

## Analysis the economic growth factors of strategic zone in Aceh Province, Indonesia

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### Abstract

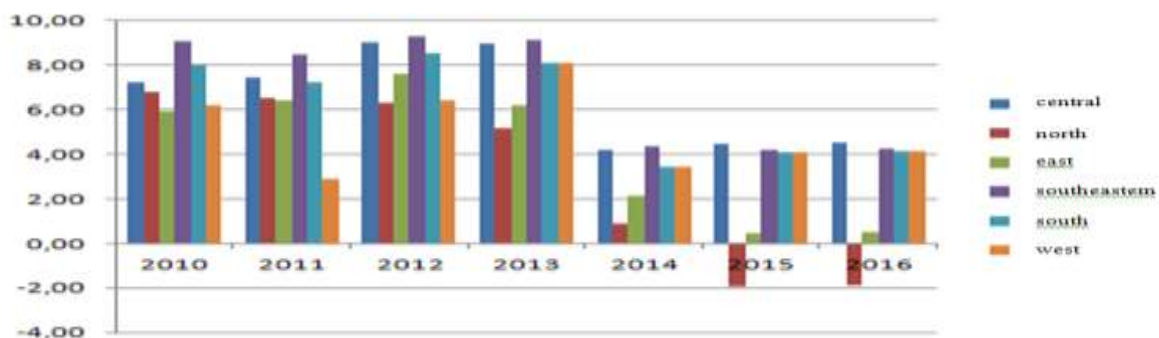
The purpose of this study was to analyse the economic growth factors strategic zone in Aceh Province, Indonesia of 2010-2016. The data used was data panel consisting of six zones namely the central, north, east, southeastern, south and west. The independent variables was development gaps, government budget, electrical energy, information technology, labor from magister/doctor. Dependent variable was economic growth. The method used was panel data regression. The result show that a model of fixed effect good enough explain economic growth. Factors that Influential very significant was information technology and electrical energy

**Keywords:** development gaps, government budget, electrical energy, information technology, labor from magister/doctor, economic growth

### 1.Introduction

Economic growth zone in Aceh Province 2010-2016 can be seen in Figure 1, as below:

Fig. 1. Economic Growth Zones in Aceh Province Year 2010-2016 (in percent)



Source : Research Data (2017)

Figure 1 shows that the average economic growth of zones has decreased dramatically. In 2010 to 2013, the average economic growth fluctuated. In 2014 it experienced a very drastic decline below the average figure until 2015. The year 2016 a slight increase, although still below the average rate of economic growth zone. The movement of the declining average numbers was so drastic that it shows that the economic growth of zones in Aceh Province has not been stable.

Strategic zone economic growth is influenced by development gaps, government budget, electric energy, information technology, labor from magister/doctor. Field observation data can be presented in Table 1 below:

Table 1 Average Zone Economic Growth

Variable	Zone					
	Central	North	East	Southeastern	South	West
Economic growth	6,5	3,1	4,2	7,0	6,2	5,0
development gap	2,661	2,018	0,725	0,865	0,817	2,347
Government budget	9,62749E+11	9,56931E+11	8,51845E+11	6,29094E+11	6,33958E+11	7,62261E+11
Information technology	20,98	11,58	12,38	7,64	7,64	8,43
Electric energy	4,59	4,56	4,57	4,51	4,52	4,57
Labor from magister/doctor	0,68	0,19	0,24	0,22	0,12	0,14

Source : Research Data (2017)

The dependent variable from Table 1 above is economic growth. The independent variables are development gaps, government budget, electric energy, information technology, labor from magister/doctor. The problem of suitable economic growth model for strategic area development can be solved by examining the factors that significantly influence it.

The study of economic growth of the zone is urgently needed given the current government has opened up to participate in the Asian Economic Community (MEA). Surely the results of this study will produce economic growth model to be the basis for the development of each zone. Therefore, the authors are interested in examining this case under the heading "Economic Growth Zone Factors Analysis in Aceh Province, Indonesia".

Based on the research background then the problem can be formulated as follows: What factors affect the economic growth of strategic zones in the province of Aceh, Indonesia ?. Related to the above problem formulation, this research is aimed to analyze the factors influencing economic growth of strategic area development in Aceh Province, Indonesia. The results of this study can be used as an information material for local governments and local parliaments in preparing provincial mid-term development plans.

## 2.Theory and Hypothesis

### 2.1 Theories of Economic Growth

#### (a) Regional Development

In the study of development of this area is made approach of various opinions that explore the factors that can move the local economy. Labor income may decrease due to imbalance of physical, human and basic labor factors (Minghai, 2016). Under these conditions, the government should take industrial policy, regional development strategies and stimulus policies (Fang, 2015).

#### (b) Strategic Zone Development

Zone development is done to see the transition of economic growth from the focus of the self-sufficiency to the focus of the region within a zone. This self-contained area is the center of development (Ming et al., 2012). It is expected to produce a comparative advantage (Ouyang, 2016).

#### (c) Endogenous Economic Growth

Endogenous economic growth models should collaborate with spatial factors to produce new economic growth models (Fischer and Nijkamp, 2014). For Indonesia the policy of development triggers disparity (Didit et al., 2015). Government intervention should be considered and not required in times of depression (Jovan et al., 2016). Nevertheless the existence of government here remains necessary as institutional monitoring (Marinescu, 2014)

#### (d) Geographical Economic Growth

Some countries begin development from rural areas to reduce inequality (Satya et al., 2012). Furthermore Jamal (2014) states that the economic geographical concentration is not a significant factor affecting the disparity or minimize the growth disparity between regions in Aceh Province. Government regulation does not affect economic growth (Zhaohui et al., 2016).

#### (e) New Regional Economic Growth

Economic growth is due to economic development and population pressure (Liang and Lijun, 2014). Dobrescu and Dobre (2013) state there is no growth in the integration economy. Meanwhile Bram (2011) added that most importantly there is a regional center for zone development.

## 2.1. Previous research

Analysis of strategic zone development in other countries has been studied by Anam, et. al. (2015), Zeren and Savrul (2013), Seliverstov and Melnikova (2013). The PDRB per capita study which has been investigated by Ershad and Mahfuzul (2016), Derek and Wayne (2000). The study of endogenous economic growth in the analysis of strategic zone development was studied by Alcouffe and Kuhn (2004), Prettnner and Prskawetz (2010). The study of geographical economic growth in the analysis of strategic zone development has been studied by Liu W (2016). Electric energy research that influences economic growth related to strategic zone development analysis has been studied by Aktaz and Yilmaz (2008). The research of information technology has been studied by Heg in Yülek (2015), Türen, et. al. (2016), Armah (2009), Mefteh (2016), Huan et. al. (2013), Maryam et. al. (2012).

## 2.2. Hypothesis

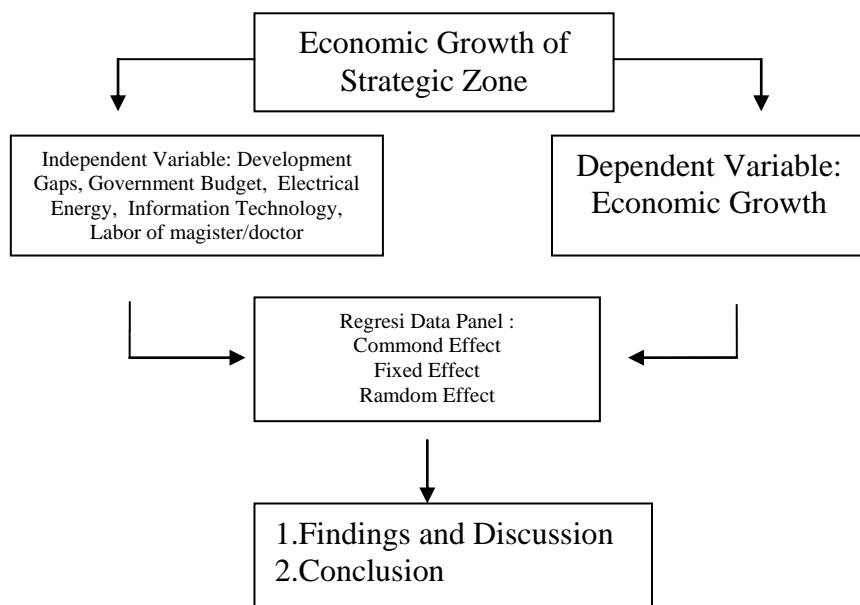
Hypothesis in this research can be formulated as follows:

Development gaps, government budget, electrical energy, information technology and labor from magister/doctor affect economic growth of strategic zone in Aceh Province.

## 2.3. Conceptual Framework

The frame work of analysis, as shown on figure 2, as below :

Fig. 2 The Frame Work of Analysis



## 3. Methods And Data

### (a) Scope of Research

This study examines economic growth along with factors affecting the development of strategic zones in Aceh Province, Indonesia. The strategic zone in Aceh Province of Indonesia is divided into 6 zones covering the central, northern, eastern, southeastern, western, and southern zones.

### (b) Source and Data Types

Data are sourced from the BPS (Badan Pusat Statistik) of each districts / municipalities in Aceh Province and processed according to the needs of the analysis. The type of data used is secondary data from 2010 to 2016. Data are economic growth, development gap, govermental budget, electrical energy, information technology, labor from magister/doctor.

The formula for economic growth is as follows:

$$Y = f (X_1, X_2, X_3, X_4, X_5, \dots u_t ) \dots\dots\dots(1)$$

Where:

- Y = Economic growth
- X1 = Development gaps
- X2 = Government budget
- X3 = Electrical energy
- X4 = Information technology
- X5 = Labor of magister/doctor
- ut = error term

The function of the above equation can be solved by using data panel method with statistical technique as follows:

$$Y_{it} = \beta_0(i) + \sum_{j=1}^K \beta_j X_{j(it)} + \varepsilon_{it}, \quad i = 1, 2, \dots, N, \quad t = 1, 2, \dots, T, \dots\dots\dots(2)$$

Where:

- Y = economic growth in zone i with period t,
- $\beta_0(i)$  = zone constant i,
- $\beta_j$  = parameter to j being searched,
- $X_j$  = independent variable to j.
- $\varepsilon_{it}$  = residual

Pasha et al. (2007) stated that data panel modeling is being used increasingly as a versatile tool for studying various economic relationships. Here are presented three models of panels are:

1. Common Effect Model

$$Y_{it} = \beta_0 + \sum_{j=1}^K \beta_j X_{j(it)} + \varepsilon_{it}, \quad i = 1, 2, \dots, N, \quad t = 1, 2, \dots, T, \dots\dots\dots(3)$$

2. Fixed Effects Model

$$Y_{it} = \alpha_1 + \sum_{d=2}^N \alpha_d D_d + \sum_{j=1}^K \beta_j X_{j(it)} + \varepsilon_{it}, \quad i = 1, 2, \dots, N, \quad t = 1, 2, \dots, T, \dots\dots\dots(4)$$

3. Random Effects Model

$$Y_{it} = \mu + \sum_{j=1}^K \beta_j X_{j(it)} + v_i + \varepsilon_{it}, \quad t = 1, 2, \dots, T, \quad i = 1, 2, \dots, N, \dots\dots\dots(5)$$

Nicoleta (2014) states that economic modeling is a managerial instrument of resource optimization (material, human, financial) in making the best decisions, without changing the reality. Model testing follows the following steps:

**(a) Chow Test.**

This test is used in the selection of suitable models between Pooled and Fixed Effects. If the number indicated by the probability is greater than 0.05, then the Pooled Effect model is considered to be better in explaining the regression result and the test is considered to end only up to this test. Instead it is considered the best Fixed model in explaining the regression results.

**(b) Hausman Test**

This test is used in the selection of suitable models between Fixed and Random Effects. If the number indicated by probability is greater than 0.05, then the Random Effect model is better to explain the regression result. Instead it is considered the best Fixed model in explaining the regression results.

## 4.Result and Discussion

### 4.1.Result

The results of the regression are presented in Table 2 below:

Table 2 Result Regression of common Model, Fixed and Random

Variable	Common Model	Fixed Model	Random Model
Constanta of Strategic Zone	-	1859.074 (94.46648)***	1816.369 (118.9249)***
Constanta of Central Zone	-	-1.178726	0.000000
Constanta of North Zone	-	-0.621320	0.000000
Constanta of East Zone	-	-1.135668	0.000000
Constanta of Southeastern Zone	-	1.211595	0.000000
Constanta of South Zone	-	0.913640	0.000000
Constanta of West Zone	-	0.632959	0.000000
Ln Development gaps	9.017586 (3.198321)***	-0.052131 (-0.256668)	0.399970 (2.539982)***
Ln Government budget	-2.988890 (-0.927126)	-0.718376 (-0.355868)	-0.876558 (-5.449877)***
Ln Electrical energy	41.22788 (5.422579)***	4.383388 (6.952660)***	6.686493 (14.04991)***
Ln Information technology	208.7061 (4.564898)***	7.264005 (2.125347)***	3.806045 (1.336643)
Ln Labor from magister/doctor	-32.82378 (-7.971600)***	0.621565 (0.893099)	-1.602100 (-4.817157)***

Source : Research Data (2017)

Note:

\* Significant degree of confidence 90%

\*\* significant at 95% confidence degree

\*\*\* significant at degree of confidence 99%

Table 2 contains the variables for the Common, Fixed and Random models. In the variable section there are area and zone constants. The regional constant indicates global conditions. Kostanta zone indicates the conditions within each zone. The variables used in the regression consist of independent and dependent variables. The dependent variable is economic growth. The independent variables are development gaps, government budget, electrical energy, information technology, labor from magister/doctor.

### Testing Model of Economic Growth Factors

#### (a) Chow Test of the Economic Growth Factor

Chow test results on the panel data regression model can be seen in Table 3 below:

Table 3 Chow Test Results for Model Common and Fixed Effect

Effects Test	Statistic	d.f	Prob.
Cross-section F	18.129428	(5,29)	0.0000
Cross-section Chi-square	56.690043	5	0.0000

Source : Research Data (2017)

Table 3 shows that the probability value of Chi Square test result is 0.0000. This indicates that the value is less than 0.05. Thus this test states reject the existence of the common model and instead accept the existence of the Fixed Effect model.

**(b) Hausman Test Model of Economic Growth Factor**

Table 4 Result Hausman Test for Random and Fixed Effect Model

Test Summary	Chi-Sq Statistic	Chi-Sq. d.f	Prob.
Cross-section F	90.647140	5	0.0000

Source : Research Data (2017)

Table 4 above shows that the probability value of Chi Square test result is 0.0000. This indicates that the value is less than 0.05. Thus this test states reject the existence of the Random Effect model and instead accept the existence of the Fixed Effect model.

Finally, the right model to explain the economic growth equation is Fixed Effect. The mathematical equation is as follows:

$$\text{Economic Growth} = 1859.074 - 0.718376 \text{ Development gaps} - 0.718376 \text{ Government budget} + 4.383388 \text{ Electrical energy} + 7.264005 \text{ Information technology} + 0.621565 \text{ Labor from magister/doctor} \dots\dots\dots (6)$$

Equation 6 can be interpreted that any additional 1 percent increase in electrical energy, will increase economic growth by 4.38 percent. Each 1 percent increase in the number of information technology, will increase the economic growth rate of 7.26 percent.

**4.2. Discussion**

Fixed Effect model shows that economic growth is influenced by electrical energy in a positive level of 99 percent confidence, information technology positive level 99 percent confidence. For more details, the factors affecting economic growth are described below.

**(a) Electrical Energy**

Electrical energy is positive. This shows that economic growth can increase with the existence of electrical energy. Aktas and Yilmaz (2008) state a two-way relationship between electricity consumption and economic growth in the short term.

**(b) Information Technology**

Information technology is positive. This shows that information technology has an impact on increasing economic growth. Nasir (2009) stated that technological change has a positive role to Indonesia's economic growth. Mowafy and Alaela (2016) state that the Fixed Effect model is the best model and has the highest explanatory and predictive capabilities, and is found through significant variable appreciation that includes the number of fixed and mobile phone subscribers.

**4.3. Summary of Key Findings**

Strategic zone economic growth is significantly affected by electrical energy positively on 99 percent confidence degree and information technology positively on 99 percent confidence degree. This means that electrical energy and information technology can be increasing the economic growth in the development of strategic zona in Aceh Province.

**5. Conclusion**

- The local government together with the state electricity company should plan the construction of the power plant of each zone in Aceh Province. It requires the role of stakeholders in meeting the needs of electrical energy for Aceh Province. The role of stakeholders in meeting the needs of electrical energy can look for another alternative that is creating other sources of electrical energy such as coal power plants, solar energy, micro hydro and others.
- Local governments should encourage the development of telecommunications and informatics infrastructure in in isolated areas by inviting stakeholders and providing all the ease of licensing.

Stakeholders should launch a program that could help people get a network for affordable internet costs and space

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