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Expenditure Analysis of Local Government and Regional Economic Development District/City of Ten Province in Sumatra Island Indonesia

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Abstract: The research problem is how to influence the local government spending, the number of local civil servants (PNSD), and the number of regional infrastructure to the local economic development districts/cities in Sumatra island of Indonesia. While the purpose of the study is to estimate the model and analyze the influence of local government spending, the number of the civil servants, and the amount of infrastructure to the local economic development districts/cities in Sumatra island of Indonesia. Regional economic theory used is Keynesian model: $Y = C + I + G + (X - M)$; A concept of Local Government Expenditure (local government spending) according to Wagner's Law, Theory Peacock and Wiseman, Wagner, and Solow. While previous empirical research, among others is: (a) Susetyo (2003) and (b) Yanizar (2012).

Research methods include: (a) the scope of the studies in this research is local government spending, the number of local officials (PNSD), local infrastructure (road length), and the regional gross domestic product (local economic). The location of observation as the unit of analysis is the district/city as much as 155 (comprising 121 districts and 34 cities) on the island of Sumatra, Indonesia; (b) The data type and data source, that the type of data used are secondary data and are equipped with primary data analysis uni; (c) The method of analysis in this research is quantitative descriptive and equipped with qualitative descriptive.

The results of the research will be grouped into two categories: the results of descriptive analysis and quantitative analysis in the form of model parameter estimation data panel. The resulting model can be tested to get a good model, precise and consistent is by Chow and Hausman Test. Theoretically could have that amount of time series data is smaller than the district/city as a cross section preferably using random effect models is: $Y = -2493,4550 + 5,7371X_1 + 1,9784X_2 - 1,2106X_3 + e_1$; where, Y = Gross Regional Domestic Product; X_1 = Regional expenditure (local spending); X_2 = Number of local civil servants; X_3 = Length of road; e_1 = error term.

Simultaneously (F-test) showed that the results obtained are the three variables observed were local spending, the number of civil servants districts/cities, length of roads in the district/city catastrophically affect positively and significantly. This value amounted to 317.2543 F-statistic is greater than F-table so the independent variable positive and significant effect to dependent variable, with the result of random effect model estimation.

Partially (*t*-test), indicating that the effect of local spending to the regional gross domestic product is positive and significant. The value *t*-statistic of the local spending, the number of civil servants, the length of the local road each 17.85835; 12.79292; -2.482922 are greater than *t*-table so that a positive and significant influence. Coefficient of determination (R^2) is 0.506860, or 50.68 percent and Adjusted $R^2 = 50.52$ percent, means that the results can be explain by the model estimates a third variable and significant amounted percent, while the rest, or by 49, 32 percent is explained by factors outside the model. The best model after the Chow and Hausman test as well as the number of time series is less than the number of districts/cities, the best estimation models are models of random effect.

Keywords: local economic development (GRDP), the local spending, the number of local civil servant, long road, district/city.

I. INTRODUCTION

1.1. Background

The phenomenon that emerged on local government spending today in Indonesia still seem not optimal characterized by unfulfilled principles of efficiency, effectiveness, transparency, and accountability in the local fiscal. It seems that the application of the principles of management of local government spending is difficult to categorize good, let alone excellent. It is certainly no processes that lead to optimal management of local spending not yet reached the optimal category in terms of efficiency and effectiveness. “The overlap between levels of local government spending on discretionary possible development planning at local government level is less effective in its implementation” (Ministry of Finance, 2008).

Some aspects were identified affect the optimal management of local spending include the limited capability of the officers (civil servant), committed leadership in managing the local spending, and the condition of local infrastructure is inadequate. Empirical conditions shows that the management of local spending still preferred to drive local economic growth, but still meet the operational needs of the apparatus, especially the new autonomous regions (autonomous regions). One of the principle of the allocation of local spending to encourage economic growth in the region, in addition to increasing employment opportunities and poverty alleviation (Mardiasmo, 2002; Susetyo, 2003).

In connection with the phenomenon that local government spending has not fully improve the regional economic development is the focus of study in this research. On the one hand, there is a causal relationship between the local spending with the regional economic development. Likewise, that the study was expanded to model the effect of local spending, the number and capability of the officers, and the condition of local infrastructure to regional economic development.

1.2. Roadmap Research

Road map the research activities related to the stages University of Sriwijaya research activities, especially supporting aspects related to financing budget management districts/cities more efficient and effective. The focus of this research relates to the formulation of management policies local spending in encouraging

regional economic growth. It means the relevance between university research plan with regional economic development into one of the research studies that have implications for the progress and welfare of the community.

This research activity is a continuation of previous stages of research that focuses on aspects of the revenue and local spending to encourage economic growth in the region. The research to be conducted is to analyze aspects of the local spending, the capabilities and the number of personnel, and the condition of the infrastructure to regional economic progress in an estimation model. This research activity is based on the current actual phenomena that some locals do spending without taking into account the impact of the principles of budget management more efficient and effective.

Related to the above, this research activity has a close connection between the four fundamental aspects of the roadmap of university research (RIP UNSRI, 2012) which markets, products, technology, and research and development (R&D) in this research activity can be showed to the roadmap of research in Table 1.

Table 1
Fiscal Management Research Roadmap Regional and Economic development District/City in Indonesia

<i>Aspect</i>	<i>Year I</i>	<i>Year II</i>	<i>Year III</i>	<i>Year IV</i>
Market	Local government province	Local government island	Local government regional	Local government national
Product	Model and policy	Model, policy, and Publication	Model, policy, and Publication	Model, Publication, and develop engineering
Technologi	Efficiency and	Efficiency and Transparency Effectiveness	Effectiveness and Accountability	Efficient, Effective, Transparent, and Accountable
R&D	Management of local Expenditure	Local Revenue and Expenditure	Focus on apparatus capability	Focus on quality of infrastructure

1.3. Problems and Objectives

The research problem is how does local government spending, the number of local officials (PNSD), and the amount of local infrastructure (road length) to the development of the regional economy (GRDP) districts/cities in Sumatra island of Indonesia. In line with the research problem, the research objective is to analyze the effects of local government spending, the number of local officials (PNSD), and the amount of infrastructure (road length) on the development of the regional economy (GDP) districts/cities ten provinces in Sumatra Island of Indonesia.

1.4. Implementation Results Activity

Application of the results of these activities can be either conceptual references (modeling) and to do community service activities, especially the workshop, FGD, and Training on the importance of managing local government spending is efficient and effective. Means the application of the results of these activities can be performed:

- (a) Academically; the form of the model estimates, publications, seminars, focus group discussions, and workshops on the management of government spending district/city.

- (b) Practically; form of training personnel/local human resource, improving the quality of infrastructure and policies for the management of local government revenue and expenditure in an efficient, effective, transparent, and accountable.

1.5. Outcomes and Contributions

Outcomes and contribute to the development of science and technology of the research activity include:

- (a) Document the results in the form of the model estimates, publications and scientific journals for publication, both journals of international and national journals;
- (b) Document the results of this study can be used as a reference or a reference in the formulation of policies and develop concepts in a model related to the management of local government revenue and expenditure.

II. STUDY REFERENCES

2.1. The Concept of Regional Economic

In macro regional economic activity may be indicated by the behavior of the economy in a market economy, the government, households, and businesses. All three of these principals perform economic activities with the objective of each specific and cumulatively can see their performance. By examining the activity of economic agents in the market can be obtained by several indicators, such as economic growth, inflation, labor market conditions, and the balance of trade in the economy. As such, regional economic activity can be seen from the development of the Gross Regional Domestic Product (GRDP) of each region as a whole.

Macroeconomic policies according to Branson and Litvack (1981) is an instrument that is often used in developing policies that will affect the macro economy can be grouped into three, namely the implementation of fiscal policy by increasing government spending, the implementation of fiscal policy by cutting taxes, and monetary policy by increasing the money supply. Changes in the economy can be approximated by the instrument balance aggregate supply (AS) and aggregate demand, (AD). The instrument can explain the condition of an economy that describes fluctuations in output, the price level, income level, and inflation. Figure 2.1 illustrates the interaction between aggregate demand and aggregate supply in the market (Dornbusch *et. al.*, 2004, and Case and Fair, 1999).

Illustration Figure 2.1 shows that the point E_0 is the point of balance between the level of output and the price level. Shifting one curve for any reason will change the price level and output level. Aggregate demand curve shifts to the right can be caused by two things:

1. an increase in government spending, and
2. a decrease in taxes.

In addition it is also the aggregate demand curve shifts to the right if the money supply increases (Case and Fair, 1999). Both of these causes shifts the aggregate demand curve shifts from AD_1 to be AD_0 .

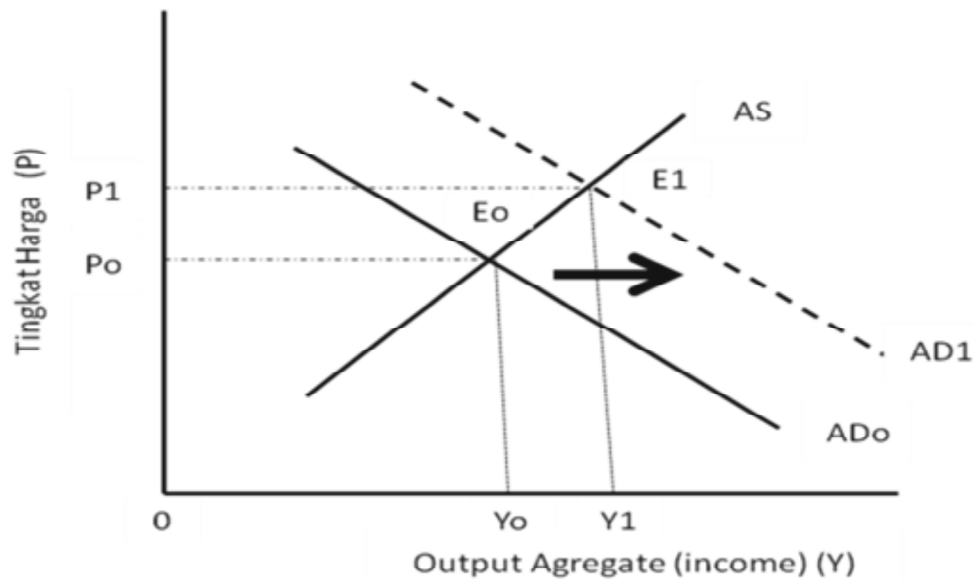


Figure 2.1: Relations Price Level, Output, Aggregate Demand and Aggregate Supply

Source: Case and Fair, 1999

Aggregate Supply curve in concept is the curve that connects between the amount of goods and services offered by the company at a certain price. This curve slope is positive because the company always strives to offer the goods produced at a higher price. While the aggregate demand curve negative slope because higher prices would reduce the value of money supply which in turn will reduce the demand for the output. Aggregate demand curve is a curve that connects a combination of price levels and the level of output at an output markets and money markets simultaneously and the state of the market is in a state of balance (Mankiw, 2003).

In the modern economy, the components of aggregate demand consist of four indicators, namely:

1. household consumption expenditure,
2. the company's investment expenditure,
3. the government spending, and
4. net exports (Krugman and Obstfeld, 2003).

This means that functionally, the government can develop policies that can affect the aggregate demand curve shifts. Components of aggregate demand should be managed optimally for a balance quality market. Thus, the area of macro-economic analysis needs to pay attention to such components. According to Krugman and Obstfeld (2003) that the aggregate demand mathematically formulated as follows.

$$- + + +, - \dots(1)$$

Where,

$C(Y - T)$ = Consumption as a function of disposable income

$I + G$ = Investment and government spending (exogenous)

$CA(EP^*/P, Y - T)$ = Current account that is a function of the real exchange rate and disposable income

The formula means that aggregate demand will be greatly affected by the amount of consumption that is a function of disposable income, tax, investment, government spending, and the exchange rate. Thus, investment and government spending is an exogenous factor that is important in moving the economy.

In the regional economy, a more comprehensive analysis can be done by combining the IS-LM curve analysis with analysis of AD-AS. In the context of increasing investment and government spending analysis tools above can be used. Policy of increasing investment and government spending with the other held constant it will result in market balance shifted. The increase in investment resulted in a change similar to the change in government spending if the assumption is the LM curve remains, and there are no exports and imports in an economy. With the economy only consists of three sectors, namely the government, companies and households, the increase in government spending or increased investment will provide the same changes, namely the movement of IS to the right (Branson and Litvack, 1981).

Illustration in Figure 2.2 that the increase of governments spending shift into g_1 from g_0 . Under these conditions the output at every interest rate becomes higher. On the curve g_1 if the interest rate r_0 , then the output achieved in conditions of balance is Y_1 . So increased government spending affect the IS curve shifts to the right, ie from IS_0 to IS_1 curve. This means that the output becomes greater. Large output level will increase economic activity. Furthermore, these conditions will promote employment, will further reduce unemployment.

The illustration in Figure 2.2 above explains that r is the interest rate, y is the output, s is the savings, t is the tax, i is an investment, and g is government spending. In the same context, if the interest rate is lower than before, the investment will increase. By the same mechanism, the lower interest rates will also

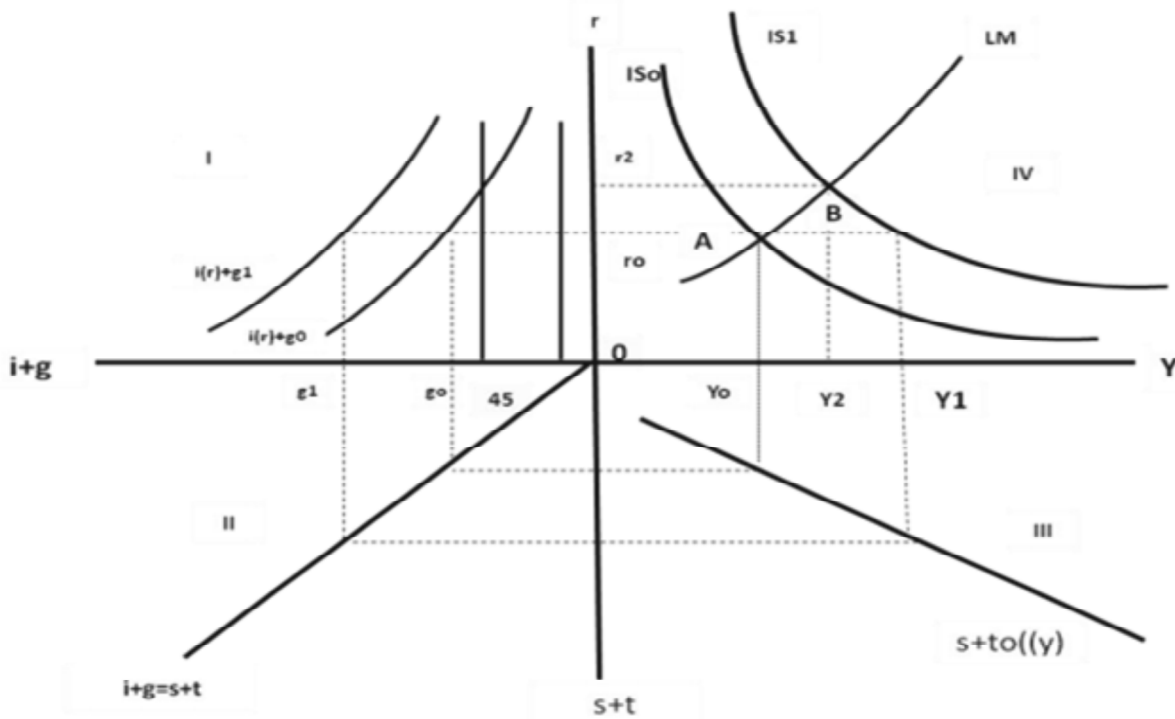


Figure 2.2: Impact of Increased Government Spending or Investment on Output

Source: Branson and Litvack, 1981

increase output. Thus, the amount of investment and government spending has the same effect on the economy, namely the addition of output. This means that investment and government spending becomes strategic to improve the performance of the regional economy.

Economic performance is generally measured an area of economic growth is the increase in the value of goods and services produced by the region in a given time period. Economic growth is usually measured by the change in Gross Regional Domestic Product (GRDP) in percent real. The GDP is usually calculated with three approaches that conception would yield the same value the production approach, expenditure approach, and income approach. Mathematically, where, Y_i is a sector GDP $_i$, in year t as follows:

$$= 1, = 1, 2, 3, \dots \quad \dots(2)$$

Furthermore, to GDP (national) and the GRDP (local) by expenditure are all components of final demand, namely private household consumption and government consumption, investment and net exports, as identity can be seen as follows:

$$Y = C + I + G + (X - M). \quad \dots(3)$$

The above equation shows that the Y is GDP, C is private consumption and private, I was spending private investment, G is government spending and investment, X is exports and M is imports.

For GDP by income is the amount of compensations to production factors which participate in the production process in the form of wages and salaries, rent for land, capital interest, and profit before income tax and other direct taxes. In this definition, GDP includes depreciation and net indirect taxes (indirect taxes less subsidies).

The competent institution calculates the GDP and the GDP is the Central Statistics Board (BPS) on a regular basis every year. GDP data source production comes from departments or agencies that collect data on production, producer prices, the cost to produce, and expenses. In the context of smaller regions, namely provincial and district/city, economic growth is calculated using Gross Regional Domestic Product (GRDP), which reflects the region's ability to manage its resources.

2.2. The concept of Local Government Spending

Local government spending is often called regional spending is a function of the reception area. The more increasing of local government is on revenue, the greater will the level of expenditure. This means that, the greater the revenue or acceptance, then the policy development of regional spending should plan spending appropriately and according to the needs of society in order to benefit from the budget can be more efficient and effective.

In the concept of regional spending is issued and the amount of funds used to finance all regional needs either requirement included in direct expenditure and included in indirect expenditures. Government spending (government expenditure) in practice is all purchases of goods and services performed by central and local governments. Government spending variables included in the group in which the magnitude of change exogenous value depends on the strategy adopted by local governments in implementing fiscal policy.

According to Mangkoesubroto (2013), the theory of expenditure can be classified into two parts, namely the theory of macroeconomics and microeconomics. Furthermore, several macro economic theories, among others:

1. The development model of the development of government spending;
2. The Wagner Law concerning the development of the government's activities;
3. Theory of Peacock and Wiseman. Explanation of the theory can be described as follows:

(a) Model of Government Spending

The development model of government spending is developed by Rostow and Musgrave. This model connects the development of government spending with economic development stages, ie the initial stage, intermediate stage and advanced stage. Stage in regional development is closely connected with the stage of economic development. Each stages of economic development has different focus of government spending but still have to pay attention to sustainability.

This is in line with the views expressed by Rostow and Musgrave in Mangkoesoebroto (2001) stated that in the early stages of economic development in government spending should provide infrastructure, such as education, health, infrastructure of transportation, and so forth. Therefore, in this stage the percentage of government investments made very large. At the intermediate stage of economic development is characterized by government spending focused on increasing economic growth in order to take off. Thus the government investment is still required in order to support in order to increase economic growth. At this stage is already greater private investment so that the role and contribution of the private sector in development is relatively larger than the first phase.

At the next level of government activity switch from the provision of infrastructure to expenditures for social activities such as programs for the elderly, programs for health services. This opinion gives an understanding that construction spending should be a concern primarily by the government itself in order allocated budget could be targeted in accordance with the plan that has been set so that the target can be realized. In the end the people's welfare can be achieved as expected. However, based on research results Ramsey (2011) there was no government spending has a multiplier effect that follows a direct effect itself.

(b) Wagner law

Wagner's Law is a law linking government spending to gross domestic product growth. Wagner law formulated government activity in development (Peters, 2012). Then, Atkinson and Stiglitz (1980) in Henrekson (1993) says that Wagner's Law, known as "The Law of Expanding State Expenditure" in principle says that in the long term there is a tendency of the public sector will grow relative to national income. In other words, the development of greater government spending is as a percentage of Gross National Product (GNP).

In this case Mangkoesoebroto (2001) says that in an economy where per capita income increased in relative terms, the government spending will also increase. Wagner's Law is formulated as follows:

$$11 < 22 < \dots < \dots(4)$$

Where,

P_kPP = government spending per capita

PPK = Income per capita

1, 2, ...n = duration (years)

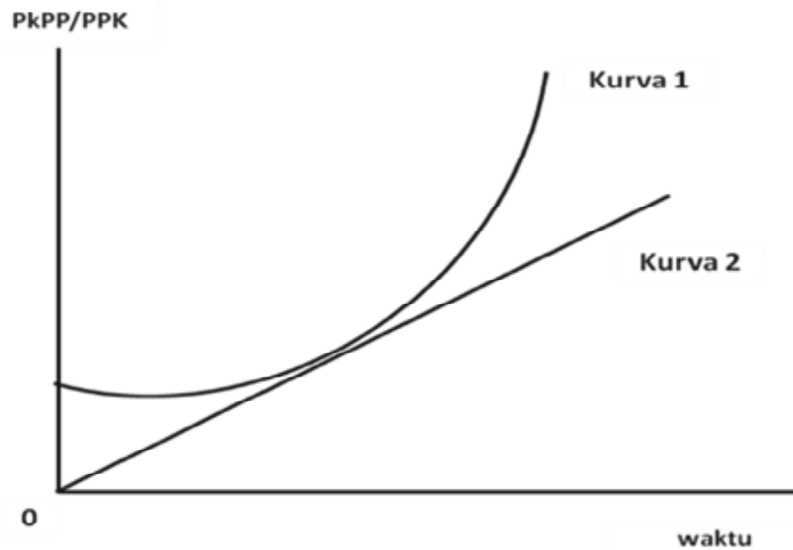


Figure 2.3: The Relationship between Government Spending and National Income

Source: Mangkoesoebroto, 2001

The illustration in Figure 2.3 explains that the increase in government spending has the shape is not linear but exponential shape. The exponential form of the curve is shown by the curve 1 and not the curve 2. In economic growth increasingly large and complex, hence the greater industrial relations, relations between industry and the public is also more complicated and complex. Thus the role of government becomes even greater because the government must regulate relations arising in society, law, education, culture, health and so on. This could take place if the government considers as free individuals acting apart from the other members (Mangkoesoebroto, 2001).

(c) Theory of Peacock and Wiseman

Peacock and Wiseman (1961) suggested that the development of government spending based on the view that the government is constantly trying to increase spending, while people do not like paying taxes to finance growing government spending them. Peacock and Wiseman stated that people have a tolerance level of the tax or the level of people's willingness to pay taxes. The tolerance level of this tax is an obstacle for the government to raise the tax levy arbitrarily.

In more detail the theory of Peacock and Wiseman (Mangkoesoebroto, 2001) stated that economic development causes increasing tax collection though tax rates have not changed; and increased tax revenues caused government spending also increased. Therefore, under normal circumstances, the increase in GNP led to greater government revenues, as well as government spending becomes.

If the normal state is interrupted, for example because of the war, the government must increase spending to finance the war. Because of the government's revenue from taxes also increased where an increase is obtained by increasing the tax rates that private fund for investment and consumption to be reduced. This condition is called diversion effect (displacement effect), namely the existence of a disorder that causes private activity shifted to government activity. This theory is illustrated in Figure 2.4.

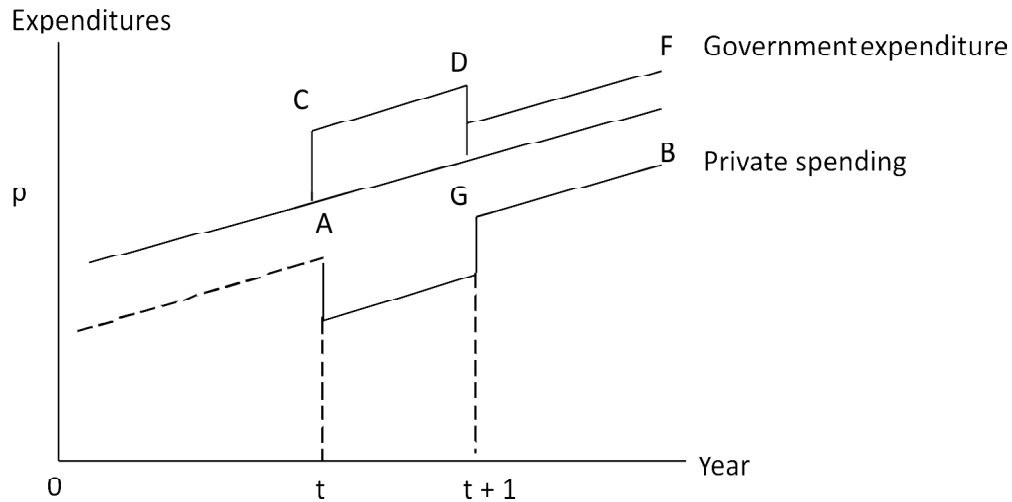


Figure 2.4: Peacock and Wiseman Theory

Source: Mangkoesebroto, 2013

In normal conditions, aside from increased taxes, the government also had to borrow from other countries with the consequences should return the loan principal and interest. Once the abnormal condition is over, there is a state called the effect of inspection. Effects inspection activities is the new government looks after the situation returned to normal. In addition, the social disorder will also cause some of the activities previously carried out by the private sector to the government concentrated (concentration effect). The third effect of the above lead to increased activity of the government after the situation returned to normal (war is over), so that the tax rate does not fall back as the level before the war.

In contrast to Wagner's view, that the development of government spending versions of Peacock and Wiseman did not form a line, but shaped like a staircase as seen in Figure 2.5.

In relation to the local or regional financial, the full local potential and revenue called fiscal capacity. While total expenditure is called fiscal needs. The difference between the local fiscal capacity and the need for fiscal shows the magnitude of the local fiscal gap. The greater negative value of the fiscal gap shows more the regional fiscal disparities gap.

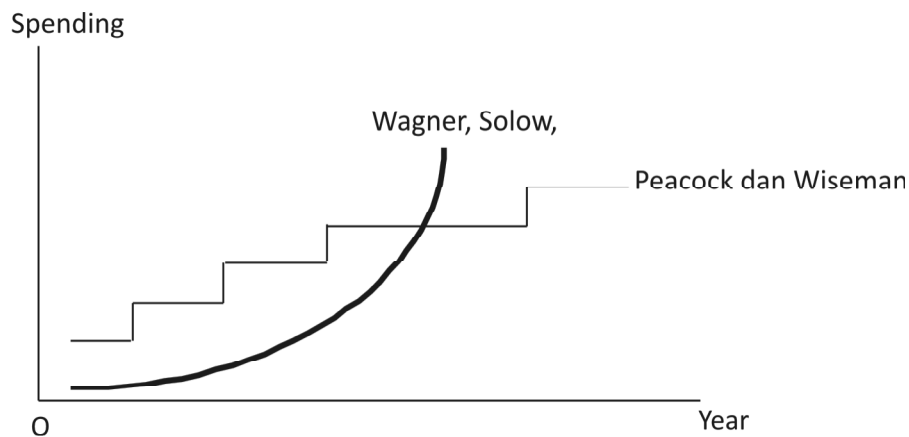


Figure 2.5: Development Curve of Government Spending

Source: Mangkoesebroto, 2013

Regional government spending cannot be separated from the local revenues, because theoretically the expenditure is a function of the local revenues. The higher the local revenues affect the higher level of local spending. For that area seeks to increase local revenues by trying to increase the source revenue and equalization funds. This has encouraged the local government tried to increase revenue potential through increased its revenue to be used for local spending within the framework of regional development.

In the process of government spending is the policy of the government to finance the construction of this area is included in the cost of the regional administration. In other words, local government spending is spending that is used to finance development in various fields, including in this case is the social, economic, governance, culture, order, tranquility, and so that is the task of government in general. In the area of financial management, governance of the administration often experience very significant changes in each period. It is adapted to the changing environment and system of government. Local spending held by the guidelines fo the Minister of the Home Affair No. 13/2006 (Regulation No.13 / 2006).

In Grand Design of Fiscal Decentralization (Ministry of Finance, 2008) stated that mission associated with local spending, namely:

1. Develop flexibility local spending responsible for achieving minimum service standards,
2. harmonization of centers expenditure and local spending to provide public services optimally.

In detecting optimizing management of local spending can be seen how the influence of the presence and capabilities of human resources of the local apparatus (officials) and local infrastructure conditions. Potential regional civil servant as a proxy for labor which provides public services to the society, while the availability of local infrastructure as a proxy for direct investment requirement for the infrastructure to encourage the development of regional economy. This is certainly related to the road map research covering the stages of activities to be undertaken in a few years (multiyear research).

In line with the road map, the activity of this research is a series of research activities in the area of fiscal management that is efficient, effective, transparent and accountable. Activities that have been studied previously, among others, fiscal capacity and fiscal needs of the local area, then analyze the activities to be carried out on the management of local government expenditures and their implications for regional economic growth. The road map will be continuous research along with the development and progress of the region in managing local finance ever-increasing numbers, such as Wagner law (Soeparmoko, 2003).

In this study some novelty activities are expected to be revealed and proved from the study include:

1. local government spending patterns still dominant to finance operational expenditures (indirect expenditure);
2. a shift in spending patterns will occur when the local government financial management has reached ten years;
3. a comparison between districts/cities reflect the diversity of the management of local government spending patterns;
4. factors of local government spending, the capability of the officers, and infrastructure affect the economic growth of the region.

2.3. Previous Research

Several previous studies that are relevant include: Susetyo (2003) examines the Analysis of Fiscal capacity and needs of Districts/Cities in Indonesia found the formulation of a model of regional spending as follows:

$$\begin{aligned} TPD/PDRB_{it} = & -0.011003 + 0.000764 \text{LogPDDK}_{it} + 0.000449 \text{LogPdat}_{it} (-6.657039)**(3.122829)** \\ & (3.703719)** + 0.018945TKEM_{it} + 0.121645TPD/PDDK_{it} + 0.975354TPD/PDRB_{i,t-1} \dots(5) \\ & (10.18361)** (35.1513)** (159.6705)** \end{aligned}$$

$$\text{Adj } R\text{-}Sqr = 0.909632; \text{ SE of } Reg = 0.017318; \text{ D-W } stat = 1.778474; (t\text{-value})$$

where:

$Pddk$ = total population, $Pdat$ = density, $Tkem$ = poverty, $TPD/Pddk$ = ratio of local spending per capita, $TPD/PSRB_{t-1}$ = ratio local spending the previous year, and $TPD/GRDP$ = ratio of fiscal local spending per GRDP,

Further research by Yanizar (2012), which is examined the impact of spending policy regional development funds and private investment to the GRDP and poverty in the Province of Jambi. Research is done by building a system of simultaneous equations econometric model using time series data from 1985 to 2010 year. The results of the research concluded that the cooperation between local governments and the private sector is essential for the economic development of the Province of Jambi due to limited fiscal capacity. This conclusion is based on findings which increase local government spending followed an increase in private investment in productive sectors will spur economic growth which in turn will reduce the level of poverty. Moreover, the consequences of the implementation of fiscal decentralization policy that allows the local governments to raise local revenue mainly from local taxes should be best utilized to develop the potential of receiving and allocating funds to the productive sectors and in the regions in an efficient and effective way to spur economic growth will increase revenue and decrease the number of poor people.

Based on the reference theory and previous research, the research framework can explain the relationships between concepts or variables that are formulated in a model. The model will be built in research activities can be seen in Chart 1.

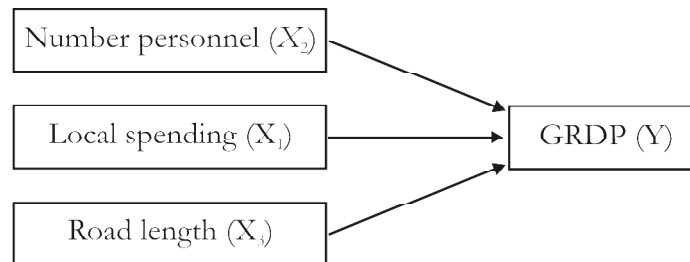


Chart 1: Conceptual Framework Research

Framework of this study describes the relationship between concepts or between variables observed in the research hypothesis, namely: Influence of local spending, the number of personnel (PNSD), and the condition of infrastructure (road length) on the development of the regional economy (GRDP) districts/cities ten provinces in Sumatra Island of Indonesia.

III. RESEARCH METHODS

3.1. Scope

The scope of the study in this research is local government spending, personnel capabilities (civil servants), local infrastructure (length of road) and local economic growth (GRDP). The location of observation as the unit of analysis is the districts/cities in Sumatra Island of Indonesia. The observation period is about 2010-2015.

3.2. Types and Sources of Data

The data used is secondary data and are equipped with primary data analysis unit. Secondary data sources are from the official publication of Directorate General Budget-Minister of Finance (DJA-Kemenkeu), the Central Board of Statistic (BPS), Local Planning Board (Bappedakabupaten/kota) and related Satuan Kerja Perangkat Daerah (SKPD).

3.3. Methods of Analysis

The method of analysis in this research is quantitative descriptive and equipped with qualitative descriptive. Parameter estimation method is used a multiple regression analysis (Multiple Ordinary Least Square).

Formulation of a mathematical model to be estimated is:

$$Y = f(X_1, X_2, X_3) \quad \dots(6)$$

Furthermore, an econometric model to estimate the parameters used method of multiple regression analysis:

$$Y = \beta_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \quad \dots(7)$$

Where, Y = GDP at constant prices; X_1 = amount of civil servant (*PNSD*); X_2 = local government spending; X_3 = total length of the road; β_i = parameter; and ε = error term.

3.4. Operational Definition

- (a) Local spending is the realization of local government expenditures listed in the results of the calculation of revenue and expenditure budget of the district/city.
- (b) Capability of local officials is the number of the officers who according to their competencies in the management of revenue and expenditure of the district/city.
- (c) Local infrastructure is the condition of infrastructure that covers the length of roads and bridges in good condition, the number of heads of household water customers (PDAM), and a number of heads of household electricity customers (PLN).

3.5. Flow chart form of the ultimate achievement of the activities and the scope of activities undertaken components each team member are arranged in the form of a fishbone diagram.

> Phenomena Research > Hypothesis > Local Spending Patterns > Accountability > Spending and Economics > Framework > Infrastructure condition > Transparency > Focus Issue > Theory and Reference > Estimation models > Spending policy

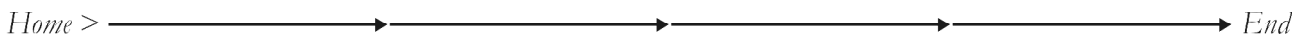
Home >  End
 > Interest Research > Research Methods > Causality Analysis > Economic growth > Benefit Research > Modeling > Efficiency and effectiveness > Expansion work > Focus and Novelty > Significance test > Capability personnel > Welfare ride

Chart 2: Fish Bone Diagram

IV. RESEARCH RESULTS

4.1. Description of Research Location

The location of this study includes the districts and cities throughout ten provinces in Sumatra Island of Indonesia. For details of which can be explained that the district and city observed until 2016 amounted to 155 districts/cities consisting of 121 districts and 34 cities. Observations were made during the period 2010-2015 that assumes a new autonomous region is also equipped with a data extrapolation method.

For each province can be explained that the South Sumatra Province has 17 districts and city consists of 13 districts and 4 cities. Jambi Province has 12 districts and city is composed of 10 districts and 2 cities, while Lampung Province has 15 districts and cities consist of 13 districts and 2 cities. Bangka Belitung Islands Province has 7 districts and cities consist of 6 counties and 1 city, Bengkulu Province has 10 districts and cities consist of nine counties and one city. Furthermore Nangro Aceh Darussalam Province has 23 districts and the city consist of 18 districts and 5 cities, North Sumatra Province has 33 districts and cities consist of 25 districts and 8 cities, Riau Province has 12 districts and cities consist of 10 districts and 2 cities. Likewise, West Sumatra Province has 19 districts and cities consist of 12 districts and 7 cities, Riau Islands Province has 7 districts and cities consist of 5 districts and 2 cities.

The number of districts and cities most is the North Sumatra Province, consists of 25 districts and 8 cities, while the second most nation points is Nangro Aceh Darussalam Province has 18 districts and 5 cities, while West Sumatra province has a total of 12 districts and 7 cities. Actually, in analyzing all districts and cities in Sumatra Island is also interesting to examine districts and cities for each province. It can be more explained the uniqueness districts and cities within the province. But on this occasion will be described specific studies transform all districts and cities ten provinces in Sumatra Island of Indonesia that provides uniqueness in terms of number of observation areas (the number of intercept) to the district and the city as a cross section.

4.2. Variable Description Research

Description of the concept or variable observed is the Gross Domestic Product (GDP) in units of billion rupiah calculated at constant prices in 2010 as the dependent variable, while the other variables studied in this research are local spending in billions of rupiah, the number of civil servants in the soul, and the road length in kilometers as an independent variable.

In the description that the distribution of the observed data is as follows:

1. variable GRDP at constant prices (Rupiah billion) that the values min = 506.99 (Papak Bharat/2010); max = 124200.83 (Medan/2015); mean = 11512.38801; median = 6123,735.
2. Variable local spending (Rupiah billion) that the values min = 102.54 (Pali/2010); max = 3754.86 (Bengkalis/2015); mean = 801.3427769; median = 634.11.
3. The variable amount PNSD (people) that the values min = 428.00 (Aceh Barat Daya/2010); max = 23369.00 (Medan/2015); mean = 5476.634705; median = 6150.5. (4) Variable length of

roads (kilometer) that the values min = 54.91 (Sibolga/2010); max = 3955.77 (Batang Hari/2015; mean = 1178.665402; median = 1211,465.

4.3. Estimate Model

The estimation results of the model were observed with a panel of data obtained estimates that some form of common effect, fixed effect, and random effect. The third estimation results have advantages and disadvantages of each. Of the three results of the estimation model can be tested to determine which model is good both efficient and consistent in the method of analysis of data panel.

Several variations of the estimation model that has been done is:

1. Common Effect Model

Dependent Variable: Y_i

Method: Pooled Least Squares

Date: 11/22/16 Time: 14:18

Sample: 2010 2015

Included observations: 6

Cross-sections included: 155

Total pool (balanced) observations: 930

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
C	-13609.19	750.6182	-18.13064	0.0000
X_1	18.62612	0.863436	21.57209	0.0000
X_2	1.878869	0.135198	13.89712	0.0000
X_3	-0.079936	0.487174	-0.164080	0.8697
R-squared	0.626058	Mean dependent var		11512.39
Adjusted R-squared	0.624847	S.D. dependent var		16182.99
S.E. of regression	9912.045	Akaike info criterion		21.24518
Sum squared resid	9.10E+10	Schwarz criterion		21.26598
Log likelihood	-9875.009	Hannan-Quinn criter.		21.25311
F-statistic	516.7733	Durbin-Watson stat		0.043810
Prob (F-statistic)	0.000000			

Explanation Model Common Effect

This technique is the simplest to estimate parameters of panel data models, which combine cross section data and time series as a whole regardless of the time difference and entities (individual). This approach is often used Ordinary Least Square (OLS). Common Effect Model overlook their differences in individual dimensions and time, or in other words the same data behavior between individuals in different periods.

From the results of the panel regression model common effect regression coefficients obtained results for each of the constants, local spending, total civil servant (PNSD), and the length of road coefficients are -13609,19; 18,62612; 1,878869; -0,079936. Indicators Gross Regional Domestic Product as dependent on constant price have the t-statistic -18.13064; 21.57209; 13.89712; -0.164080 0.0000 and probability; 0.0000; 0.0000 and 0.8697 below 5% or 0.05 α so significant effect between dependent and independent variables with the value of R^2 0.626058 and Adjusted R-squared 0.624847 with the assumption that 62.60 percent of the three independent variables can explain the variation of the dependent variable and the remaining 37.40 influenced other variables. The results of the panel regression F-statistic values obtained 516.7733 and higher than F-table and Mean value of 11512.39.

2. Fixed Weight Effect Model

Dependent Variable: Y_t

Method: Pooled EGLS (Cross-section weights)

Date: 11/21/16 Time: 21:15

Sample: 2010 2015

Included observations: 6

Cross-sections included: 155

Total pool (balanced) observations: 930

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3124.520	395.3266	7.903641	0.0000
X_1	4.250624	0.136856	31.05901	0.0000
X_2	0.822279	0.090148	9.121461	0.0000
X_3	0.405832	0.166473	2.437830	0.0150
<i>Effects Specification</i>				
<i>Cross-section fixed (dummy variables)</i>				
<i>Weighted Statistics</i>				
R-squared	0.996458	Mean dependent var		20320.06
Adjusted R-squared	0.995737	S.D. dependent var		17206.87
S.E. of regression	1160.649	Sum squared resid		1.04E + 09
F-statistic	1383.197	Durbin-Watson stat		0.708043
Prob (F-statistic)	0.000000			
<i>Unweighted Statistics</i>				
R-squared	0.993143	Mean dependent var		11512.39
Sum squared resid	1.67E + 09	Durbin-Watson stat		0.416931

Explanation Model Fixed Weight Effect

Fixed Effect model approach assumes that the intercept of each individual is different among individuals while the slope is fixed (same). This technique uses a dummy variable to capture the diversity intercept between individuals. From the results of the panel regression with fixed effect regression model results are obtained coefficients of the variables constant (intercept), local spending, total civil servant (PNSD), and length of road each of 3124.520; 4.250624; 0.822279; 0.405832 to Gross Regional Domestic Product as dependent on constant price with t-statistic 7.903641; 31.05901; 9.121461; 2.437830 and each probabilities; 0,0000; 0.0000; 0.0000 and 0.0150 below 5% or $\alpha = 0.05$ so significant effect between dependent and independent variables with the value of R^2 0.996458 and Adjusted R-squared 0.995737 with the assumption that 99.64 percent of the independent variables can explain variation on the dependent variable and the rest of 0.37 is influenced by other variables, the results of the panel regression F -statistic 1383,197 values obtained the prob(F -statistics) 0.0000 and Mean value of 20320.06.

3. Random Effect Model

Dependent Variable: Y_t

Method: Pooled EGLS (Cross-section random effects)

Date: 11/21/16 Time: 21:14

Sample: 2010 2015

Included observations: 6

Cross-sections included: 155

Total pool (balanced) observations: 930

Swamy and Arora estimator of component variances

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
C	-2493.455	1054.698	-2.364141	0.0183
X_1	5.737133	0.321258	17.85835	0.0000
X_2	1.978455	0.154652	12.79292	0.0000
X_3	-1.210558	0.487554	-2.482922	0.0132

Effects Specification

	<i>S.D.</i>	<i>Rho</i>
Cross-section random	9519.366	0.9786
Idiosyncratic random	1407.840	0.0214

Weighted Statistics

R-squared	0.506860	Mean dependent var	693.8168
Adjusted R-squared	0.505262	S.D. dependent var	2089.300
S.E. of regression	1469.563	Sum squared resid	2.00E+09
F-statistic	317.2543	Durbin-Watson stat	0.388430
Prob (F -statistic)	0.000000		

Unweighted Statistics

R-squared	0.477846	Mean dependent var	11512.39
Sum squared resid	1.27E+11	Durbin-Watson stat	0.006115

Explanation Random Effect Model

The approach taken in the Random Effect assumes each district/city has differences intercept, which is variable random intercept or stochastic. Model is particularly useful if the individual (entity) that is taken as a sample is chosen randomly and is representative of the population. This technique also takes into account that the error may be correlated throughout the cross section and time series.

From the results of the panel regression with random effects regression model results are obtained coefficients of each constants, local spending, total civil servant (PNSD), and length of road amounted -2,493.4550; 5.737133; 1.978455; -1.210558 to Gross Regional Domestic Productas dependent on constant price with the *t*-statistic each -2.364141; 17.85835; 12.79292; -2.482922 and probability; 0.0183; 0,0000; 0,0000 and 0,0132 below 5% or $\alpha = 0.05$ so significant effect between dependent and independent variables with the value of R^2 0.506860 and Adjusted R-squared 0.505262 with the assumption that 50.68 percent of the dependent and independent variables can explain the variation of the model and the residual of 49.32 influenced by other variables. The results of the panel regression F-statistic 317.2543 values obtained prob (*F*-statistic) 0.0000 and Mean value of 693.8168 and Sum of 2.00E + 09.

Some models are estimated using panel data mentioned above can be tested to obtain a model that better fits criteria ‘goodness of fit model’ with the Chow and Hausman test. Selection of the best model has implications for, among others:

1. to test the Chow and Hausman test to obtain a model that is considered the best;
2. The test results showed that the model can be used to estimate the model obtained in the future.

4.4. Test of the Model

Selection of the model (the estimation technique) panel data regression of several techniques (models) panel data estimation can be selected in accordance with the state of research, judging from the number of individual districts/cities and research variables. However, there are some ways that can be used to determine which techniques are most appropriate in estimating panel data parameter. According Widarjono (2007: 258), there are three tests to select the panel data estimation techniques, namely: First, the statistical test F is used to choose between Commom method or methods Fixed Effect Effect. Second, Hausman test is used to select the method or methods Fixed Effect Random Effect. Third, the Lagrange Multiplier test (LM) is used to select the method or methods Commom Effect Random Effect.

According to Nachrowi (2006: 318), the selection method Fixed Effect or methods Random Effect can be done with consideration of the purpose of analysis, or there is also the possibility of the data used as the basis for the model, can only be treated by one method alone due to various technical issues mathematical underlying calculations.

In the rules of software *e*-views, that the Random Effect method can only be used under conditions the number of individual districts/cities is greater than the number of coefficients, including the intercept.

Moreover, according to some econometric experts say that, if the data is owned by the panel have a significant amount of time (t) is greater than the number of individuals (district/city), it is advisable to use the method Fixed Effect. Meanwhile, if the panel data hold is the amount of time (t) is smaller than the number of individuals (district/city), it is advisable to use the method of Random Effect.

The results of model estimation with panel data usually can be tested against so the model is good and proper by the Chow and Hausman test. The second test is certainly different from one another and has their respective advantages for their intended use. To find out more about the testing process by Chow Test can be listened to the description of the results of subsequent Chow.

Chow Test

Redundant Fixed Effects Tests

Pool: POOLED

Test cross-section fixed effects

<i>Effects Test</i>	<i>Statistic</i>	<i>d.f.</i>	<i>Prob.</i>
Cross-section F	439.217073	(154,772)	0.0000

Cross-section fixed effects test equation:

Dependent Variable: $Y?$

Method: Panel EGLS (Cross-section weights)

Date: 11/22/16 Time: 00:56

Sample: 2010 2015

Included observations: 6

Cross-sections included: 155

Total pool (balanced) observations: 930

Use pre-specified GLS weights

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
C	-3915.198	229.5105	-17.05890	0.0000
$X_1?$	14.44916	0.515162	28.04780	0.0000
$X_2?$	0.428672	0.074051	5.788876	0.0000
$X_3?$	-1.119759	0.180141	-6.216010	0.0000

Weighted Statistics

R-squared	0.686091	Mean dependent var	20320.06
Adjusted R-squared	0.685074	S.D. dependent var	17206.87
S.E. of regression	9976.073	Sum squared resid	9.22E + 10
F-statistic	674.6331	Durbin-Watson stat	0.090548
Prob (F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.448372	Mean dependent var	11512.39
Sum squared resid	1.34E + 11	Durbin-Watson stat	0.015372

Chow test is a test conducted to determine which model is better in the test panel data, can be done by adding a dummy variable so it can be seen that different intercept can be tested with this test F statistics used to determine whether a panel data regression techniques with methods Fixed Effect better than regression panel data model without the dummy variable or method Common Effect.

Nul hypothesis in this test is that the same intercept, or in other words the right model for panel data regression is Common Effect, and the alternative hypothesis is not the same intercept or the right model for panel data regression is Fixed Effect.

Values calculated F -statistics will follow a statistical distribution F with degrees of freedom of m for the numerator and total $n - k$ for denominator. M is the number of restriction or limitation in the model without any dummy variables. Total restriction is the number of individuals minus one. N is the number of observations and k is the number of parameters in the model Fixed Effect. The number of observations (n) is the number of individuals multiplied by the number of periods, while the number of parameters in the model Fixed Effect (k) is a variable number plus the number of individuals. If the value of F count larger than F critical then the hypothesis null rejected, which means the right model for panel data regression is a model Fixed Effect. And vice versa, if the calculated F value is smaller than F critical then the hypothesis null accepted, which means the right model for panel data regression is a model of Common Effect.

Basic rejection of the hypothesis above is by comparing the calculation of F -statistic with F -table. Comparison is used when the results of the F -count is greater ($>$) on the F -table then null hypothesis is rejected, which means the most appropriate model used is the Fixed Effects Model. *Vice versa*, if the F -statistic is smaller ($<$) than F -table then null hypothesis is accepted and the model used is the Common Effect Model.

Results from tests conducted using the Chow test with a probability value below 5% or 0.05α of 0.0000; 0.0086 and 0.0000 and analysis on the test of the above table F -calculated at 10797.65 and the results, in which the F -count is greater than the table so that the most suitable use of Fixed Effect Model (Chow Test).

The implications of testing the model with the Chow test are:

1. The test is done to choose a better model the results estimation of common effect or fixed effect model models;
2. this testing by comparing the F -value is calculated by the value of the F -critical table;
3. the results of testing both models can determine a better estimate of the model in accordance with its maxims;
4. estimation models such as the common effect was selected as the result of parameter estimation by ordinary regression, whereas the fixed effect estimation results have intercept for each individual constants (district/city).

Furthermore, Hausman test is a test that is done to choose the estimation models with panel data between fixed effect model and random effect model. After testing the model selection with Chow test can

be done also with Hausman test point for information consistency models tested to be more convincing. The results of the Hausman test in question can be seen below:

Hausman Test

Correlated Random Effects - Hausman Test
 Pool: POOLED
 Test cross-section random effects

<i>Test Summary</i>	<i>Chi-Sq. Statistic</i>	<i>Chi-Sq. d.f.</i>	<i>Prob.</i>
Cross-section random	85.976456	3	0.0000

Cross-section random effects test comparisons:

<i>Variable</i>	<i>Fixed</i>	<i>Random</i>	<i>Var(Diff.)</i>	<i>Prob.</i>
X ₁ ?	5.879156	5.737133	0.009528	0.1457
X ₂ ?	1.611783	1.978455	0.009430	0.0002
X ₃ ?	-1.450825	-1.210558	0.051775	0.2910

Cross-section random effects test equation:

Dependent Variable: Y?

Method: Panel Least Squares

Date: 11/22/16 Time: 00:57

Sample: 2010 2015

Included observations: 6

Cross-sections included: 155

Total pool (balanced) observations: 930

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
C	-315.9431	850.3607	-0.371540	0.7103
X ₁ ?	5.879156	0.335759	17.51003	0.0000
X ₂ ?	1.611783	0.182612	8.826293	0.0000
X ₃ ?	-1.450825	0.538037	-2.696515	0.0072

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.993711	Mean dependent var	11512.39
Adjusted R-squared	0.992432	S.D. dependent var	16182.99
S.E. of regression	1407.840	Akaike info criterion	17.49109
Sum squared resid	1.53E+09	Schwarz criterion	18.31255
Log likelihood	-7975.355	Hannan-Quinn criter.	17.80440
F-statistic	776.9395	Durbin-Watson stat	0.496196
Prob(F-statistic)	0.000000		

Testing with Hausman test done that Hausman has developed an assay to select whether the methods of Fixed Effect and Random Effect is better than the method Common Effect. Hausman test is based on the idea that the Least Squares Dummy Variables (LSDV) in the method Fixed Effect and Generalized Least Squares (GLS) in the method of Random effect is efficient while Ordinary Least Squares in Common Effect inefficient method. On the other hand, the alternative is an efficient method of OLS and GLS is inefficient. Therefore, test the null hypothesis of these is estimated that the two are not different Hausman test can be performed based on different estimates.

Hausman test statistic follows the Chi-Squares statistical distribution with degrees of freedom (d.f) equal to the number of independent variables. The null hypothesis is that the right model for panel data regression is a model Random Effect and the alternative hypothesis is the right model for panel data regression is a model Fixed Effect. If the value of the Hausman statistic is greater than the critical value, the Chi-Squares null hypothesis is rejected, which means the right model for panel data regression is a model Fixed Effect. And vice versa, if the value of the Hausman statistic is less than the critical value, the Chi-Squares null hypothesis is accepted which means the right model for panel data regression model is Random Effect.

Hausman test results indicate significance between dependent and independent variable which is equal to prob (*F*-statistic) 0.0000, 0.0000, and 0.0163 ie, α below 5% or 0.05 and a statistical value on the *F*-statistic equal to 776.9395 greater than *F*-table is used that is not a test-Chow more precise (Fixed Effect Model).

The results of parameter estimation data panel with random effect model is:

$$Y = -2493,4550 + 5,7371X_1 + 1,9784X_2 - 1.2106X_3 + \varepsilon$$

(-2,3641)
(17,8583)
(12,7929)
(-2,4829)

R-squared	0.506860	Mean dependent var	693.8168
Adjusted R-squared	0.505262	S.D. dependent var	2089.300
S.E. of regression	1469.563	Sum squared resid	2.00E+09
<i>F</i> -statistic	317.2543	Durbin-Watson stat	0.388430
Prob (<i>F</i> -statistic)	0.000000		

Where, *Y* = Gross Regional Domestic Product; *X*₁ = Regional spending; *X*₂ = Number of Civil servant employees; *X*₃ = Length of road; ε = error term. tvalue in brackets

Furthermore, to get the best model should be tested classical assumptions. However, to complete testing of the model estimation, this can be done with the classic assumption test to make it more complete and meet the criteria of 'goodness of fit model' which are:

1. Test of normal distribution,
2. test of heteroscedasticity,
3. test of collinearity,
4. test of autocorrelation actually the assumption of classical model should not be done to the analysis model estimation data panel for analysis.

Estimation model panel data is one of the rules to address some of the weaknesses and violations classical assumption of the results of the estimates, especially the small number of observations and the number of time series data and cross section.

4.6. Research Findings

Based on the results of the model estimation and testing random effect model gained some implications of the results are:

- (a) Simultaneously (F -test) showed that the results obtained are the three variables observed were local spending, the number of civil servants districts/cities, influence to gross regional domestic product (GRDP) simultaneously positive and significant, but length of road to go negative. The value of the F -statistic 317,2543 is greater than F -table, so the independent variables have positive and significant effects, as the result of random effect model estimation.
- (b) Partially, (t -test) showed that the influence of local spending to gross regional domestic product is positive and significant. Value of t -statistic 17,8583 of the local spending is larger than t -table so that a positive and significant influence. Regression coefficient 5,7371 of variable capital expenditure of means if there is additional capital expenditure of one unit will have an effect on the increase in Gross Regional Domestic Product by one unit.
- (c) Partially (t -test) showed that the effect of the number of civil servants to the gross regional domestic product is positive and significant. Value t -statistic 12,7929 for the number of civilian servant is greater than t -table so that a positive and significant influence. Regression coefficient 1,9784 of variable number of civil servant means in case of increase by one unit will have an effect on the increase in Gross Regional Domestic Product by one unit.
- (d) Partially (t -test) showed that the effect of the road length to the local gross regional domestic product is negative and significant. Value of t -statistic $-2,4829$ for the length of the road is greater than t -table so that a significant influence. Regression coefficient $-1,2106$ of variable the length of the road means if there is additional path of the road length of one unit will have an effect on the decrease in Gross Regional Domestic Product by one unit.

Coefficient of determination (R^2) is 0,506860 or 50,68 percent and Adjusted $R^2 = 0,505262$ percent means the results of the estimation model can be explained by three variables and significant amounted to 50,68 percent, while the remaining 49,32 percent or R_p described by factor- factors outside the model, such as the investment in the form of foreign investment and domestic investment, total employment, labor force city districts, and other infrastructure the length distribution of clean water, or the length of power lines or other distribution.

Implications of the findings of a random effect model estimation obtained are:

1. Effect of local spending, the number of PNSD, and the road length to the development of the GRDP of districts/cities in a positive and significant, either simultaneously or partially.
2. The results of the model parameter estimation with panel data for districts/cities as much as 155 in Sumatra island of Indonesia, have the same slope and intercept are different for each region.
3. The best model after the Chow and Hausman test as well as the number of time series is less than the number of districts/cities, the best estimation models are models of random effect.

The implication of the above can be traced that the model estimation results are consistent with theory and previous research, namely:

1. The findings of this study seem consistent with the theory used is the Keynesian theory, Wagner's Law, Theory Peacock and Wiseman, and Wagner Theory and Solow. Regional economic development, as measured by the GDP is influenced by the development of the area as a proxy for investment spending, the number of workers PNSD as a proxy for labor, and the length of the road as an element of an infrastructure proxy.
2. Increasingly local spending, the number of PNSD, and long quality roads will push up the GDP of the districts and cities in Sumatra, Indonesia. The greater the shopping area is needed to improve the availability of goods and services for public services.
3. The greater utilization of civil servants (PNSD) will encourage the development of regional economy.
4. The length of their road will improve the quality and connectivity accessibility activities to increase production, consumption, and economic distribution.
5. This study looks different from previous research related variables, years of observation, and the coverage area is used.
6. The point of this study is in line with previous studies, but there is a different and broader study of the region as well as research findings.
7. Model approach is analyzed in line with the principle that in order to develop the GRDP must be supported by regional spending adequate, amount of PNSD competent, and the road length that the more qualified and increasingly spreading to realize the accessibility and connectivity to all corners of the region, such as road length comprising of the criteria for state roads, provincial roads, and district/city road.

Some findings have implications of the core analysis model some suggestions for the recommended form of policies, among others:

- (a) The increase in the GRDP district/city became one of the keys to success of development and progress of the region so that each district/city can be seen in the development and improvement of people's purchasing power.
- (b) Management of regional spending should be not only increased in the form of quantity but also in quality and allocations to accelerate the economic development of the region.
- (c) Empowerment of local civil servants (PNSD) precedence so that more competent in the field of public services and the progress of the production area.
- (d) Increasing the length of the road in terms of quantity and quality should be made to sustain the development and improvement of local production more evenly to improve accessibility and inter-regional connectivity.
- (e) Assessment of the study should be extended by proxy of other variables so that the model can be used to advance estimation of districts/cities in Sumatra island of Indonesia.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusion

Based on the research and testing in the previous chapter obtained some conclusions as follows:

- Simultaneously shows that the results obtained are the three variables observed were local spending, the number of local civil servants, the road length in the districts/cities influence to the gross regional domestic product positively and significantly.
- Partially, shows 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.
- The effect of the number of civil servants to the region's gross regional domestic product districts/cities is positive and significant. The more the number of local civil servants can potentially provide better public services to encourage local economic growth.
- The impact of the length of road to the gross regional domestic product districts/cities is negative and significant. These results showed that increasingly the road length will managed by the districts/cities actually have a negative impact on the improvement of regional economic production.
- The coefficient of determination that the relationship of Gross Regional Domestic Product can be explained by three variables, namely local spending, total of civil servants (PNSD), and the length of the road is positively and significantly by 50.68 percent, while the rest, or by 49.32 percent is explained by factors beyond models, such as the investment in the form of foreign investment and domestic investment, total employment, labor force, and other infrastructure the length distribution of clean water, or the length of power lines or other distribution.

5.2. Suggestion

Based on some of the above conclusions, some suggestions for recommended in the form of suggestions are as follows:

- (a) Management of regional spending should be increased in the form of quantity but also in quality and allocations to accelerate the economic development of the region. Suggestion of capital expenditure increased by a larger portion compared with operating expenditure that will encourage the multiplication of other activities.
- (b) Empowerment of the local civil servants (PNSD) continue to take precedence so that more competent in the field of public services, the bureaucracy, and the progress of the production. The local civil servants (PNSD) relatively important role and is very useful for speeding up the development to increase economic growth, expansion of employment opportunities and reduce unemployment, and poverty.
- (c) Increasing the length of the road in terms of quantity and quality should be made to sustain the development and improvement of local production more evenly to improve accessibility and

connectivity between regions. Improving the quality of roads should be prioritized especially the authority of district roads allocate more adequate road management.

- (d) For the advanced research that this study should be extended by proxy of other variables so that the estimation model can be used to advance the districts/cities in Sumatra island of Indonesia.

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