Effect of Capital Expenditure, Investments and Human Development Index to Gross Regional Domestic Product Provinces in Sumatera-Indonesia

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Abstract: The purpose of this study is to analyze the effect of capital expenditure, investment (domestic and foreign) and the human development index to GDP provinces in Sumatra Island. This study uses data 2007-2016 period were sourced from the official website of each relevant institutions namely the Directorate General of Fiscal Balance, the Central Bureau of Statistics and the Investment Coordinating Board. The analytical method used is the panel data regression and statistical tests. Based on panel data regression test results, it is known that the effect of capital spending, investment, and human development index to GDP province is simultaneous positive and significant effect. While the individual test result showed that capital spending is positive but not significant effect; the Investment is significant and positive effect; and the human development index is positive and significant impact.

1 INTRODUCTION

1.1 Background

Among the five biggest islands in Indonesia, one of which is the island of Sumatra. Through policies and programs of the government, every province in Sumatra Island continue development ranging from repair of roads, construction of bridges, construction of school buildings and other public facilities. Construction of this growing encouraging increased government spending while also attracting investors to make investment. If the construction is already well underway, the human development index numbers will also increase along with the welfare of society has also increased so that it will encourage economic growth.

Economic growth is defined as a long-term increase in the ability of a country to provide more and more kinds of economic goods to its citizens, this ability to grow in accordance with the advancement of technology, institutional and ideological adjustments are needed (Jhingan, 2007: 57).

The relationship between economic growth and government spending, or more generally the size of the public sector, is government spending can boost economic growth in the long term (Sodik, 2007: 27).

Budget areas listed in the Regional Budget (APBD) portrait reflect local governments to determine priorities related to programs and activities that will be implemented in a budget year (DJPK, 2015).
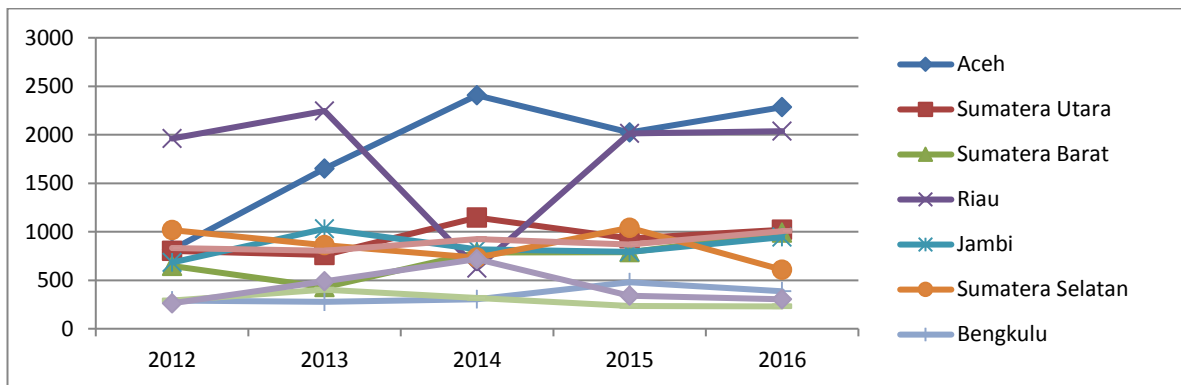
Source: Directorate General of Taxation and Finance, 2017

Figure 1: Actual Capital Expenditures by Province in Sumatra (billion rupiah) Year 2012-2016
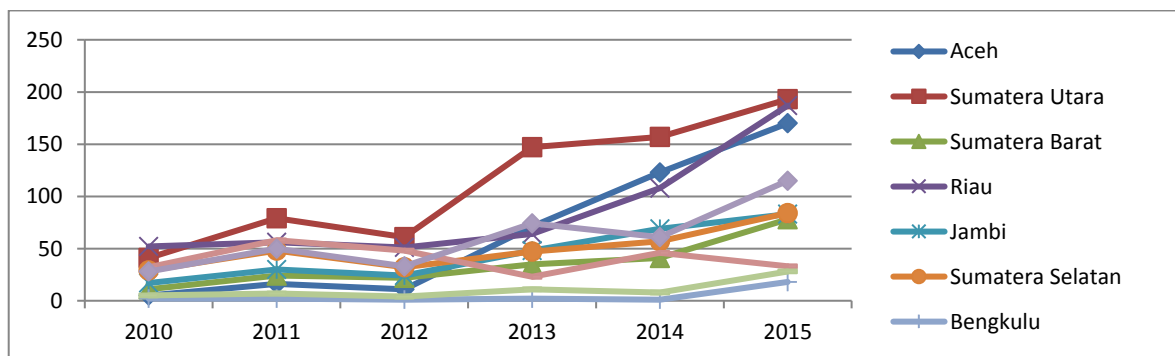
Figure 1 illustrates the realization of capital spending by province in Sumatra Island. The highest capital expenditures made by Riau Province in 2012 amounted to 1961.67 billion rupiah and the lowest capital expenditure undertaken by the Riau Islands province of 262.34 billion rupiah. From the picture above we can see that capital expenditures fluctuates.

These data relevant to result study of local government district-city in Sumatra of (Susetyo et al., 2017) that the influence of regional spending to gross regional domestic product districts-cities is positive and significant. The bigger local spending will increase the gross regional domestic product regencies-cities. Local spending is one form of government investment to stimulate the local economic growth.

According Sodik (2007: 8) the portion of capital expenditures in the budget is a very important component of expenditures for capital expenditures will have a *multiplier effect* in moving the economy

of the area. Therefore, the higher the number the better the ratio is expected to impact on economic growth. Conversely, the lower the number, the less the impact on economic growth.

In macroeconomic theory, in terms of expenditure, gross regional income is the sum of many variables including the investment. There are some things that actually affect in terms of this investment. Investment itself affected by foreign and domestic investment. Investments are happening in the area consists of public investment and private investment. Investment from the private sector can come from domestic and overseas (foreign). The government investment is done in order to provide public goods. The amount of government investment can be calculated from the difference between total government budget by shopping routine. While private investment consists of the Domestic Investment (DCI) and Foreign Direct Investment (FDI), which helps speed development.
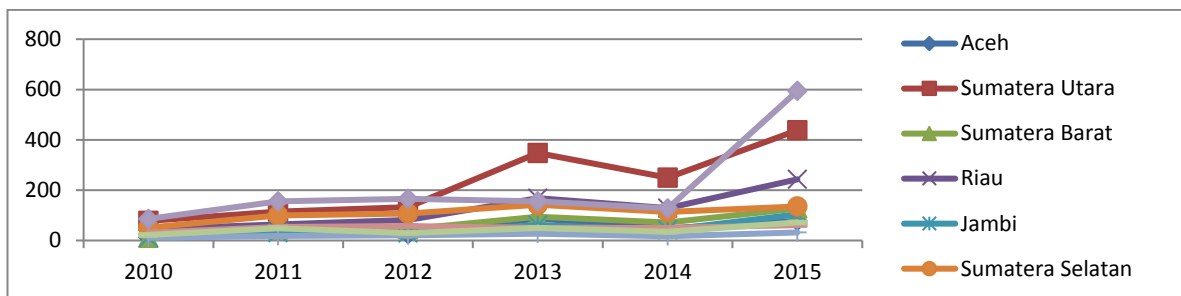

Source: Central Institution of Statistics, 2017.

Figure 2: Realization of Private Domestic Investment Projects by Province in Sumatra (units) Year 2010-2015

Figure 2 illustrates the condition of private investment by the Province in Sumatra fluctuation. The realization of domestic investment projects (Domestic Investment) were highest in 2015 owned by the Province of North Sumatra with a total project cost of 193 units valued at 4.28 trillion rupiah and the second largest is owned by Riau Province for 187 projects worth 9.94 trillion rupiah.

Source: Central Institution of Statistics, BPS, 2017

Figure 3: Realization of Private Investment Project PMA by Province in Sumatra(units) Year 2010-2015

Projectrealizationforeigninvestment (PMA) were highest in 2015, isownedbythe Riau Islandsprovinceunits as many as 594 projectsworth 640 million US thedollarlater in thesecondpositionheldbyNorth Sumatra provinceunits as many as 438 projectsworth 124.6 million US dollars.

Development is one way to improve the quality of life for the creation of prosperous societies. The government continues to development in all aspects, aspects of education, health and a decent life. To measure the success of the development, one of the indicators that can be used is the Human Development Index (Melliana and Zain, 2013: 23).

Table 1: Human Development Index by Province in Sumatra 2011-2015 Year

Provinsi	Tahun				
	2011	2012	2013	2014	2015
Aceh	72.16	72.51	73.05	73.16	74.28
Sumatera Utara	74.65	75.13	75.55	76.28	76.75
Sumatera Barat	74.28	74.70	75.01	75.25	76.15
Riau	76.53	76.90	77.25	77.56	78.65
Jambi	73.30	73.78	74.35	74.75	75.13
Sumatera Selatan	73.42	73.99	74.36	74.56	75.25
Bengkulu	73.40	73.93	74.41	74.25	75.16
Lampung	71.94	72.45	72.87	73.35	73.13
Kep. Bangka Belitung	73.37	73.78	74.29	74.85	75.35
Kep. Riau	75.78	76.20	76.56	77.24	77.65

Source: *CentralInstitution of Statistics (BPS), 2017.*

Human Development Index is one measure that can be used to assess the quality of human development, both in terms of its impact on the physical condition of the human being (health and welfare) as well as non-physical (education) , Because in the calculation of life expectancy index, education index, and the index of decent living standards involving components of economic and non-economic quality of education, health and population, the HDI deemed relevant to be the benchmark in determining the success of development (Melliana and Zain, 2013: 237).

1.2 Research Problem

Based on the background description can be formulated research problem as the following issues:How does the effect of capital expenditure, investment (domestic and foreign), and the human development index to GDP provinces in Sumatra Island?

The purpose of this study is to analyze the effect of capital expenditures, investment (domestic and foreign) and the human development index to GDP provinces in Sumatra Island.

1.3 Benefits Research

This study is expected to provide of theoretical and practical benefits as follows:

a. Theoretical Benefits: These results are expected to enrich the research and can be used as a benchmark for future studies both in the way of analysis and the results of its analysis. As well as for other students who may be learning and assessment process by using disciplines have been studied which can be used as a source of data, information, as well as writing and literature for further research activities.

b. Practical benefits of this research to provide feedback or information materials for relevant agencies for consideration or to contribute to studies related to the effect of capital expenditure, investment and human development index on economic growth.

1.4 Theoretical Framework

Economic growth explain or measure the achievement of economic development of something. In economic activities, in fact, economic growth means development of the physical production of goods and services existing in the country, such as increasing and the amount of production of industrial goods, development of infrastructure, increase the number of schools, the increase of the production of the service sector and an increase of the production of capital goods (Sukirno, 2010: 423).

To explain the requirements that must be met for a perokonomian can achieve steadfast growth or *steady growth* in the long term, the analysis of the Harrod-Domar use the analogy-analogy follows: (i) capital goods has reached full capacity, (ii) savings is proportional to the national income, (iii) capital-output ratio*(capital-outputratio)*value, and (iv) the economy consists of two sectors.

Harrod-Domar theory did not notice requirements to reach full capacity when the economy consists of three sectors or four sectors. However it is based on the theory above can easily be concluded things that need to apply if the aggregate expenditure includes more components, which include government spending and exports. In such circumstances, capital goods that increase can

be fully used if the $AE_1 = C + I_1 + G_1 + (XM)_1$ where $I_1 + G_1 + (XM)_1$ isequal to $(I + \Delta I)$. Through analysis of the Harrod-Domar can be seen that (i) the long-term growth of aggregate expenditure prolonged need to be accomplished to achieve economic growth, and (ii) economic growth firm would only be possible if $I + G + (XM)$ continuously increases with the level of encouraging (Sukirno, 2010: 435).

Wagner put forward a theory about the development of greater government spending in the percentage of the GNP which is also based on the observation well in European countries, the USA and Japan in the 19th century. Where is Wagner is the development of government spending in relative terms, the law of Wagner is in an economy, when per capita income increases, in relative terms in government spending will increase (Mangkoesoebroto, 2001: 171).

Another thing with the theory of Peacock and Wiseman, the theory is based on an analysis of government expenditure reception. The government always tries to enlarge its expenditure by relying increase tax revenue, but people do not like paying taxes to finance government expenditures are growing. Increased tax revenues caused government spending also increased. Under normal circumstances the increase in GNP led to greater government revenues, as well as government spending becomes larger (Mangkoesoebroto, 2001: 173).

Government spending is one component of expenditure, then the higher government spending will result in planned expenditures were higher for all income levels. If the government spending rises, the planned expenditure curve shifts upward. The increase in government spending to encourage the increase in revenue is greater. Fiscal policy has a multiplier effectagainst earnings due according to the consumption function $C = C (Y - T)$, the higher incomes lead to higher consumption. When the increase in public spending increase revenues, it also increases consumption, which in turn increases income, and increase consumption, and so on. Therefore, the increase in government spending lead to a larger income (Mankiw, 2006: 277).

Empirical study has been done of capital expenditure district-city in Sumatra by Susetyo*et al*., (2018) that the influence of local public utility of capital expenditures toward GRDP districts-cities is positive and significant. The greater the capital expenditures for local public utilities will increase the GRDP districts-cities in Sumatra. Capital expenditure for public utility districts and cities into

one form of government investment can stimulate local economic growth.

Human Development Index (HDI) is a measure for the impact of development performance area that has a very large dimensions, because it shows the quality of the population of a region in terms of life expectancy, education and decent living standards. HDI is a composite index calculated as the average of the three indices that describe the basic human capacity to expand the choices, the life expectancy index, education index, and a decent standard of living index (CBS, 2008).

Education and health are fundamental development objectives; health education and each also has an important meaning. Health is very important for well-being, and education are essential for a satisfying and rewarding life; both are fundamental in relation to the broader notion of the improvement of human capability as the core meaning of the actual construction. At the same time, education plays an important role to improve the ability of developing countries to absorb modern technology and develop the capacity for the realization of sustainable growth and development. Moreover, health is a prerequisite for increasing productivity, and educational success is also dependent on adequate health. Thus, health and education can also be seen as a component of a vital growth and developmentas an input for the aggregate production function. Their dual role as input and output at the same time make the health and education is very important in economic development (Todaro, 2009: 445).

2 RESEARCH METHODS

The scope of this study to discuss the effect of capital expenditure, investment (*domestic and foreign*) and the human development index to GDP provinces in Sumatra Island. The study covers ten provinces, such asNangroAceh Darussalam, North Sumatra, West Sumatra, Riau, Kepulauan Riau, Jambi, Bengkulu, South Sumatra, Bangka Belitung, and Lampung. The data used in this research is panel data which is*time series* and a *cross-section* 2007 to 2016 period.

2.1 Types and Sources of Data

The data used in this research is quantitative data by category of secondary data.The panel data are combined between *time series* and *cross- section data*of the years 2007-2016. The sources of

secondary data were obtained from*website of* the officialthe Statistic Central Institution, the Directorate General of Taxation and Finance, and Investment Coordinating Board of Indonesia.

2.2 Method of Analysis

Regression analysis with panel data can be done in several steps (Yamin, *et.al,*2011: 200): (a) Pooled Least Squares Models; (b) Fixed Effects Model (Least Squares Dummy Variables);)c) Random Effects Model (REM).

Selection of modelestimationapproaches use the data panel is determined by using two ways: (1) Chow test, can be used to decide to use Pooled OLS Model or Fixed Effects Model (FEM).If the *p-value cross section F* <0.05, H_0 isrejected. (2) Hausman test, can be used to decide using the Fixed Effects Model (FEM) or Random Effects Model (REM).If the *p-value Chi-square cross section* <0.05, H_0 isrejected.

Hypothesis testing is done to see the significance of parameters by using: (1) F-test or simultaneously test used to prove the hypothesis that the overall coefficient simultaneously regression significant influence in determining the value of the dependent variable. If the entire value of the regression parameter is equal to zero, it can be said that there is no linear relationship between the dependent variable and independent variables. (2) t-test or test each partial variable. Testing using t-test aims to see the level of significance of the effect of each independent variable assuming the other independent variables held constant. If the value of the t statistic <t table, then the zero hipotetsis accepted. This means between independent and dependent variables did not affect significantly. Conversely, if the value of the t statistic> t table, then hipotetsis zero is rejected, in other words, the alternative hypothesis is accepted, which means significant independent variable on the dependent variable.

3 RESULT AND DISCUSSION

There are three techniques fundamental approach used in estimating the regression model with panel data, namely: (a) Model Pooled Least Square;(b) Fixed Effect Approach Model and (c) Random Effect Approach Model.

Estimation Results Regression with Method *Pooled Least Square*

The calculation results using a panel data regression modeling techniques *Pooled Least Square* asthe following.

Table 2: Estimation Results Regression with Method *Pooled Least Square*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1546084.	354489.5	-4.361439	0.0000
BM	39.37229	12.05299	3.266600	0.0015
I	8.755284	1.308530	6.690932	0.0000
IPM	21655.37	4828.812	4.484617	0.0000
R-squared	0.651486	Mean dependent var		138859.9
Prob(F-statistic)	0.000000			

Based on estimates presented in Table 2 can be seen that the Capital Expenditure (BM) has a coefficient value of 39.37229 and the probability of 0.0015.It is claimed that there is positive and significant, while Investment (I) have a coefficient of 8.755284, which means positive and significant impact with the probability 0.0000. From the estimation can also be seen that the Human Development Index (IPM) has a coefficient value of 21655.37 and probability of 0.0000, which means positive and significant impact. With a coefficient value of -1546084 which assumes that the value of the intercept between individuals are considered equal where this is the assumption that severely limit, so themethods *Pooled Regression* can not catch the real picture on the relationship between the dependent variable with independent and too simple to describe the phenomenon which exists. Therefore thing to do is to process the data using *Fixed Effect.*

Estimation Results Regression with Method *Fixed Effect*

Panel regression output results with *Fixed Effect* methods can be seen in the Table.

Table 3: Estimation Results Regression with Method *Fixed Effect*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2332434.	374835.0	-6.222562	0.0000
BM	19.28110	15.66544	1.230805	0.2217
I	3.773998	1.265323	2.982636	0.0037
IPM	32858.29	5157.132	6.371426	0.0000
Effects Specification				

Cross-section fixed (dummy variables)

R-squared	0.837207	Mean dependent var	138859.9
Adjusted R-squared	0.814753	S.D. dependent var	128240.9
S.E. of regression	55195.33	Akaike info criterion	24.79588
Sum squared resid	2.65E+11	Schwarz criterion	25.13455
Log likelihood	-1226.794	Hannan-Quinn criter.	24.93295
F-statistic	37.28511	Durbin-Watson stat	1.000954
Prob(F-statistic)	0.000000		

Coefficient Capital Expenditure (BM) of 19.28110 showsthatthereis a positivecorrelationtothe GDP with a probabilityvalueCapital expenditureamountedto 0.2217 where 0.2217 isgreaterthanalpha 5 percentsothattheindependentvariableis not significanttothe GDP. Investment (I) is also a positive influence on the GDP with acoefficient of 3.773998 and probability of 0.0037, which means investing significantly affect the GDP due to the probability value is greater than alpha 5 percent. Similarly, the HDI has a coefficient of 32858.29, meaning IPM positive effect on the GDP. HDI has a probability of 0.0000. This indicates that the HDI significantly affect the GDP.

R-squared value of 0.837207 indicates thatthevariable Capitalexpenditure (BM), investment (I) and HDI are abletoinfluencethe GDP amountedto 83.72 percentandtheremaining 16.28 percentisexplainedbyothervariables.

Results Regression Estimation Method with *Random Effect*

Table 4: Estimation Results Regression with Method *Random Effect*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2154363.	352822.1	-6.106089	0.0000
BM	27.53116	14.05931	1.958215	0.0531
I	4.691863	1.209599	3.878858	0.0002
IPM	30295.58	4835.968	6.264636	0.0000

Effects Specification

	S.D.	Rho

Cross-section random	54301.61	0.4918
Idiosyncratic random	55195.33	0.5082

Weighted Statistics

R-squared	0.583770	Mean dependent var	42492.87
Adjusted R-squared	0.570763	S.D. dependent var	85657.94
S.E. of regression	56119.82	Sum squared resid	3.02E+11
F-statistic	44.88059	Durbin-Watson stat	0.932240
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.605792	Mean dependent var	138859.9
Sum squared resid	6.42E+11	Durbin-Watson stat	0.523153

Based on estimates using *Random Effect* method it is known that the R-squared value of 0.583770, meaning that 58.37 percent of the GDP variable is affected by the variable Capital expenditure (BM), investment (I) and IPM and the remaining 41.63 percent is influenced by other variables.

In the method of *Random Effect,* Capital Expenditure (BM) has a coefficient of 27.53116, means capital expenditure to GDP has a positive relationship with probability equal to 0.0531. The probability that results from method *Random Effect* showed that the relationship between capital expenditure in the GDP is not significant.

In contrast to the Investment (I) which has a coefficient of 4.691863 and probability of 0.0002, meaning that the investment has a positive and significant relationship to GDP. Likewise with HDI, the results of estimation using method, *Random Effect* resulting HDI coefficient of 30295.58, meaning that there is a positive correlation to GDP with a probability of 0.0000 which indicates that the relationship is significant.

Chow Test *(Common Effect vs. Fixed* Effect)

Model selection with *Common Effect* or *Fixed Effect* can be done by testing *Likelihood Ratio Test* provided that if a significant probability value generated by the α (alpha) then the decision could be made by using a model *Fixed* Effect. Selection of panel data model using the Chow test, by comparing the *p-value Chi-square cross section* of the significance level of 0.05. Chow test in this study carried out by means test *Likelihood* available on the program

Table 5: Regression Results with Chow Test

Redundant Fixed Effects Tests

Equation: ESTIMASI

Test cross-section Fixed Effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	11.028131	(9,87)	0.0000
Cross-section Chi-square	76.119880	9	0.0000

Based on test results known that the probability of *a Chi-square cross section* of 0.0000 while significant value α is 5 percent so that H_0 rejected and H_1 *accepted.*

Hausman Test *(Fixed Effects vs Random Effect)*

This test aims to compare methods *Fixed Effect* and methods *Random* Effect. Hausman test is done by comparing the *p-value random cross section* of the significance level of 0.05. Hausman test on the research carried out by means Hausman test available. The test results can be seen in the following table:

Table 6: Results of the Hausman TestRegression with

Correlated Random Effects - Hausman Test

Equation: ESTIMASI

Test cross-section Random Effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.242794	3	0.0104

From Hausman test known that probability *radom cross section* of 0.0104 and less than the significance level α which is 5 percent, so that the decisions taken at this Hausman test is H_0 rejected and H_1 accepted. Thus the election decision making model estimation method used is the method *Fixed Effect.*

The estimation result of the fixed effect model as follow:

$$GDP = -2332434 + 19.28110 \ BM + 3.773998 \ I + 32858.29 \ IPM + e$$

$$(-6.222562) \quad (1.230805) \quad (2.982636)$$
$$(6.371426)$$

R-squared	0.837207	Mean dependent var	138859.9
Adjusted R-squared	0.814753	S.D. dependent var	128240.9
S.E. of regression	55195.33	Akaike info criterion	24.79588
F-statistic	37.28511	Durbin-Watson stat	1.000954
Prob(F-statistic)	0.000000		

Hypothesis Test

The F-test is a hypothesis test equipment to see if together (simultaneously) the regression coefficient of the independent variables affect the dependent variable. F test can be seen by comparing the value

of the F-statistic with the F-table or by comparing the F-statistic probability with a significance level (α = 5%).

By the estimation results indicate that the probability of an F-statistic showed a value of 0.000000, this means that the probability F-statistic is less than 0.05 then H_0 is rejected. That is, it can be concluded that the variable capital expenditure, investment and human development index significantly affect the GDP provinces in Sumatra Island.

The student t-test a hypothesis test to see whether partial regression coefficients of independent variables affect the dependent variable. The t-test can be seen by comparing the value of t-statistic with t-table, or comparing the t-statistic probability with a significance level (α = 5%).

By the estimation results indicate that the t-statistic variable capital expenditure amounted to 1.230805, where the value of t-statistic is smaller than t-table(1,230 805 <2.353), then H_0 is received, which means that the variable capital expenditure does not significantly influence the GDP provinces in Sumatra Island. In addition, the probability of a t-statistic on the t-test is at 0.2217, where the value is greater than 0.05 (t-statistic 0.2217>0.05).

Investment variable has a value of t-statistic of 2.982636, where the value of t-statistic greater than t-table (2.697663> 2.353), then H_0 is rejected, which means that the investment variables significantly influence the GDP provinces in Sumatra Island. In addition, the probability of a t-statistic on the t-test is at 0.0037, where the value is less than 0.05 (t-statistic 0.0037 <0.05).

From the estimation, it is known that the human development index variable has a value of t-statistic of 6.371426, where the value of t-statistic greater than t-table (6.371426>2.353) then H_0 is rejected, it means a significant effect on the human development index to provinces in Sumatra Island. It can also be seen from the t-statistic probability of 0.0000 which is smaller than the significance level of 0.05.

The result of the study has some implications related to the theory of regional growth. Based on the estimated model which the effect of the capital expenditure, investments, and human development index has significant to gross domestic product province in Sumatra. The coefficient determination of fixed effect models about 83.72 percent. It means all variable independent can explain significantly to the dependent variable and the residual explained by others variables about 16.28 percent such as improving public facilities in infrastructure,

education, and health expenditure will improve human quality.

Some of implications on the policy by maintaining the stability of the economy, politics and security in the country, improve the facilities and infrastructure which support the projects, and making simplify the rules in investing program. For the purposes of further research is that the study should be extended by using proxy of variables so that the estimation model can be used to advance the provinces in Sumatra.

4 CONCLUSIONS ANDRECOMMENDATIONS

Based on the analysis and discussion above, it can be taken some conclusions such as:
1. The effect of capital spending, investments, and human development index to GDP province is simultaneously positive and significanteffect.
2. The partial estimation that capital expenditures have a positive relationship to the GDP but partially no effect significantly to GDPprovince.Investment (domestic and foreign) have a positive relationship to the GDP provinces in Sumatra Island. Human development index has a positive relationship to the GDP provinces in Sumatra Island.
3. Coefficient of determination of fixed effect method showed that capital spending, investment, and human development index explained significantly to the GDP province in Sumatra. The residual explained by others variables such as improving public facilities,regionalinvestment climate, education, and health expenditure will improve human quality.

Based on the analysis, discussion, and conclusions that have been presented, the recommendation as follow:
1. The capital expenditure should be allocated appropriately and proportionately to investment projects whose benefits could be felt by the people so that they can provide significant impact on the growth of regional gross domestic product.
2. The local government is expected to increase investment Domestic Investment (DCI) through a policy of maintaining the stability of the economy, politics and security in the country, improve the facilities and

infrastructure which support and simplify the rules in investing so as to increase the GDP provinces in Sumatra Island.

3. The local government is expected to attract foreign investment by creating a climate conducive to investment, simplification of the licensing process, as well as improving the quality of human resources so that the expected value of Foreign Direct Investment (FDI) can be increased and can push the GDP provinces in Sumatra Island.

4. Government policies should be oriented towards social welfare. By improving public facilities in infrastructure, education and health will improve human quality that the human development index numbers will increase which in turn will push the GDP provinces in Sumatra Island.

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