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Research Article

Panel Analysis of the Effect of Locally-Generated Revenue on Provincial Economic Growth

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Abstract: The purpose of this study is to measure and analyze the effect of locally-generated revenue on the economic growth of 23 districts in Aceh Province, Indonesia over the period 2013-2017. Using the weighted fixed effect model (FEM) of panel regression, the study found that the locally generated revenue has a positive and significant effect on the economic growth of 23 districts in Aceh Province, Indonesia. Of the districts, 11 of them, their locally-generated revenues have a positive effect on the districts' economic growth with the most significant increase was recorded in the North Aceh District and Banda Aceh City. In contrast, 12 districts' locally-generated revenues have a negative effect on their economic growth with the lowest decline was recorded for the Sabang city. These findings suggest that to further improve economic growth; the local government should pay attention to further increase and manage efficiently their locally-generated revenues.

Keywords: Locally-generated Revenue, Regional economic growth, Fixed effect model.

INTRODUCTION

Tax plays an important role in promoting economic growth. However, an increase in an income tax does not always have a positive effect on economic growth (McNabb, 2018). Similarly, an income generated from oil source, if it is not well-managed, it does not affect other economic sectors (Kabir, 2016). In contrast to Kabir (2016), Nweze and Edame (2016), in his study, found that income generated from oil has a significant influence on economic growth. These facts show that both incomes generated from taxes and oil has important roles in the promotion of economic growth.

In addition to the above factors, the value of production from natural products can also enhance economic growth. The greater income collected by the region is expected to increase the economic growth in the area, such as in the province of Aceh, Indonesia. The development budget of the Aceh provinces across 23 districts is sourced from the special autonomy fund, the additional oil and gas funds, and the general allocation fund as the balancing fund income group. To further improve economic growth, each region needs funds that are not only sourced from the state budget, but also from local revenue itself. The ability of the region to provide funding from the regions in the form of locally-generated revenue is highly dependent on the ability to realize the existing economic potential into forms of economic activity capable of creating revolving funds for sustainable regional development. In creating regional independence, local governments must adapt and improve the quality of public services and improvements in various sectors that have the potential to be developed into sources of local revenue.

According to the report of BPS – Statistics Indonesia (2018), the percentage of original regional income to total regional income, the level of financial independence of a region could be classified as very low (0-25%), low (25-50%), moderate (50-75%), and high (above 75%). But unfortunately, the level of financial independence of the districts in Aceh province was classified as very low with a percentage of locally-generated revenue of 6-9% annually or worth IDR1 - 2.7 trillion per year.

Tax as parts of the provincial original revenue group has been contributing little to spending compared to the three types of regional income. This condition illustrates the lack of independence of Aceh province to fund its activities of development. Meanwhile, revenue-sharing funds are likely to decrease due to the decline in oil and gas revenue-sharing revenues which are

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expected to continue to decline in the coming years in the absence of new sources of oil and gas fields.

As reported by the BPS – Statistics Indonesia (2018), the realization of Aceh's original revenue for all districts in the province in the last five years has increased. Regional original income in 2016 reached IDR2,648 billion, amounting to 17.63% from the previous year which reached IDR2,251 billion. The regional original income in 2014 reached IDR1,910 billion or doubled from 2013 reaching IDR1,026 billion. Furthermore, the local government in 2017 is expected to achieve the targeted revenue of IDR2,660 billion. This increased realization shows the commitment of the Government of Aceh to continue to explore the potential sources of regional funding collected through taxes, levies, provincial state-owned enterprises' profits, and other sources of income, which in turn can affect the economic growth and the level of community welfare. However, it is important to realize that the region's original revenue has been not optimal, which is reflected in the low percentage of actual regional revenue realization to total regional income.

This study intends to explore the effect of locally-generated revenues on the economic growth of 23 districts in the Aceh province, Indonesia. This study contributes to the existing studies as it has advantages and differences compared to previous studies. The similarity of the studies by Hariyadi and Yasa (2014) and Novianto and Atmanti (2013) with this study are both using the variable Gross Regional Domestic Product (GRDP) as the dependent variable tested, whereas in some other studies using economic growth, per capita income, and infrastructure development. In addition, the use of locally-generated revenue in the form of realization in this study is due to the realization of regional income is considered good if it exceeds the budget target, because revenue is the minimum limit that must be achieved by the region, so this indicator can be used to evaluate the performance of local governments in implementing the budget. Another difference lies in the selection of periods, the object of observation, and the analytical method used. Therefore, this study seeks to determine the effect of locally-generated revenues on GRDP in 23 districts in Aceh Province, Indonesia over the period 2013-2017.

The rest of this study is structured in the following manner. Section 2 provides the selected literature reviews 2 and followed by the discussion on the research method in Section 3. Section 4 provides the findings and their discussion and ended with the concluding remarks in Section 5.

LITERATURE REVIEW

Several pieces of literature have explored the effect of taxation and locally-generated revenues on economic growth. For example, in the study using a panel regression analysis, Babatunde *et al*. (2017) found a positive relationship between tax revenue and GDP. Dang and Dashe (2017) examine the contribution of regional income to economic growth (GDP) in Nigeria using Panel Fully Modified Least Square (FMOLS) techniques over the 2011-2016 period and found that regional own-account revenues have a small and insignificant contribution to economic growth in Nigeria.

Other studies examined the effect of tax on economic growth that has been conducted by Takumah (2014) for the case of Ghana using quarterly data for the period 1986 to 2010 and analyzed using the Vector Autoregressive (VAR) framework. The study found that there was a short-term and long-term relationship between economic growth and tax revenue. The results showed the directional causality from tax revenue to economic growth with a positive and statistically significant effect. Rosoiu (2015) analyzed the impact of government revenue and government spending on economic growth in Romania for the period 1998.Q1-2014.Q1 using the Granger causality and VAR techniques and documented a positive relationship between tax revenue and economic growth.

Furthermore, Chingbu *et al*. (2012) examined the causality between economic growth and taxation in Nigeria for the period 1970-2009 using econometric models of Granger causality and Johansen's cointegration approaches. They found that taxation as an instrument of fiscal policy has affected economic growth. In a study of Adenugba and Ogechi (2013) that examined the effects of local revenue on infrastructure development in the Lagos State, they found a significant positive relationship between regional own-source revenue and infrastructure development. Ogbu *et al*. (2017) evaluated the impact of the use of local revenue on structural development in the Ebonyi State, such as road infrastructure, water and education over the period 1996-2014 using simple regression analysis and found that local sources of revenue have an insignificant impact on road infrastructure, but it has a significant impact on education and water infrastructure. Nkechi and Onuora (2018) investigated the effect of local revenue on the infrastructure development of Southeastern countries in Nigeria using linear multiple regression and found a significant relationship between regional own-source revenue and infrastructure costs.

Several researchers have also conducted studies on the effect of local revenue in Indonesia. For example, Harianto and Adi (2007) examined the effects of special fund allocation, capital expenditure, locally-generated revenue, and per capita income in the provinces of Java and Bali during the period 2001-2004 using the Structural Equation Modeling method. The study documented that locally-generated revenue has a positive and significant effect on economic growth. Novianto and Atmanti (2013) analyzed the determinants

of the growth of Central Java's GRDP from 1992-2011 with the Ordinary Least Square (OLS) method. The results showed that regional own-source revenue has a positive and significant effect on GRDP. Hariyadi and Yasa (2014) conducted a study to determine the effect of locally-generated revenue on GRDP and capital expenditure with multiple linear analysis methods with intervening variables. The study showed that locally-generated revenue has a positive and significant effect on capital expenditure and GRDP. However, locally-generated revenue has an insignificant effect on GRDP through capital expenditure. These empirical pieces of evidence are also supported by a few other studies (Majid, 2007a, Majid, 2007b, Majid *et al*., 2007, and Majid and Kassim, 2015).

In a similar vein, Mutiara (2015) explored the effect of local taxes, regional levies, capital expenditure, and labor force participation rates on GRDP in the districts of East Kalimantan Province during the period 2004-2013. Using a panel data of the Fixed Effect Model (FEM), the study recorded that regional taxes and levies have a significant and positive effect on GRDP. In addition, Maridjo and Mudayen (2016) examined the effect of institutional changes, balance funds, and locally-generated revenue on Indonesia's economic growth over the 2000-2015 period using multiple regression analysis methods. They documented the existence of a positive and significant influence of locally-generated revenue on regional economic growth. Finally, Simanjuntak *et al*. (2017) used the path analysis to explore the determinants of economic growth as a mediating variable from local original income, investment and asset management on employment, and social welfare of regencies in the Riau Islands province during the 2010-2015 period. The study found that local own-source revenue has a significant influence on economic growth.

RESEARCH METHODS

This study uses panel data that is a combination of time-series data (2013-2017) and cross-section data (23 districts in Aceh Province, Indonesia). Secondary data were obtained from government agencies such as BPS – Statistics Indonesia and the Directorate General of Balance and Finance (DJPK), the Ministry of Finance of the Republic of Indonesia.

To measure and analyze the relationship between locally-generated revenue and economic growth of 23 districts in the province, a panel data regression analysis method was used in the study. In the estimated model, the dependent variable of Gross Regional Domestic Product (GRDP) of Aceh at the constant price of 2010 is regressed against the independent variable of locally-generated revenue, as illustrated by the following equation:

$$GRDP = f(LGR) \text{ ----------(1)}$$

Where the GRDP is the Gross Regional Domestic Product as a measure for economic growth, LGR is the locally-generated revenue.

To measure the Equation 1, the panel regression analysis is used. In the panel regression analysis, a combination of data that is collected individually (cross-section) and it is collected at a certain time (time series) were utilized. Cross-section data is data collected from time to time for many individuals, while time-series data is collected from time to time to an individual. In the panel regression analysis, Equation 1 could be re-written as follows:

$$LGRDP = \alpha_0 + \alpha_1 LLGR_{it} + e_{1it} \quad (2)$$

where α_0 is the constant term, α_1 is the estimated coefficient of the locally-generated revenue, LGRDP is the logarithm of Gross Regional Domestic Product, LLGR is the logarithm of the locally-generated revenue, *e* is the error term, and it is the district i at the period t.

In general, the panel data analysis techniques could be estimated using the Common Effect, Fixed Effect, and Random Effect methods. To determine which method is more appropriate to be adopted in our study, the Chow Test and the Hausman Test were used. Chow Test is used to test the suitability of the model between the Common Effect and Fixed Effect methods. Next, the Hausman Test is performed to select the best model between the Fixed Effect and Random Effect methods.

FINDINGS AND DISCUSSION

Table 1 reported the findings of the Chow test and the Hausman test to identify the most suitable panel model for estimating the effect of locally-generated revenue on the economic growth of 23 districts in Aceh province, Indonesia.

The Chow test is conducted in the first stage to find out which model is better to use between common effects and fixed effects. As illustrated in Table 1, the null hypothesis is rejected at the 1% level, showing the fixed effect model is more suitable to be adopted as compared to the common effect model. In the second stage, the Hausman test is conducted to select which model is more suitable between the fixed effect model and random effect model. The test showed that the null hypothesis is also rejected at the 1% level of significance, signifying that the more appropriate model to be used in this study is the fixed effect model as compared to the random effect. Thus, this study adopted the fixed effect model to estimate the effect of locally-generated revenue on the economic growth of 23 districts in Aceh province, Indonesia, as evidenced by both the Chow test and the Hausman test.

Table 1: Findings of Model Specification Tests

Test	Statistic value	Prob.
Chow test	707.650	0.000*
Hausman test	51.215	0.000*

Note: *significance at the 1% level.

Before the fixed effect model is estimated, the test of classical assumptions to ensure the estimated model fulfills Best, Linear, Unbiased Estimator (BLUE) criteria are conducted first. These tests include a multicollinearity test, serial correlation test, and heteroscedasticity test. Table 2 reports the classical assumption test.

Table 2: Findings of Classical Assumption Tests

Test	Finding	Remark
Heteroscedasticity test (SSR Weighted/SSR Unweighted)	0.0546 < 0.0597	Homokedastic
Autocorrelation (Durbin Watson) test	1.3398	No serial correlation
Multicollinearity test	0, k = 1	Non-multicollinearity

In this study, the weighted fixed-effect model in the form of a cross-sectional weight is performed, as shown in Table 2. This is intended to overcome the problem in the heteroscedasticity test. Based on the table, it can be seen that the value of Sum-Square Residual (SSR) Weighted Statistics (0.0546) is smaller than the Sum-Square Residual Unweighted Statistics (0.0597), then this model is said to be free from the assumption of heteroscedasticity. Furthermore, the serial correlation test showed the evidence of rejection of the alternative hypothesis, confirming the data used in the study are free from serial correlation problems. This is shown by the Durbin Watson (DW) value of 1.3398, while the DW table value obtained the lower Durbin value (dL) = 1.6783 and the upper Durbin value (dU) = 1.7133 (n = 115 and k = 1). Based on the estimation results, where the DW value is smaller than the dL, which means it is a non-serially correlated. Autocorrelation problems often occur in time series data whereas in panel data do not require the consideration of a model-free from serial, the test of the serial correlation can be ignored (Nachrowi and Usman, 2006). Finally, the multicollinearity test can also be ignored because there is only one independent variable that is used is the estimated model, thus the model is free from multicollinearity assumptions.

Table 3 reports the findings from the fixed effect model. As illustrated in the table, the F-statistics is found to be significant at the 1% level, indicating that the estimated linear regression model is feasible to use to estimate the parameters in the model. Regression estimation results showed that the coefficient of determination (R^2) is 0.9978, indicating that 99.78% variations in the economic growth of 23 districts in the province of Aceh, Indonesia are explained by the changes in their locally-generated revenue, while the remaining 0.22% is explained by variables excluded in our estimated model.

Table 3: Findings of the Effect of Locally-Generated Revenue on Economic Growth Based on the Weighted *Fixed Effect Model*

Variable	Coefficient	t-value	Prob.	Sign	Remark
Constant	11.2989	132.1576	0.0000		
Locally-generated revenue	0.1172	14.8847	0.0000*	+	Significant
F-Statistics = 1776.828; R^2 = 0.9978; Adjusted R^2 = 0.9972; Prob. F= 0.0000					

Note: *significance at the 1% level.

As reported in Table 3, the estimated value of the constant term of 11.2989 showed that when the locally-generated revenues are non-existent, the value of GRDP was equal to 11.2989. It is also found that the locally-generated revenue has significantly and positively affected the economic growth across 23 districts in the province at the 1% significant level. This shows that an increase in 1% of the locally-generated revenue has contributed positively to a 1.17% increase in the economic growth of 23 districts in Aceh province, Indonesia. These findings confirmed that the locally-generated revenue can be used as a measurement tool to assess the economic development of the districts, as their economic growth is highly dependent on the tax capacity of the districts concerned. The tax received from the locally-generated revenue reflects the volume of economic activity. As long as the economy is not developing, the locally-generated revenue cannot be developed by the regional government (Sugianto, 2008).

Referring to the report by the BPS – Statistics Indonesia (2018), the development of the locally-generated revenue has always increased during the study period. The increase in the locally-generated revenue has been inseparable from the potential sources of it alone which are levied through taxes, levies, provincial state-owned enterprises, and other sources of income. (Babatunde *et al*., 2017) stated that the relationship between tax revenue and economic growth is not surprising because developing countries such as Africa have used taxation as a key to local revenue to improve economic performance. In several African countries, it is evident that the increase in income generated from sectors such as agriculture, industry, and trade has increased the contribution of taxes to economic growth.

With the increase in the locally-generated revenue, the government will be able to easily finance regional needs, which in turn will improve the performance of local governments. The increase in Aceh's locally-generated revenue will have an impact on improving the facilities for the community. Relevant results found by Nkechi and Onuora (2018), who stated that local revenue plays a very important role in infrastructure development, including regional original income which does not cause hyperinflation, do not have interest payments like domestic loans, makes the government more responsible and more responsive to people's needs, serves as a tool for economic development, helps in investment planning, savings, and strong fiscal instruments to drive the economy. So when the government has a lot of capital to do development, it will create more jobs and business opportunities that have a positive impact on all economic growth. Our finding also supports the findings of studies by Adenugba and Ogechi (2013) and Ogbu *et al*. (2017). In their studies, they reported that local own-source revenue had effectively increased infrastructure development. The results of our study are also in accordance with studies by Harianto and Adi (2007), Novianto and Atmanti (2013), Hariyadi and Yasa (2014), Mutiara (2015), Maridjo and Mudayen (2016), and Simanjuntak *et al*. (2017), who all of them found a positive and significant effect of regional own-source revenue on the regional economic growth.

Finally, Table 4 reports the findings of the effect of locally-generated revenues on economic growth across 23 districts/cities in the province of Aceh, Indonesia.

Table 4: The Findings of *Fixed Effect Model* Based on the District

District/cities	Individual effect	Constant
Banda Aceh	0.4818	11.7807
Aceh Besar	0.3341	11.6330
Sabang	-0.5827	10.7161
Pidie	0.2002	11.4991
Pidie Jaya	-0.1941	11.1048
Bireuen	0.3187	11.6176
Aceh Utara	0.5867	11.8855
Lhokseumawe	0.3075	11.6064
Aceh Timur	0.2920	11.5909
Langsa	-0.0772	11.2217
Aceh Tamiang	0.1298	11.4286
Bener Meriah	-0.0651	11.2337
Aceh Tengah	0.0945	11.3934
Gayo Lues	-0.3015	10.9974
Aceh Tenggara	-0.0860	11.2129
Aceh Jaya	-0.3042	10.9947
Aceh Barat	0.1249	11.4238
Nagan Raya	0.1653	11.4642
Aceh Barat Daya	-0.1589	11.1400
Aceh Selatan	-0.0272	11.2717
Subulussalam	-0.4681	10.8308
Aceh Singkil	-0.3612	10.9377
Simeulue	-0.4092	10.8897

As illustrated in Table 4, of 23 districts/cities, 11 districts in Aceh province have a positive fixed effect coefficient. This positive effect is in accordance with the hypothesis that the greater the locally-generated income, the greater its effect on economic growth. The most significant increase in economic growth, which is above the average of the provincial economic growth, was recorded by the

districts of Aceh Utara and Banda Aceh City. Meanwhile, in other regions, there were still many that were negative or experienced a decline in economic growth that is below the average of Aceh Province by 12 districts/cities. The Sabang city has a very low fixed effect value. This negative value means that the increase in locally-generated income tends to reduce economic growth. This is influenced by several factors, such as low acceptance in some regions making it difficult to achieve higher economic growth. In addition, taxes, which are one component in the source of locally-generated revenues, can reduce consumption. The reduced consumption will, in turn, cause a decrease in income.

Specifically, the districts that have positive effect and the effect of locally-generated revenue on economic growth were greater than the average of provincial economic growth were Banda Aceh (0.4818), Aceh Besar (0.3341), Pidie (0.2002), Bireuen (0.3187), Aceh Utara (0.5867), Lhokseumawe (0.3075), Aceh Timur (0.2920), Aceh Tamiang (0.1298), Aceh Tengah (0.0945), Aceh Barat (0.1249), and Nagan Raya (0.1657). These districts/cities proved to have collected locally-generated income optimally and well-managed them to promote economic growth.

On the other hand, 12 districts/cities in the province were found their locally-generated revenue negatively affected their economic growth. These districts/cities include Sabang (-0.5827), Pidie Jaya (-0.1941), Langsa (-0.0772), Bener Meriah (-0.0651), Gayo Lues (-0.3015), Aceh Tenggara (-0.0859), Aceh Jaya (-0.3042), Aceh Barat Daya (-0.1589), Aceh Selatan (-0.0272), Subulussalam (-0.4681), Aceh Singkil (-0.3612), and Simeulue (-0.4092). These findings showed that these districts/cities failed to maximize the collection of locally-generated income and thus could not promote their economic growth.

In summary, the ability of local government to collect and well-managed their local sources of income, particularly from the taxes would contribute to the enhancement of their regional economic growth. The efficient utilization of income taxes to promote the welfare of citizens would be easily materialized. A better budget planning and its implementation, followed by gradual and continuous monitoring and evaluation would ensure the improvement of the citizens' welfare.

CONCLUSIONS

Based on the above discussion, it could be summarized that all districts/cities in Aceh Province experienced an increase in regional own-source revenue during the 2013-2017 period with an average of IDR91.5 billion. Overall, Aceh's locally-generated revenue has a positive and significant effect on economic growth for all 23 districts/cities in Aceh Province. Of 23 districts/cities, 11 of them, their locally-generated revenue have a positive influence on economic growth, where the highest effects were recorded by the districts/cities of Aceh Utara and Banda Aceh. Meanwhile, the rest 2 districts/cities, their locally-generated revenue have a negative effect on economic growth, where the lowest effect was recorded by Sabang city.

Referring to this empirical evidences it is suggested that the government of Aceh to continue striving to increase locally-generated revenue as it contributes toward higher economic growth of the province. The government of Aceh must set a target of increasing Aceh's locally-generated income annually at least by 50%. Finally, it is suggested that the government should pay attention to 12 districts/cities that have a negative influence of locally-generated income on economic growth by further exploring all the potential local income sources by each region.

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