



## **Impact of Capital Expenditure and Public Utility Customers to Economic Development of District-City in Sumatra-Indonesia**

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### **ABSTRACT**

The research problem is how to influence local public utility capital expenditures, the amount of household electric customers, the number of clean water customers, the number of telephone customers on the economic development of the district-city in Sumatra, Indonesia. The theory of regional economic growth used Keynesian models and Concept Capital expenditure for the Public Utility Law according to Wagner. Previous empirical research, among others: (a) Susetyo et al. (2017), (b) Prasetyo (2013), (c) Yanizar (2012). Research methods include (a) the scope of public utilities is capital expenditure, the number of customers of electricity, water, telephone and the gross regional domestic product (GRDP). The unit of analysis is the district-city as much as 155 in Sumatra-Indonesia; (b) the data used is secondary data and source of data from the official publication; (c) the method is quantitative analysis and estimation method is multiple ordinary least square method of panel data. The result is simultaneously (F-test) showed that the results obtained are four variables observed were regional public utility capital expenditures, the number of electricity customers, the number of water customers, the number of telephone subscriber positive effect on the GRDP regencies-cities significantly. Partially (t-test), indicating that capital expenditure has positive influence local public utilities to GRDP regencies and cities significantly. The local public utility capital expenditures are a positive and significant influenced. Likewise, shows that the effect of the number of customer electricity, clean water, the phone toward the regional gross domestic product is positive and significant. Analyzing coefficient of determination ( $R^2$ ) is 62.02% means the results of the model estimates the variation can be explained by four variables and significantly.

**Keywords:** Regional Economy, Capital Spending Public Utilities, Customers of Electricity, Clean Water and Telephone

**JEL Classifications:** O10, H50, H54, H70

## **1. INTRODUCTION**

### **1.1. Background**

Activities of regional development cannot be separated from related phenomena with the regional economic development (Storper, 2011; Capello, 2011). Today the development of economic infrastructure, especially public utilities still impressed leads to the western part of Indonesia so that the disparity in development is very pronounced. Not optimal development of public utility causes the difference in several locations regions and cities in Sumatra (Susetyo, 2008). The diversity of these conditions results from the construction of public utilities that are not balanced.

The phenomenon mainly limited allocation of development funds for capital expenditure for public utilities seem to have an efficient,

effective, transparent and accountable. Capital expenditures for public utilities are not the magnitude of the initial investment development but capital expenditure to operational expenditure and the improvement of public utilities (IMF, 2015). Management of capital expenditure for public utility is still fraught with inefficiency. This, of course, led not yet optimal management of capital expenditure for public utilities and local economic growth.

The factors identified influence on the activity of production and regional economic development, among others; (1) limited capital expenditure for operation and repair of public utilities; (2) the limited number of customers of electricity, water and telephone; (3) the potential for disaster in some areas also affect the availability of public utilities so that the level of service (coverage) is relatively low; (4) the general conditions of inadequate local infrastructure,

particularly public utility services is relatively limited, causing imbalances between regions (Rose and Krausmann, 2013).

The empirical condition indicates that economic growth inter-region is still the gap (Prasetyo, 2013; Susetyo, 2016) due to the limited availability of public utility districts-cities is necessary for the sustainability of the community. To assess the presence of public utilities and the impact on regional economic development becomes important, although the public utility development program should be completed in the second millennium under the MDGs program. However, in this third-millennium factors availability of public utilities, both in quality and quantity is still very worrying, especially the availability of public utilities can encourage the development of regional economy (Cutanda and Joaquina, 1994).

Study phenomena underlying problem is certainly related to the management of capital expenditure for public utilities have not prioritized to encourage local economic growth, but still meet the operational needs of the apparatus, especially the new autonomous regions (autonomous regions). Human resources area will not be accomplished to increase the value added when the availability of public utilities is still relatively rare. Development priority in the allocation of regional spending is to increase the power of public utility services the widest possible so that the public does not accept the gap between regions.

In connection with the phenomenon that the availability of public utility areas not yet fully enhance the regional economic development the focus of study in this research. On one hand, that there is influenced of capital expenditures for public utilities to the development of regional economy. Likewise, the study was expanded to model the effect of the number of customers of electricity, water, and telephone on the economic development of districts and cities in Sumatra.

## 1.2. Problems and Objectives

The research problem in this activity is:

How does the influence of utility capital expenditures, the number of household customers of electricity, water and telephone on the economic development districts and cities in Sumatera-Indonesia?

In line with the research problem, the research objectives are:

Analyze the effects of utility capital expenditures, the number of household customers of electricity, water and telephone to regional economic growth districts and cities in Sumatera-Indonesia.

## 1.3. Implementation Results Activity

Application of the results of this activity can be a reference conceptual (modeling) and to do community service activities, especially workshops, focus group discussions (FGD), and training on the importance of managing public service in the form of customer electricity, water, and telephone area an efficient and effective. Means the application of the results of these activities can be performed:

- a. Academic; the form of the model estimates, publications, seminars, FGD, workshops (workshop) on the management of public utility districts and cities.

- b. Practice; a form of training personnel/human resources areas, improving the quality of public utilities, and various policies for the management of the area of capital expenditure in an efficient, effective, transparent and accountable.

## 2. THEORETICAL FRAMEWORK

### 2.1. Regional Economic Developments

In a macro-regional economy, the regional economic activity may be indicated by economic behavior in a market economy, the public and private sectors. Each of these actors has a different goals but still contributes to the economic development of the region. Regional economic activity is still faced with the alarming state of public utilities so that the development program for quality-quantity improvement and public utility not optimal. In addition to the purpose of each specifies and cumulatively can see their performance in the area of economic development and progress.

By examining the activity of macroeconomic players 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. Thus, the economic activity of the area can be seen from the development of regional output that gross domestic product (GDP) of each region as a whole, both calculated by the method of expenditure or by the method of production.

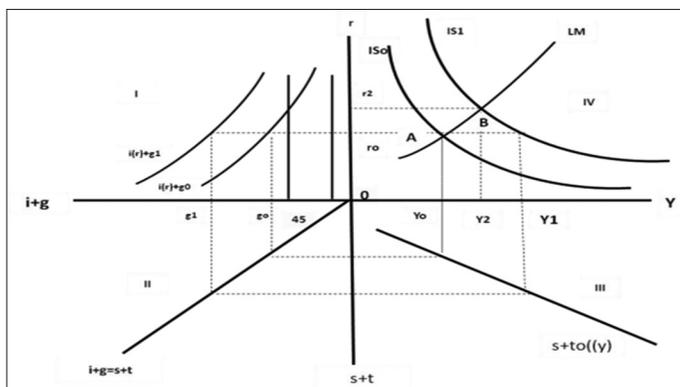
Macroeconomic policies according to Branson and Litvack (1981) is an instrument that is used in formulating policies that will affect the macroeconomic can be grouped into three, namely the implementation of fiscal policy by increasing government spending (Oates, 1999), the implementation of fiscal policy by cutting the tax and monetary policy how to increase the money supply.

Changes in the economy can be approached with balance instruments aggregate supply (AS) and aggregate demand (AD). The instrument can explain the condition of an economy that describes the fluctuations in output, the price level, income level, and inflation. Examples of such an interaction are between AD and aggregate supply in the market (Dornbusch et al., 1999; Case and Fair, 1999).

As an illustration, in Figure 1 that is the increase in government spending shifts into  $g_1$   $g_0$ . Under these conditions, the output at every interest rate is higher. In the  $g_1$  curve 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, that of  $IS_0$   $IS_1$  to curves. 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 1 above explains that  $r$  is the interest rate,  $Y$  is the output,  $S$  is the savings,  $t$  is a tax,  $I$  is an investment,  $G$  is government spending. In the same context, if the interest rate is lower than before the investment will increase. With the same mechanism, the lower interest rates will also increase output. Thus, the amount of investment and government spending has the same

**Figure 1:** Increasing the impact of government spending or investments against output



Source: Branson and Litvack, 1981

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.

Furthermore, Keynes introduced the concept to calculate GDP (national) or the gross regional domestic product (GRDP) (local) by expenditure are all components of final demand, namely household and private consumption, government consumption, investment and net exports, as identities are:

$$Y=C+I+G+(X-M) \tag{1}$$

The above equation shows that the Y is GDP or the GRDP, C is private consumption and private, I is spending private investment, G is government spending and investment, X is exported and M is imported.

The competent institution calculates the GDP or the GRDP is the central statistics agency (BPS) on a regular basis every year. Source of GDP or the GRDP is derived from the production departments or agencies that collect data on production, producer prices, the cost to produce, and expenses. In the context of a smaller area which provinces and districts and cities, the economic growth was calculated using the GRDP that reflects the region's ability to manage its resources.

### 2.2. The Concept of Government Capital Expenditure

Government spending in the form of capital expenditure is often called regional spending is the identity of the reception area. The greater the reception area, the greater the ability of shopping areas. This means that the greater the acceptance of local, then the development of policies appropriate to shopping areas planned expenditure allocations and appropriately the needs of society in order to benefit from the budget can be more efficient and effective.

In the concept of regional expenditure is incurred and the number of funds used to finance all the needs of the region, both requirements are 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 of exogenous variables

in which the magnitude of value depends on the strategy adopted by local governments in implementing fiscal policy.

According to Mangkoesubroto (2001), the theory of expenditure can be classified into two parts, namely the theory of macroeconomics and microeconomics. Furthermore, some macroeconomic theory, among others: (1) The development model of the development of government spending; (2) the Wagner law regarding the development of the government's activities; (3) theory Peacock and Wiseman. Explanation of the theory can be described as follows:

#### 2.2.1. Model development expenditures

The development model of the government spending developed by Rostow and Musgrave. This model connects the development of government spending with economic stages, i.e., the initial stage, intermediate stage, and advanced stage. Stages of regional development are highly correlated with the stages of economic development. Each stage of economic development has a different focus government spending but still must consider sustainability.

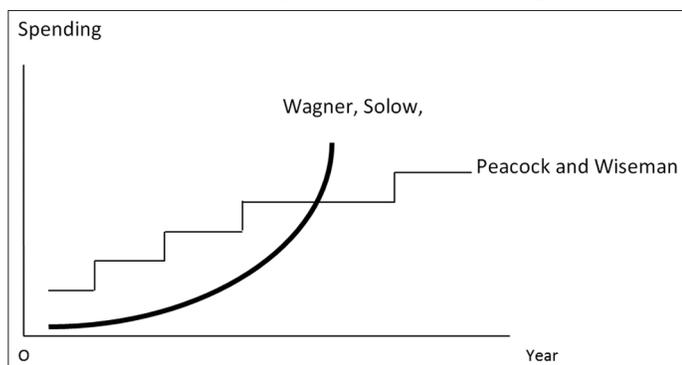
This is in line with the views expressed by Rostow and Musgrave in Mangkoesubroto (2001) stated that in the early stages of economic development in government spending should provide infrastructure such as education, health, infrastructure transportation, and so on. Therefore, in this stage, the percentage of government investment is very large. At the intermediate stage of economic development characterized by government spending focused on increasing economic growth in order to be able to take off. Thus the government investment is still required in order to support in order to increase economic growth. At this stage, private investment had grown 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 to shift from the provision of infrastructure spending for social activities such as programs for the elderly, programs for health care. This opinion provides an understanding that development expenditure should concern itself primarily by the government in order to budget allocations can be better targeted in accordance with a predetermined plan so that the set target could be realized. In the end, the people's welfare can be achieved as expected. However, based on research results Ramey (2011) there was no government spending has a multiplier effect that follows the direct effect itself.

#### 2.2.2. Wagner law

Wagner's Law is a law that links government spending to the development of the regional GDP. Wagner formulates government activity development law (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 as a percentage of gross national product.

In contrast to the view of Wagner, that the development of government spending Peacock and Wiseman's version does not form a line but is shaped like a staircase as seen in Figure 2.

**Figure 2:** The development curve government spending

Source: Mangkoesubroto, 2001

In relation to the financial area, the entire potential and revenue areas called fiscal capacity. While total expenditure is called fiscal needs. The difference between local fiscal capacity and the need for fiscal shows the magnitude of the fiscal gap area, the greater the negative value of the fiscal gap shows the fiscal gap area of a widening (Susetyo, 2004; Susetyo, 2017).

Government spending is government policies to finance the development of this area are 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, governmental, cultural, order, tranquility, and so is the task of government in general. In the area of financial management, governance of the administration frequently changing is very significantly each period. It is adapted to the changing environment and system of government. In the 2006 budget shopping areas carried out with guidelines to the Permendageri No. 13 of 2006 (Regulation No. 13/2006).

In grand design of fiscal decentralization stated mission related to shopping areas, namely: (1) Develop flexibility shopping areas are responsible for achieving minimum service standards, (2) harmonization of shopping centers and shopping areas to provide public services is optimal. In detecting optimizing management of shopping areas can be seen how the effect of the presence and capabilities of human resources and the local apparatus of local infrastructure conditions (Ministry of Finance, 2008). Potential regional government as a proxy for labor provide services to the public, while the availability of local infrastructure as a proxy for direct investment requirement for the infrastructure to encourage the development of regional economy.

The focus of this research activity is a series of research 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 area (Susetyo, 2011). Further research activities will be conducted to analyze the management of capital expenditure for public utilities and their implications for regional economic development. This study will be continuous along with the development and progress of the region in managing the regional finances continue to increase, as the law of Wagner (Suparmoko, 2002).

### 2.3. Definition Infrastructure

According to the publication World bank (1994) which states that there is no exact definition of the infrastructure, but still, there is broad agreement on the meaning of infrastructure. According to Macmillan Dictionary of Modern Economics (1996) that economic infrastructure is a structural element that facilitates the flow of goods between buyer and seller. According to Grigg (1998) that infrastructure is a physical system that provides transportation, irrigation, drainage, buildings, and other public facilities, which are required to meet basic human needs, both social needs and economic needs. In this case, matters related to infrastructure cannot be separated from each other. The system can be connected environment for their infrastructure that sustains the social system and the economic system.

While those workers will be more productive if they have tools to work. Equipment and infrastructure used to produce goods and services are called physical capital (Mankiw, 2003). It is also described in Todaro (2006) that the availability of infrastructure in a country is important and determining the factor for the rate of speed and the expansion of economic development. Infrastructure is a container for shoring activities in the space. Availability infrastructure provides easy access for the public to resources so as to improve efficiency and productivity in social and economic activities. By increasing the efficiency of automated indirectly promote economic development in a region that is very important the role of infrastructure in economic development.

According to Hansen (1965) differentiate into two types based infrastructure directly or indirectly impact on economic development, the social and economic infrastructure. The direct economic infrastructure to support production activities, such as roads, airports, ports, sewage network, water pipelines, electricity grids, and irrigation. Social infrastructure is built for social comfort and built in order to support economic productivity, such as schools, hospitals, gyms, and others.

In line with the classification of the infrastructure, The World Bank Report 1994 to classify infrastructure into three types: (a) Economic infrastructure is the physical assets needed to support economic activity, both in production and final consumption, including public utilities (power, telecommunications, drinking water, sanitation, and gas), public work (roads, dams, canals, irrigation channels, and drainage) and transportation (road, rail, transit ports, airfields and so on). (b) Social infrastructure is an asset that supports health, community expertise, including education (schools and libraries), health (hospitals and health centers), residential and recreation (parks, museums, etc.). (c) Administrative infrastructure or institutions, including law enforcement, administrative control, and coordination as well as culture.

Understanding the economic infrastructure is an infrastructure made up of physical infrastructure and services derived from it to improve economic productivity and quality of life such as transport, telecommunications, electricity, and irrigation. While the settlement infrastructure is an infrastructure made up of physical infrastructure services obtained from her body to meet

basic human needs and improve the quality of life such as clean water and housing.

**2.4. Research Accomplished**

Several previous studies that are relevant include: Susetyo et al. (2017) studied the influence of government expenditure, the total length of road and city-district number of civil servants in the province of Sumatra island Indonesia found the formulation of the regional economic development model as follows:

$$Y_{it} = -2,493.4550 + 5,7371X_1 + 1,9784X_2 - 1.2106X_3 + e_{it} \quad (2)$$

(-2.3641) (17.8583) (12.7929) (-2.4829)

Where,  $Y_{it}$ =Gross regional domestic product;  $X_1$ =Regional spending;  $X_2$ =Number of civil servant employees;  $X_3$ =Length of road;  $e_{it}$ =Error term;  $i$ =County-town;  $t$ =Time;  $t$ -value in brackets.

The research result Prasetyo (2013) examines the impact of infrastructure development on economic growth and inequality in the land border between Indonesia, with the approach of panel data of 16 counties inland border between Indonesia, found that social infrastructure is more dominant in influencing the growth of income per capita in the land border between Indonesia. The social infrastructure is education and health. Meanwhile, the economic infrastructure that plays a role in the growth of per capita income is telecommunications. Inequality in land border between Indonesia region affected directly by the public per capita income and the number of workers in the industrial sector.

Likewise, Radiansyah study (2012), which examines the contribution of infrastructure to economic growth in Indonesia in 1996-2008 with panel data approach 26 provinces of Indonesia found that all independent variables studied (roads, electricity, and telephone) positive and significant effect to economic growth. Implementation of the regional autonomy policy gives a positive and significant effect on GDP per capita caused by infrastructure development.

Further research by Yanizar (2012), which is examined the impact of the regional development spending policies and private investment to GDP and poverty in the province of Jambi. Research is done by building a system of the simultaneous equations econometric model using time series data from 1985 to the 2010 year. Research results conclude that the cooperation between local government 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 the increase in local government spending followed by an increase in private investment in productive sectors will spur economic growth which in turn will reduce the level of poverty.

By reference to the theory and previous researchs, the framework of research that may explain the relationship between concepts or variables that are formulated in a model. The model will be built in research activities can be seen in Figure 3.

The framework of this study describes the relationships between concepts or between variables observed in the research hypothesis is the influence of utility capital expenditures, the number of household customers of electricity, water and telephone on the economic development districts and cities in Sumatra, Indonesia.

**3. RESEARCH METHODS**

The scope of the study in this study is the number of customers of electricity, water and local telephone, and regional economic development. The location of observation as the unit of analysis is the districts-cities in Sumatra-Indonesia 155 districts and cities, while the observation period from 2010 to 2016 or during the period of 7 years.

Data used is secondary data and provides information for the primary data analysis unit. Secondary data sources are from the official publication of the Central Statistics Agency and the National Provincial, DJA-Finance, Bappeda and related OPD according to data. To overcome the limitation of the number of observed data, the use of panel data method (pooling data) is possible in this study or the multiplication of the number of districts and towns 155 with a series of observations of 7 years means that the number was around 1085 observations.

The method of analysis in this research is descriptive quantitative and qualitative descriptive. Parameter estimation method by using multiple simple regression use data panel (multiple ordinary least square).

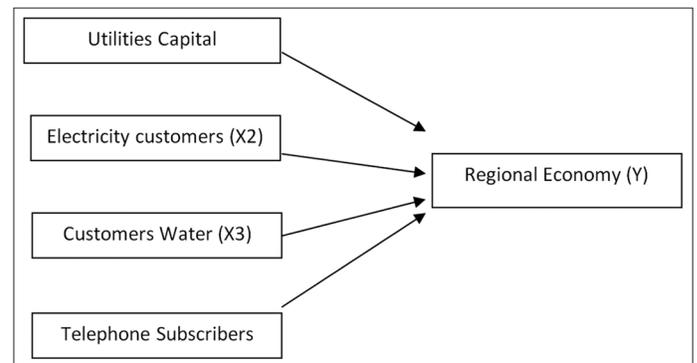
Furthermore, the econometric model to estimate the parameters using method of multiple simple regression (ordinary least squares) are:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + e_{it} \quad (3)$$

Description:  $Y$ =Economic growth (GRDP ADHK);  $X_1$ =Capital expenditures public utility;  $X_2$ =The number of electricity customers (PLN);  $X_3$ =The number of water company (PDAM);  $X_4$ =The number of phone subscribers (Telkom);  $\beta_i$ =Parameter;  $i$ =County-town;  $t$ =Time series;  $e$ =Error term.

Operational definitions of variables: (1) The economic development of the region is the regional GDP of regions and cities are

**Figure 3:** Framework research



calculated at constant prices every year (Billion Rupiah). (2) Capital expenditures for public utilities are capital expenditures (direct expenditure) for the utility areas listed in the results of the calculation of revenue and expenditure budget districts-cities (Millions Rupiah). (3) The number of electricity customers (PLN) is the number of household electricity customers (power) of the State Electricity Company (PLN) per year (units). (4) The number of clean water customers (PDAM) is the number of households subscribing to clean water for bathing and drinking sourced from local Regional Water Company (PAM) per year (unit). (5) The number of telephone customers (Telkom) is the number of households that subscribe to the telephone of PT Telkom every year (unit).

#### 4. DISCUSSION

Research variables that were examined in this study are the independent variables include capital expenditures for utilities, the number of electricity customers (PLN), the number of water customers (PAM), and the number of telephone customers (households) and the dependent variable is economic development by proxy GRDP of the districts-cities in Sumatra-Indonesia.

Economic developments are proxied by the regional GDP growth districts and cities in Sumatra. The accumulation of economic activity can be realized by the products and services produced in a given period and are represented by a proxy variable GRDP of the city district concerned. The economic development of regions and cities are very dependent on the availability of public utilities both quality and quantity proxied by the number of electricity customers (PLN), water (PAM), and telephone cables (Telkom).

Figure 4 shows the development of the GDP (in billions) respective regions and cities in Sumatra 2010–2016 period. GRDP districts-cities between 2010 and 2016 period showed an increase in absolute terms, but there are some districts and cities has decreased due to the expansion area. There are some districts and cities formed after 2012 so that the GRDP data do interpolation to needs analysis alone. Cumulatively that the GRDP growth districts-cities showed an increase in economic activity due to the increased

consumption of electrical energy, water consumption, and the increased use of telephone cables.

Similarly, capital expenditure for the development of public utilities showed an increase in the procurement of electrical energy production, clean water discharge, and a home telephone network. The increase in capital expenditures for the operations and maintenance of public utilities can be improvement infrastructure of public utilities. This means that with the quality of supply of public utilities will lead to more productive human activity and increase value-added production area.

Figure 5 shows the number of household customers of electricity, water, and telephone districts-cities in Sumatra 2010–2016 period. These indications show no significant customer growth for the amount of electrical energy that is used for the citizens thereby increasing the activity of daily activities. Similarly, more and more people using clean water and telephone networks will drive increased water consumption and increased communication activity has implications for increasing the economic activity of society.

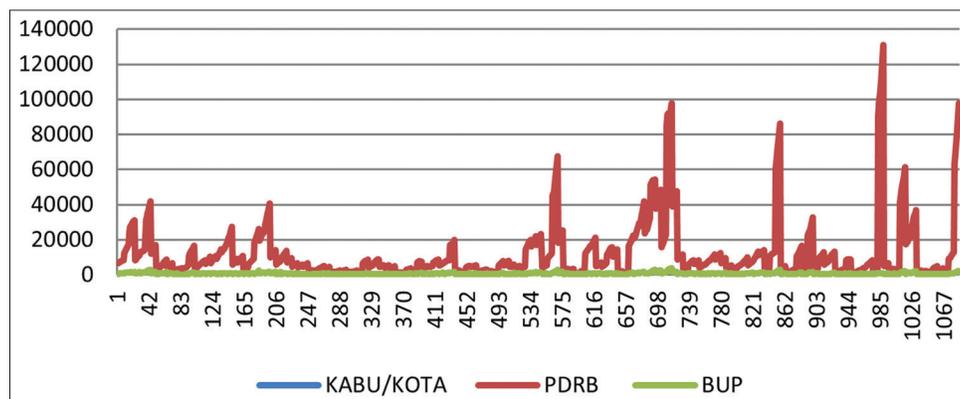
Furthermore, to obtain information about the ratio of capital expenditure to GRDP for public utility districts and cities in Sumatra 2010–2016 period can be seen in Figure 6.

The ratio of capital expenditure to GDP public utilities showed the ability of local public utility capital spending to boost economic growth figures are a relatively small area. When examined more in capital expenditures of public utilities (direct expenditure) seems still very low even relatively small compared to the operating expenditure or expenditure not directly. Regional public utility capital expenditures tend to increase with increasing need for funds to finance the procurement of goods and services of public utilities and public services to the community. Capital expenditure areas can accelerate regional economic growth when it is allocated to finance the capital expenditure of public utilities so that will be a multiplication of other activities, which in turn boost economic growth.

#### 4.1. Random Effect Model Estimation Results

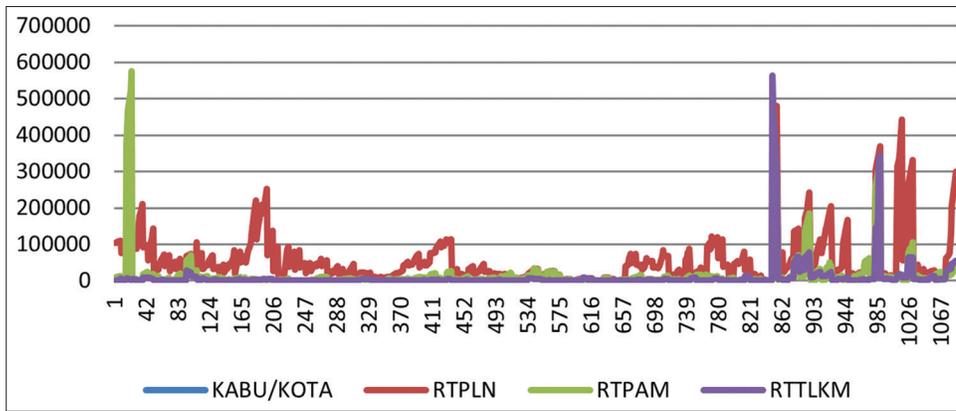
The results of parameter estimation data panel model with random effect are:

**Figure 4:** Development of the gross domestic product (billion) and expenditure of public utilities (billion) District-City in Sumatra Island 2010–2016



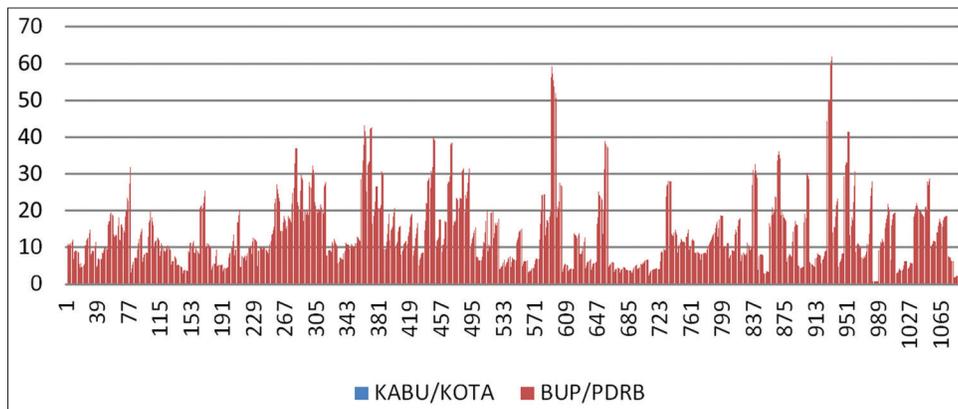
Remarks: GRDP=Gross Domestic Product ADHK; BUP=Public utility capital expenditures

**Figure 5:** Trends of total household subscribers electricity, water, and telephone district-city in Sumatra-Indonesia 2010–2016



Note: RTPLN=Number of household electric customers (PLN); RTPAM=Number of household water customers (PAM); RTTLKM=Total household fixed line subscribers (Telkom)

**Figure 6:** Ratio of public utilities capital expenditure to gross domestic product district-city in Sumatra 2010–2016



$$Y = 3068.452 + 5.379260X_1 + 0.036271X_2 + 0.104382X_3 + 0.038438X_4 + e_1$$

(4.426746)    (22.14616)    (9.584894)

(18.21292)    (9.010344)

|                         |          |                    |          |
|-------------------------|----------|--------------------|----------|
| R <sup>2</sup>          | 0.620157 | Mean dependent var | 767.4196 |
| Adjusted R <sup>2</sup> | 0.618750 | SD dependent var   | 2430.920 |
| SE of regression        | 1500.982 | Sum squared resid  | 2.43E+09 |
| F-statistic             | 440.8200 | Durbin–Watson stat | 0.325867 |
| Prob (F-statistic)      | 0.000000 |                    |          |

Description: Y=Gross regional domestic product; X<sub>1</sub>=Capital expenditure for public utility; X<sub>2</sub>=Total electricity customers (PLN); X<sub>3</sub>=The number of water customers (PAM); X<sub>4</sub>=The number of cable telephone customers (Telkom); e<sub>1</sub>=Error term, t-value in parentheses.

Based on the test results of the model estimation and model selection turned out to be elected random effect model obtained some implications of the results include:

a. Simultaneously (F-test) showed that the result obtained is observed the fourth variables are the capital expenditures of public utility, the number of electricity customers, clean water, and cable telephone of districts-cities, simultaneously

affect positively and significantly. It is with the F-count equal 440.8200 greater than F-table so that a fourth variable positive and significant impact.

- b. Partially, (t-test) showed that the effect of capital expenditure on the GRDP is positive and significant. Value t-count to the capital expenditure of public utility is 22.14616 greater than t-table so that a positive and significant influence. The regression coefficient of variable capital expenditure amounted area 5.379260 meaning that if there is an additional capital expenditure of area equal to one unit will have an effect on the increase in GDP at 5.38 of the unit.
- c. Partially (t-test) shows that the effect of the number of household electricity customers toward the regional GDP is positive and significant. Value t-count for the number of a number of household electricity customers is 9.584894 greater than t-table so that a positive and significant influence. The regression coefficient of a variable number of household electrical customers 0.036271 meaning that if there is an additional amount for one unit of electricity customers will have an effect on the increase in GRDP amounted to 0.0363 one unit.
- d. Partially (t-test) showed that the effect of the number of household water customers toward the regional GDP is positive and significant. Value t-count for the number of household water customer is 18.21292 greater than t-table so that a positive and significant influence. The regression coefficient of a variable number of water customers 0.104382

meaning that if there was an additional amount of water customers of one unit will affect the increase in GRDP amounted to 0.0144 unit.

- e. Partially (t-test) showed that the effect of the number of cable telephone customers toward the regional GDP is positive and significant. Value t-count for the number of telephone customers is 9.010344 greater than t-table so that a positive and significant influence. The regression coefficient of a variable number of telephone customers 0.038438 meaning that if there are additional telephone subscribers amounted one unit will affect the increase in GRDP amounted to 0.0384 unit.
- f. Analyzing coefficient of determination ( $R^2$ ) of 0.620157 or 62.02% and adjusted  $R^2=0.618750\%$  means the results of the estimation model can be described by the four-variable and significantly by 62.02%, while the remaining 47.98% explained by factors outside the model, such as investment in the form of foreign direct investment and domestic investment, total employment, labor force districts-cities, and other infrastructure for the installation of water distribution, long electricity network installation, telephone network installation cable length, and other variables.

#### 4.2. Implications of Research Findings

One of the findings in this study is the variable number of electricity customers, customers of clean water, and cable telephone customer positive effect on the economic development of districts and cities significantly in Sumatra. When referring to previous research that the variable infrastructure (road length) a negative effect on the economic development of regions and cities in Sumatra (Susetyo et al., 2017). The results of this study seem to deny the earlier research. It is not surprising that the changes observed variables have changed and indeed different variables at the time of observation of the previous period.

Similarly, in a study of infrastructure in Indonesia, there are some results that need further study related to procurement projects for electric power plants, the addition of clean water discharge, and the addition of wired telephone networks have operational constraints systematically. As an illustration of the challenges related explanations infrastructure investment in Indonesia can listen to explanations Syahrzard (2016) about the key challenges of lack of infrastructure investment (key challenges limiting infrastructure investment) are: (a) Investment electricity transmission, distribution, and power (electricity-transmission-distribution-power) is done in the public finance schemes or public-private partnership (PPP public-public/private); (b) clean water project: Transmission, distribution, and production (water-transmission-distribution-production) was also carried out with financing scheme by the government or PPP (PPP Public-Public/Private); (c) The investment in the telecommunications sector: Cable lines, cableless (mobil), internet (telecommunication Line-fixed-mobile-internet done by public financing schemes or public-private (PPP Public/Private-PPP/Private).

Furthermore, many government programs to provide clean water that were not served by the water company (PAM), as Pamsimas. The definition of clean water (clean water): Water used for

everyday purposes whose quality meets the health requirements and can be taken if it has been cooked (Minister of Health No. 416/Menkes/Per/IX/1990). Meanwhile, drinking water (potable water): Water through the treatment process or without any processing that meets the health requirements and you can drink (Minister of Health No. 492/Menkes/PER/IV/2010).

Fulfillment of clean water from the clean water drinking water (cooked before consumption) can be obtained from the source: Water taps, water wells, bottled drinking water (bottled water), water refill (AMIU). Water taps ~ water quality is generally a source of water comes from surface water, generally have experienced physical contamination, chemical, biological necessitating conventional processing up to advanced must be cooked first, while the well water must be cooked first because the quality depends on the location.

#### 4.3. Relevance Results to Theory and Research Previous

The results of random effect model estimation with panel data in this study are consistent with the results of model estimation common effect and fixed effect. If the record of the results of estimation of these models provide consistent results can be seen from the test-F simultaneously and the value of the t-test partially. This shows that all three models estimation results are consistent and significant. Despite the difference is in the coefficient of determination  $R^2$  for the model of such an approach.

Some implications of random effect model estimation selected above can be traced that the model estimation results are consistent with the 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 regions and cities affected by the development capital expenditure utility area as a proxy for the investment of public utilities, the number of electricity customers as a proxy for electricity consumers, the number of water customers as a proxy for consumer water, and the number of fixed line subscribers as a proxy for consumer phones.
2. Increasing local public utility of capital expenditures, the number of electricity customers, the number of water customers, and cable telephone customers more quality and will push up the GDP regions and cities in Sumatra-Indonesia. The greater the capital expenditures for local public utilities are needed to improve the availability of goods and services, especially public services and public utilities increased production.
3. The greater the increase in the number of electricity customers will increase their productivity means people will encourage the economic development of the region.
4. More and more customers are getting quality water will increase the life benefit for increased production, consumption, and economic distribution.
5. The more the quality of cable telephone customers will increase the benefit of domestic life in communicating to increase the activity of production, consumption, and distribution of regional economy.

6. This study is a different study with previous research related variables and the number of years of observation.
7. The bottom line of this study are in line and it is no different with the previous study, but the difference may be broader implications for the study of the locations or regions were observed to further increase the supply of utilities to the public.
8. Model estimates obtained in this study is one of the approaches that were analyzed by the principle that in order to develop the GDP regions and cities must be supported by capital expenditures for public utilities adequate area, the number of electricity customers, the number of water customers, and the number of telephone customers more qualified and more broad-reaching. It's certainly become one of the priorities of development to realize improvement of public services to all corners of districts and cities.

## 5. CONCLUSIONS AND RECOMMENDATIONS

Based on the research and discussion in the previous section some conclusions as follows:

- a. The estimation results are obtained simultaneously shows that it is the fourth observed variables, namely capital expenditure of public utility area, the number of household electricity customers, the number of household water customers, the number of households of cable telephone customers districts-cities in Sumatra positive effect toward the regional GDP (GRDP) and significant.
- b. Partial results of parameter estimation indicate 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 expenditures for public utility districts and cities into one form of government investment to stimulate economic growth area.
- c. Similarly, the effect of the number of household electricity customers is a positive effect on the GRDP districts-cities and significant. The more the number of electricity customers can potentially increase the consumption of electricity for household use so that good public services can boost economic growth area.
- d. The variable amount of household water customers positive effect on the GRDP districts-cities and significant. The increasing number of water customers managed by the district-city will encourage increased production of the local economy. More and more households consume clean water will increase its production and increase local economic activity.
- e. Variable number household of cable telephone customers is a positive effect on the GRDP districts-cities and significant. The increasing number of cable telephone customers of districts-cities will boost the production of the local economy. More and more households augment wireline network will increase production and increase local economic activity.
- f. Analyzing to the coefficient of determination that the GRDP relationship can be explained by four variables: Capital expenditures of public utilities area, the number of electricity customers, the number of water customers, the number of cable telephone customers are positively and significantly by 62.02%, while the rest or at 37.98% is explained by factors outside the model, such as the value of investment of foreign capital investment in the country's public utilities, the number of workers each public utility, the length of wiring electrical installations, the length of the distribution network of water pipes, cable length telephone installation household, or other variables.

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

- a. Management of local public utility capital spending should be increased, especially public services for the installation of new and old customers are impaired. The addition of capital expenditures to expand the network of public utilities, both the quantity but also in quality and quantity so that the funds allocated to accelerate the economic development of the region. Capital expenditure for public utility is enhanced with a larger portion compared with operating expenditure that will encourage the multiplication of other activities.
- b. Increasing the number of household electricity customers should continue to be made in line with the improvement of public services, particularly services in the event of interruption (blackout) and the addition of a power plant to areas still not reached by electricity. Improvement and procurement of electric energy supply are very important and useful to accelerate its range of services for local development in order to increase economic growth, expansion of employment opportunities and reduce unemployment and poverty.
- c. It seems that the level of affordability of water services in the regions and cities in Sumatra has not yet reached the ideal number that should be no installation of additional programs and distribution of clean water in the area. Improvement of water distribution in terms of quantity and quality should continue to support domestic activity and regional development. Increased production of clean water more evenly area to improve public services between regions is expected to increase the number of household customers. Increasing the number of possible water customers will add a family activity and boost local economic activity.
- d. Likewise, the increase of installation of cable telephone network is expected to increase the number of customers. The addition of public utilities primarily telephone installation wiring, both in quantity and quality should continue to support domestic activity in communication. Increased wireline network more evenly for improved public services among regions is expected to increase the number of household customers. Currently the program increase in the number of cable telephone a package of cable TV channels and the internet it is possible to add insight and information for family activities and boost the production of the local economy.
- e. For the purposes of further 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-Indonesia.

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