,07
2011	6,94
2012	8,05
2013	6,58
2014	8,50
2015	7,98

Source: *Statistical Agency of East Kalimantan*

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On the other hand, the economic structure of the district and town in East Kalimantan is more dominated by the contribution of the mining and quarrying sectors such as Kutai Kartanegara, East and West Kutai Regencies and the processing industry sector in the city of Balikpapan and Bontang, this contains of oil and gas. The contribution of natural resources sector from 2002 to 2015 was in around 65,35 %

B. The literature reviews

B. 1. The size of the poverty

Poverty can be defined according to two approaches: absolute poverty and relative poverty (Abdul Hakim, 2009 and Indonesia Statistical Agency, 2009). Absolute poverty is determined based on the inability to fullfill the minimum basic needs such as food, clothing, housing, education and health are needed to be able to live and work. The minimum basic needs is translated as a financial measure in the form of money and its value is known as the poverty line. Residents who have an average per capita income/expenditure per month under the poverty line are classified as the poor population. In Indonesia, a measure of poverty is often based on the approach used by The Indonesia Statistical Agency. Before 1993, The Indonesia Statistical Agency used a poverty line based on the magnitude of the dollars spent to meet the needs of food equivalent to 2,100 calories per day per person. This figure is often referred to as the poverty line food. In this approach is regarded as "imejiner" due to the approach of total expenditure assumed everything was spent on calorie needs only. Since the year 1993, Indonesia Statistical Agency used a basic needs approach by entering the calculation needs the food and not the food. Minimum requirements for food has chosen 52 types of food (each for the regions towns and villages) and a magnitude equivalent to 2,100 calories needs. In the National Socioeconomic Survey has been used implicit prices to obtain the poverty line. This methodology is considered more simple and understandable in relation to the needs of the data to determine the poverty line. The minimum requirements for being not food includes 46 types of commodities consisting of housing, clothing, education, health, transportation, durable goods and a wide range of goods and services.

The components of spending instead of this undifferentiated food between urban and rural areas. Thus, the total sum obtained from the poverty line between food needs and not food. However, the World Bank (2001) in its report entitled Indonesia Constructing a New Strategy for Poverty Reduction, giving critics of the approach applied to poverty reduction in Indonesia because it was considered too concentrates on the numeric targets. The poverty line for example, emphasized on expenditure to meet the needs of life in a very narrow sense. The target figures combined with a development approach that is both top-down approach has set aside the many dimensions of poverty even though hard to measure, but the dimensions are very important. By just looking at the statistically they fall into the category below the poverty line, this approach narrowed its scope of poverty and the poor reality distanced from the dynamic. Therefore, one of the themes expressed in the report is the need to broaden the definition of, the facts and the objectives of the anti-poverty programs. Even so, the World Bank is aware that ignoring the numbers and keep away from mathematical targets certainly also not possible, because after all the numbers are still needed. On the other hand, too operates on achieving targets figures also don't thoughtful due to too simplify the problem. And then The World Bank recommends the use of International Development Goals Indicators compiled by its representatives from the international community and Indonesia among its members. The expansion of poverty reduction targets such as the World Bank has recommended more focus on the depth of the targets that have been set for this. On the dimensions of a standard of life materially, for example, the proportion of the poor population (1999) was 27% and in 2004 targeted amounted to 13.5%. On the human resources dimension also developed targets for example the numbers completed primary education in the poorest residents, the rate of infant mortality as well as health level. Similarly, access to infrastructure, the poorest group whether access against the water resources or sanitation can be upgraded five years and no less important, are the participation among the poor population in the local political decisions that affect their lives, can be improved through specific programmes.

C. Model Formulation

System of equations that are used to look at the impacts of natural resource sector comprising mining sector and the industrial sector towards poverty is a structural system of equations. In the system of equations is a number of endogenous variables that mutually interact, either directly or indirectly, explicitly considered in the model. Specifications model structural equation respectively, are described as follows:

C.1 Specification Model of the growth of Per capita income

In various literatures, among all variables that affect growth, especially in Indonesia using sectoral variables that contribute to GDP growth in this case is used mining sector (Mng) (Rolfe et al, 2011), industrial sector (Ind) (Asep Suryahadi et al, 2008), government spending (GI) (Nurudeen and Usman, 2010). So the equation model of income growth becomes:

$$\mathrm{YP} = \alpha_0 + \alpha_1 NR + \alpha_2 GEd + \mu_1 \quad (1)$$

Where:
YP = per capita income growth
NR = GDP of mining sector and industry sector
GEd = Government expenditure on education
A_0 = intercept
A_j = estimated parameter, where j = 1 and 2
μ1 = error term

C.2. Poverty Model Specification

With respect to poverty, as Lopez (2004) points out, the degree of poverty depends on two aspects: (i) the average level of income, and (ii) the degree of inequality. The specification of the poverty equation model to be used, is directly derived from this perception. Therefore, to obtain elasticity of growth against poverty and elasticity of inequality to poverty is used equation (Zaman, 2010):

$$PH = \gamma_0 + \gamma_1 YP + \gamma_2 GR + \mu_3 \quad \ldots \quad (2)$$

$$\gamma_1 = \frac{\partial PH}{\partial YP} < 0;\ \gamma_2 = \frac{\partial PH}{\partial GR} > 0$$

Where:
PH = Percent of poor population
YP = Economic growth
GR = Gini coefficient
γ_j = parameter estimation, where j = 1,2
γ_0 = intercept
μ3 = error term

Recent empirical studies have shown that various macroeconomic variables have an indirect effect on poverty, through growth. Arimah (2004) found that education affected poverty, Laabas and Limam (2004). But in addition to variables that have an indirect effect also on variables that directly affect poverty. Thus, the model of poverty equation becomes:

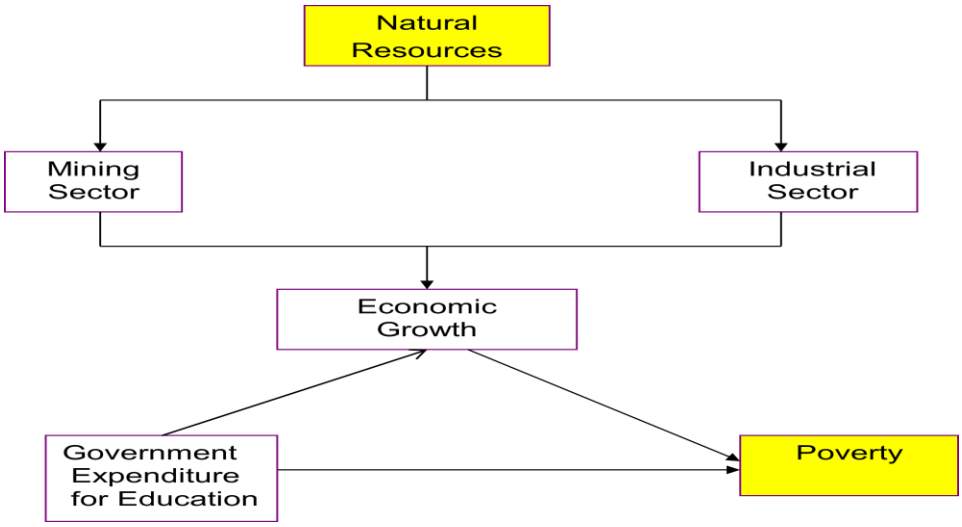
$$PH = \gamma_0 + \gamma_1 YP + \gamma_2 GEd + \mu_2 \quad (3)$$

PH = Percent of poor population
YP = Growth per capita income
Ged = Percent of government spending on education
γ_j = parameter estimation, where j = 1,2
γ_0 = intercept
μ2 = error term

D. Research Framework

From the description above, then the frame of thought in this study are:

Figure .1. *The Framework of The Research*



E. Research Methodology

E.1. Object of Research

The objectives of the research are four main points, namely: natural resources sector, government expenditure on education, per capita income growth and poverty in all regencies / cities throughout East Kalimantan from 2003 to 2015.

E.2. Research methods

In this study, the method used is explanatory research. This method is very suitable for social studies that try to see, measure and test the causality relationship between the variables studied. The nature of this research is verificative, which is to examine the relationship of interrelationship and influence between independent variables and dependent variables, and to test the interrelationship between variables with statistical and econometric test to get the conclusion.

E.3. Types and Data Sources

This study uses secondary data in the form of time series in annual form covering the period 2003 to 2015 and cross-sectional data (panel) for 9 Regencies/Cities in East Kalimantan Province, because the data required in this research is macroeconomic data which include:

1. GRDP growth data and population of Regency / City as an indicator of per capita income growth, GRDP of mining and industrial sectors for 9 regencies / cities in East Kalimantan Province.
2. Data of the number of poverty headcount and government spending on education in 9 regencies / cities in East Kalimantan Province. The data obtained by using library method (library search). These data are expected to be obtained either through the Website of Indonesian Central Bureau of Statistics or BPS of each Regency / City in East Kalimantan Province or other related institutions.

E.4. Analysis Model

In this research we will use the model of multiple regression equation by using ordinary least squares regression technique (OLS) to see indirect relationship between mining sector and industry sector to poverty. In this model, growth and poverty are treated as endogenous variables, while the percentage of the mining sector, industry sector, and government spending on education are treated as exogenous variables. So the structural equation model used in this research is:

$$YP = f1(NR, GEd) \quad \ldots\ldots\ldots\ldots (4)$$

$$PH = f2(YP, GEd) \quad \ldots\ldots\ldots\ldots (5)$$

Where:
YP = Percent of GRDP per capita Growth of Regency / City.
PH = Percent of poor population by Regency / City
NR = Percent of GRDP of industrial sector and mining sector by Regency / City
GEd = Percentage of government spending on education by Regency / City

Since it is assumed that all of the above structural equations have linear relations, the form of the equation can be formulated in such a way that it qualifies the linear regression model. So the equation becomes:

$$YP_t = \alpha_0 + \alpha_1 Na_t + \alpha_2 GE_t + \varepsilon_1 \ldots (6)$$

$$PH_t = \gamma_0 + \gamma_1 YP_t + \gamma_2 GE + \mu_2 \ldots (7)$$

Where:
YP = Percent growth of GRDP per capita Regency / City.
PH = Percent of poor population by Regency / City.
NR = Percent of GRDP of mining and industrial sectors by Regency / City.
GEd = Percent of government spending on education by Regency / City.
t = year t, where t = 2003 – 2015
αj γj = parameter estimasi
α0 γ0 = *intercept*

F. Analysis

F.1. Results of Per Capita Growth Equation Model Estimation

In the growth equation in this study using the growth of income per capita influenced by natural resource sector variable consisting of mining and processing industry sectors and government expenditure for education. Estimation of growth model as shown in table 2.

Table 2. *Estimation of Growth Model Estimates*

Variable	Coeficient	Std. Error	t-Statistic	Probability
Constanta	10,0852	6,0283	1,6730	0,0971
NR	-0,0545	0,0277	-1,9679	0,0515
GE	-0,0812	0,2917	-0,2785	0,7811
Adjusted R2	0,0164	S.D. dependent var		5,9982
S.E. of regression	5,9488	Akaike info criterion		6,4296
Sum squared resid	4034,3140	Schwarz criterion		6,5004
Log likelihood	-373,1302	Hannan-Quinn criter.		6,4583
F-statistic	1,9658	Durbin-Watson stat		1,0303
Prob(F-statistic)	0,1448			

Source: Data processed

1. Hypothesis Testing

a. T-test

The t test shows that all independent variables used are natural resource sector and government expenditure for education variables for education have t-statistic smaller than t-table (2,358) on the significance of one percent and t-table (1.658) at a significance of five percent which means that all such independent variables do not have affect per capita income growth.

b. F-test

The F-test is used to see the influence between independent variables and dependent variables together, The result of F-test shows a number of 1,9658, it means that this number is smaller than F-table (2,47) with significance level one percent. It concludes that natural resources variable and government expenditure for education have no effect on income per capita growth in East Kalimantan Province.

c. R2-test

Test R2 is used to determine the variation of dependent variable change (YP) due to variation of change of independent variable (natural resource sector variable and government expenditure for education variable), Test Result R2 shows the number of 0,0164. This means that the independent variables have an effect on the dependent variable (YP) of 1.64 percent, while the rest of 98.36 percent is caused by factors outside the model.

3. Classical Assumption Validation Model Testing

a. Multicolinearity Test

The method used to determine whether there is a correlation between independent variables by knowing the variance of inflation factor (VIF). General rule used to know the existence of multicollinearity if VIF> 10, then this means that the occurrence of high multicollinearity among exogenous variables (predetermined),

Table 3.: *Multicollinearity Test Results of Growth Equation*

Independent Variable	Adjusted R2	VIF	TOC
NR	0,00033	1,0003	0,9997
GE	0,00033	1,0003	0,9997

Source: *Data processed*

From the value of variance inflation factor (VIF) obtained in the table above, natural resource sector and government expenditure variables for education have very small R2 values far below the number one, indicating that among these independent variables are not correlated, thus that the equation is still unbiased, linear and has a minimum variance (BLUE).

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b. Heteroscedasticity Test

Heteroscedasticity test is used to determine the presence or absence of heteroscedasticity symptoms that the model used has a constant variant or homoscedasticity. Heteroscedastisity test used in this research is Park and White methods

Table 4. *Heterocedasticity test of growth model according to Park*

Variable	Coeficient	Std. Error	t-Statistic	Probability
NR	0,84036	0,33777	2,48797	0,01430
GE	-1,06127	1,18524	-0,89540	0,37240
Adjusted R2	0,03998	S.D. dependent var		78,12669

Source: *Data processed*

Park's heteroscedasticity test results show that the natural resource sector (NR) variable statistically significantly affects to residuals squared at one percent significance because t-Statistics are greater than t-table (2.358) and government expenditure variables for education (GEd) is statistically insignificant influence on residual squared on significance of one percent because t-statistic is smaller than t-table (2.358). While the heteroscedasticity test of the growth model according to White shows the results as in table 4.

Table 5. *Heterocedasticity test of growth model according to White*

Variable	Coeficient	Std. Error	t-Statistic	Probability
NR	-0,83278	1,67276	-0,49785	0,61960
NR^2	0,01354	0,01387	0,97609	0,33110
GE	30,21506	14,67582	2,05883	0,04180
GE^2	-1,46942	0,71471	-2,05595	0,04210
Adjusted R2	0,06232	S.D. dependent var		78,12669

Source: *Data processed*

From table 4. It can be seen that the value of coefficient of determination (Adjusted R2) of 0.06232 with the number of samples are 117, so that the calculated Chi square value of 7.292 which the number is smaller than the critical value of chi square ($\chi 2$) of 33.409 at the level of significance one percent. Thus it can be concluded that the estimation model used there is no problem of heteroscedasticity.

F.2. Estimation Result of Poverty Equality Model

The estimation result of poverty headcount model (PH) as shown in table 5.

Table 6. *Poverty model estimation results (STLS)*

Variable	Coeficient	Std. Error	t-Statistic	Probability
Constanta	5,5466	5,2211	1,0623	0,2903
YP	0,3054	0,0838	3,6459	0,0004
GE	0,1356	0,2653	0,5113	0,6101
R-squared	0,1057	Mean dependent var		9,6916
Adjusted R2	0,0900	S.D. dependent var		5,6709
F-statistic	6,7388	Durbin-Watson stat		0,9775
Prob(F-statistic)	0,0017			

Source: *Data processed*

1. Hypothesis Testing

a. t-test

The t-test results show that all variables used in this study are the variable growth of income per capita (YP) has a t-count value of 3.6459, greater than the t-table value of (2.358) with significance of one percent meaning That the variable of growth of income per capita individually has influence to the poor (PH), while the variable of government expenditure for education has t-count value equal to 0,5113

smaller than t-table value equal (2,358) and t-table of (1,289) on the significance of one percent and ten percent, which means that the government's expenditure variable for the education individually has no effect on the poor (PH).

b. F-test

The F-test is used to see the effect of independent variables on the dependent variable simultaneously. The F-Test shows the figure of 6.7388 which is below the F-table value (6.85) at the one percent level of significance. Thus it can be concluded that independent variables of per capita income growth and government spending on education together have no effect on the poor (PH).

c. R2-test

Test Result R2 shows a number of 0.0900. This figure means that the variation of dependent variable change is caused by variation of independent variable change by 9 percent, while the remaining of 91 percent variation of dependent variable change caused by other factors outside the model.

2. Testing Models of Classical Assumption Validation

a. Multicolinearity Test

The multicollinearity test of the simultaneous equation of poverty headcount shows that the variance inflation factor (VIF) is less than 10. This means that the equation does not occur multicollinearity among exogenous variables (predetermined). Multicollinearity test results among the independent variables as shown in table 6.

Table 7. *Multicollinearity Test Results Poverty Headcount Equation*

Independen Variabel	Adjusted R2	VIF	TOC
YP	0,00050	1,00050	0,99950
GE	0,00050	1,00050	0,99950

Source: Data processed

b. Heteroscedasticity Test

According to Park's test that all the variables used in this equation have t count smaller than t-table equal to (1,289) with significance of ten percent, which means that those variables do not have any heteroscedasticity problem.

Table 8. *Heterocedasticity test of poverty headcount model according to Park*

Variable	Coeficient	Std. Error	t-Statistic	Probability
YP	0,95728	0,01886	50,76541	0,00000
GEd	-0,23849	0,00745	-32,02344	0,00000
Adjusted R2	0,95691	S.D. dependent var		5,89734

Source: *Data processed*

According to White heteroscedasticity test, the coefficient of determination (Adjusted R2) is 0.95691 with the number of samples is 117, so that the value of chi square ($\chi 2$) is 111,959, which is bigger than $\chi 2$ table (33,41) at the level of significance ten percent. It can be concluded that poverty headcount estimation model has heteroscedasticity problem. While according to White heterokedasticity test shows the coefficient of determination as shown in Table 8 below:

Table 9.*Heteroscedasticity test of poverty headcount model according to White.*

Variable	Coeficient	Std. Error	t-Statistic	Probability
YP	-8,32418	0,26953	-30,88447	0,00000
YP^2	0,97731	0,01436	68,04302	0,00000
GE	2,85488	1,94177	1,47025	0,14430
GE^2	-0,10140	0,09844	-1,03008	0,30520
Adjusted R2	0,982328	S.D. dependent var		78,12669

Source: *Data processed*

From Park and White tests could be concluded that the equation there is a problem of heteroscedasticity or data is not homoscedasticity.

G. Discussion

G.1. The Influence of Governmental Expenditure on Per Capita Income Growth

The two independent variables used in this study are natural resource sector and government expenditures for education variables have no significant effect on the per capita income growth of regencies in East Kalimantan Province. An important finding in the natural resources sector is that the negative impact of -0.0545 on per capita income growth means that an increase in the natural resource sector of one percent will decrease the per capita incomes of the district by 0.0545 percent, in line with opinion of Ahmad's Komarulzaman and Armida S, Alisyahbana 2006) and Sudarlan et all (2015) that the mining sector had a negative impact on regional economic growth in Indonesia, but in contrary to Mensah's opinion (2011: 10-11), Connolly and Orsmond (2011: 47) and

Tawiah and Baah (2011: 7), Pourush And Thanai, (2012: 8) with case studies in Ghana, Australia and India that mining has a positive impact on economic growth, education and development and transfer of new technologies especially in mining, While government spending on education has a coefficient of -0.0812 but is not statistically significant which means that the government spending on education variable has no effect on the growth of per capita income of regencies / cities, which means that the increase or decrease of regencies / city budgets has no impact on the growth of income per capita regencies / city. This is supported by a study by Sinha (1998: 78) and Adeyose et al (2010: 35) that government spending has no effect on economic growth, in contrast to studies conducted by Taiwo and Abayomi (2011: 25) that government spending has a positive effect on economic growth.

G.2. The Influence of Per Capita Income Growth on Poverty.

The result of the model of per capita income growth shows a coefficient of 0,3054, it means that increasing of economic growth would increase the number of poverty. It is not unexpected, should economic growth as measured from growth of income per capita has a negative coefficient. Some studies of the relationship between growth and poverty have been made by economists with differing opinions. The growth and poverty relationships are negative (trade offs) such as Ahluwalia et al (1979), Janvry and Sadoulet (2000), Bigsten and Levin (2000)), 2010 (2010) and Ijaiya et al (2011) and Yue (2011). The results of this study conclude that per capita income growth has a positive effect Against poverty in East Kalimantan. While government spending on education is not statistically significant both negative and positive for poverty in East Kalimnatan. Thus the first and second hypothesis that the natural resource sector has affected to per capita income growth of regencies / cities and poverty is not proven because the variable of the natural resource sector is insignificant to per capita income growth although per capita income growth has a positive effect on poverty. Similarly, the second hypothesis of government spending on education affecting poverty reduction in East Kalimantan is also not proven because government spending on education has an insignificant coefficient on poverty reduction.

H. Conclusions and Suggestions

H.1. Conclusion

Based on the results discussed earlier, it can be concluded that :

a. Natural resource sector variables and government spending on education have no effect on the per capita income growth of regencies/cities in East Kalimantan Province.
b. An economic growth variable as measured by per capita income growth has a positive effect on poverty headcount and government spending on education has no significant effect on poverty headcount in East Kalimantan Province.
c. The natural resource sector variable does not have affected significantly to the poverty headcount in East Kalimantan Province.

H.2. Suggestions

H.2.1. Suggestion for the Development of Science

The role of the natural resource sector comprising the mining and manufacturing sectors in enhancing economic growth through per capita income growth in East Kalimantan is currently at a downward stage, given the contribution of the mining sector and the processing industry sector in East Kalimantan from year to year decrease. Given that the natural resource sector is a non-renewable resource and will be exhausted, it will require other sectors to replace the natural resource sector to increase revenue growth per capita of the Regencies/Cities in East Kalimantan.

H.2.2. Suggestions for Policy Makers

Related to the operationalization of the policy, some suggestions that may be considered include:

1. The significance of the mining and manufacture industrial sectors have no impact on economic growth as measured by the per capita income growth of regencies/cities in East Kalimantan Province, with data from 9 regencies/cities that mostly have the potential of the mining sector and the declining manufacture industrial sector. So efforts are made to find new natural resources and processing industries or diverted to other sectors directly related to poverty reduction such as tourism, palm oil and rubber sectors and river and sea fish farming.
2. An economic growth as measured by the growth of per capita income of regencies/cities in East Kalimantan has a positive impact on poverty, it is necessary to look again at factors affecting economic growth as measured by per capita income growth to find solutions to poverty alleviation.
3. Government spending on education has no effect on the improvement of economic growth as measured by per capita income growth of regencies/cities to poverty reduction, it is necessary to assess the allocation of larger government expenditures so as to maintain stable economic growth and accelerate poverty alleviation.

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