ANALYSIS OF CONVERGENT SIGMA AND CONVERGENT BETA REVENUE AND EXPENDITURE OF REGENCY/CITY GOVERNMENT IN THE SPECIAL REGION OF YOGYAKARTA

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ABSTRACT

The era of fiscal decentralization requires every region to be more optimal in managing their Regional Revenue and Expenditure Budget (APBD). However, due to the differences in the characteristics of each region, fiscal decentralization encourages the existence of regional budget gaps. This analysis explored the convergence of district/city government revenues and expenditures in the Special Region of Yogyakarta in 2011-2019 based on the sigma and beta convergence models. This study uses a quantitative approach that describes data in numerals or percentages and econometric analysis in the form of panel data regression (data pool). Panel data combines data, cross-section, five regencies/cities in DIY, and data for time series 2011-2019. The data needed in this study is the Realization of Regional Revenue and Expenditure data, as well as data on the control variables, namely the population, economic growth, and inflation sourced from the Central Statistics Agency and the Directorate General of Fiscal Balance, Ministry of Finance of the Republic of Indonesia. The calculation of sigma convergence uses the coefficient of variants, while the beta convergence calculation uses
panel data regression analysis with a fixed-effect model approach. The results showed that Regency/City Revenues and Expenditures in DIY had not experienced sigma convergence because the average coefficient of variants of each revenue and expenditure was 3.51% and 3.29%; however, there was a tendency to experience convergence because the coefficient of variants has decreased from year to year. Conditional beta convergence, which includes control variables, shows a tendency for acceptance convergence with a convergence speed of 0.478%, and the length of time required to cover half the gap (half-life) is 16.83 years. Explanatory variables such as population and economic growth have accelerated revenue convergence. Meanwhile, the conditional beta also shows a tendency for spending convergence which takes 19.04 years with a convergence speed of 0.420%, where only the population variable is proven to accelerate the convergence of spending.

**Keywords:** Convergence; Regional Revenue; Regional Expenditures.

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**INTRODUCTION**

Convergence is the reduction of income disparities between regions or conditions where the gap or disparity between regions becomes smaller (Schmitt & Peter, 2011; Maryaningsih; and Dana, 2018). Convergence makes conditions between regions in certain variables more similar (Schmitt and Starke, 2011). Barro and Sala-i-Martin (1992), Marques and Soukiazis (1998) stated that convergence means a negative relationship between the initial income level and economic growth during a specific period, while the level of income in question is the income per capita. Many studies on convergence whose discussion are no longer limited to economic growth and per capita income, such as the convergence of decentralization fiscal (Dana, 2018) labor market convergence (Estrada et al., 2012). The condition of convergence is a condition that should be achieved by every country and region, as is the case in Indonesia. Fiscal decentralization transfers financial resources from the central government to local governments to fund decentralized affairs from the expenditure and revenue sides. The transfer of financial resources from the central government used for local government spending to carry out economic development will encourage regional economic growth and allow inter-regional convergence (Skidmore & Steven, 2008; Sarue et al., 2007; Coughlin et al., 2007; Dekiawan, 2007). 2014; Dana, 2018). According to Saad & Kalakech (2009), Lahirushan & Gunasekara (2015), Hasnul (2015), and Rosoiu (2015), local government revenues and expenditures in the era of fiscal decentralization are significant in encouraging economic development. Therefore, the management of the APBD must be optimal so as not to cause disparities between regions.

Implementation of decentralization in Indonesia is at the district/city government level, so this examination tries to examine the condition of convergence in the districts/cities in DIY by using fiscal decentralization indicators in regional revenues and expenditures. This research has taken because research on the convergence of regional revenues and expenditures at the Regency/City level is minimal. With this research, it is hoped that the government can detect the influence of fiscal decentralization policies on economic development. This research is also expected to contribute empirically in enriching and expanding existing analyses on the impact of implementing fiscal decentralization in Indonesia.
Fig. 1. Average Growth of Regency/City Government Revenue and Expenditure Realization in DIY 2011-2019 (Percent)

Growth of Revenue and Expenditure realization in Regency/City DIY In the era of fiscal decentralization, it appears to have the same pattern where the high regional income also affects the high regional expenditure. Even the growth of Regional Expenditures exceeds Regional revenues. The gap between local revenues and expenditures where expenditure growth is more significant than revenue growth can be sourced from suboptimal management of local governments caused by weak government performance. This condition can trigger inequality between districts/cities in DIY (see table 1). Based on these conditions, the goal of this analysis is to examine the convergence of Regency/City government revenues and expenditures in DIY based on the sigma and beta convergence models to find out whether Regency/City revenues and expenditures in DIY are already leading to a convergence condition or are actually leading to divergence.

THEORY OVERVIEW

Fiscal Decentralization

Decentralization is more like the transfer of policies from the central government to the local governments to manage their households, but not for all matters, security, law, and policy are some things that are still centralized, but there is still delegation to the regions. Rondinelli and Cheema (1983) define decentralization as transferring planning, decision-making, and administrative authority from the central government to central regional organizations, local administrative units, semi-autonomous and parastatal organizations (companies), local governments, or non-governmental organizations. Fiscal decentralization is defined as the delegation of authority in allocating previously centralized finances. Fiscal decentralization requires shifting some responsibility for revenues and/or expenditures to lower levels of government Halim (2012).

The concept of fiscal decentralization is also known as the money follow function, which means that the granting of authority from the central government to local governments will be
followed by the distribution of authority in receiving funding. With the delegation of some of these authorities to sources of revenue in the regions, it is hoped that the regions can carry out their routine tasks, provide public services and increase productivity (investment capital investment) in their regions. Fiscal decentralization requires a shift of some responsibility for revenue and/or expenditure to lower levels of government. A crucial factor in determining fiscal decentralization is the extent to which local governments are given the authority (autonomy) to determine the allocation of their expenditures. Another critical factor is the ability of the regions to increase PAD revenues (Elmi 2002).

According to Oates (1993) in Sasana (2006), fiscal decentralization will improve economic growth and the general welfare because sub-national governments or local governments will be more efficient in producing and supplying public goods. Decision-making at the local government level will be heard more to diversify local choices and benefit allocation efficiency. Oates also stated that fiscal decentralization raises financial efficiency, which is connected to the dynamics of economic growth. Regional government spending on infrastructure and the social sector is more likely to spur economic growth than central government policies. According to him, regions have advantages in making expenditure budgets so that they are more efficient by satisfying the community's needs because they know more about the situation.

**Convergence**

Convergence is the reduction of income disparities between regions where convergence conditions can occur if an area with low income experiences rapid growth compared to a region with high income so that in the long term, it will experience convergence (Kaitila, 2013; Malik, 2014; Li et al., 2004; 2016). Convergence can also be interpreted as an indicator in presenting inclusive economic growth (Maryaningsih, Hermansyah, & Savitri, 2014). Convergence theory based on neoclassical growth theory is derived through Cobb-Douglas production function with a constant return to scale. Following Barro and Sala-i-Martin (1992) and Onder et al. (2007), it can be explained as follows:

\[ Y_t = K_t^\alpha (A_t L_t)^{1-\alpha}, \quad 0 < \alpha < 1 \]  
\[ Y \text{ is output, } K \text{ is capital, } L \text{ is labor, } A \text{ is technology. In the Solow model, the saving rate, population growth, and technological progress are considered exogenous. If } g \text{ and } n \text{ show the growth rates of } A \text{ and } L \text{ respectively, while the share of output, } s, \text{ is constant and saved, then:} \]

\[ (t) = (t) -(n + + )k(t), \delta = \text{depreciation rate} \]  
\[ \text{Using the steady-state value of } k \text{ in the above equation, the steady-state income per capita is:} \]

\[ \ln \left( \frac{Y(t)}{L(t)} \right) = \ln A(0) + g + \frac{\alpha}{1-\alpha} \ln s - \frac{\alpha}{1-\alpha} \ln (n + g + ) \]  
\[ \text{If } y^* \text{ indicates income steady state, then:} \]

\[ \frac{d \ln Y_t}{dt} = (\ln Y^* - \ln Y_t) \]  
\[ \text{So, the convergence model using Sollow growth can be formulated as follows:} \]

\[ \ln Y_t = e^{-\lambda t} \ln Y_{t-1} + \left( 1 - e^{-\lambda t} \right) \ln y^* \]
Research conducted by Schmitt & Peter (2011) and Gáspár, (2012) emphasizes that convergence makes the economy of a country or region the same level. The concept of convergence is divided into two, namely beta convergence and sigma convergence. Sigma convergence measures the degree of dispersion of income. If the income dispersion has decreased, it can be said that the inequality between regions tends to decrease, or there has been a convergence of income (Dekiawan, 2014; Young, Higgins, & Levy, 2008). The occurrence of convergence at convergent sigma is seen through the value of the coefficient of variants when the coefficient of variants shows a value that is getting smaller or approaching zero.

Beta convergence is used to determine the effect of the estimated factors in determining the level of convergence. Convergent beta describes convergence acceleration between underdeveloped and developed regions (Maryaningsih et al., 2014; Gáspár, 2012; Dekiawan, 2014; Acemoglu, 2008). Beta convergence is divided into unconditional or absolute convergence and conditional convergence. Absolute convergence is a condition where the economy between regions has similarities, such as economic structure, demographic conditions, savings rates, and other economic variables. Conditional convergence states that the structural characteristics inequality between countries or regions have so convergence is influenced by the structural characteristics of the country or the region (Lall and Yilmaz, 2000; Schmitt and Starke, 2011). This result has the consequence that the model conditional convergence needs to be added with various explanatory variables (Dekiawan, 2014).

**Fiscal Convergence and Decentralization**

Skidmore & Steven (2008); and (Dana 2018) incorporate the concept of fiscal decentralization convergence by including it in the government spending model to see how fiscal decentralization policies can reduce disparities between regions. The concept of convergence in fiscal decentralization is written with a mathematical model as follows:

\[
G_t = a_t Q_{t-1} \tag{6}
\]

Parameter \(a\) is constant so that the government budget reflects past events and conditions. According to Skidmore and Deller (2008), existing conditions are not unrelated to current governance spending, but one-time conditions also have relevance. \(t\) Output per capita (\(Q/L\)) is a part of private capital (\(K\)) and government social inputs (\(G_t\)), while private inputs are a separate part of government inputs. This parameter is formulated by Skidmore and Deller (2008:43) as follows:

\[
\frac{Q_t}{L_t} = f \left( \frac{K_t}{L_t}, \frac{G_t}{L_t} \right) = V_p (k_t) V_g (g_t) \tag{7}
\]

Equation (7) describes economic growth with the condition of social input from the government. Furthermore, equations (6) and (7) are combined using a constant return to scale approach that uses the production function *Cobb-Douglas* as follows:

\[
G_t = a_t L_{t-1} q_{t-1} a_t A L_{t-1} k_t^{\alpha} g_t^{\beta} \tag{8}
\]
Equation (8) is a production function of Cobb-Douglas, which has included the concept of fiscal decentralization policy. The study conducted by Dekiawan (2014) included the element of population in equation (9) to see the per capita variable:

$$\ln \frac{\theta t}{\theta t-1} = \ln \ln A a_t n_t + \partial \ln k_{t-1} + (\beta 1) \ln g_{t-1}$$  

(9)

Value nt which is the swiftness of population growth. Thus, equation (9) can be interpreted as the level of government spending influenced by confidential and general inputs, population growth, and also the proportion of outputs sourced from the government. Equation (9) can also be a convergence model of the production function Cobb-Douglas, which incorporates the concept of fiscal decentralization policy (Dana, 2018; Dekiawan, 2014).

Empirical Review


Dekiawan's research (2014) shows no sigma convergence but beta convergence in all provinces in Indonesia. Dana's research (2018) shows no convergent sigma on provincial income and expenditure in Indonesia. Khoirunurrofik's research (2020) shows that the economy between regions in Indonesia during the implementation period of fiscal decentralization experienced convergence. In his research Aritenang (2010) also uses indicators of fiscal decentralization and how it affects the convergence of revenue per capita between regions at the provincial level.

RESEARCH METHOD

Types and Sources of Data

This analysis uses a quantitative technique that defines data in numerals or percentages and econometric analysis in the panel data regression (data pool). Panel data combines data cross-sections from 5 regencies/cities in DIY: Yogyakarta City, Sleman Regency, Bantul, Kulonprogo, and Gunungkidul. The research period was conducted in 2011-2019. The data needed in this study is data on Regional Revenue, Regional Expenditures, Population, Economic Growth, and Inflation from the Central Statistics Agency and the Ministry of Finance of the Republic of Indonesia.
DATA ANALYSIS METHODS

Convergent Sigma

Sigma analysis used to see the condition of convergence between regions based on coefficient variation (Dekiawan, 2014; Dana, 2018). The equation coefficients of variation (coefficient of variants) as sigma converging in the study using the following formula:

CV is the coefficient of variants observation variables; \( G_t \) is the variable of provincial APBD revenues and expenditures used in the study; \( G = \text{Average of each variable (mean G)}; P_t = \text{Total population in each observation province}; P = \text{Total population in all observation provinces}; \) and \( N = \text{number of observation provinces}. \)

The indicator of sigma convergence measurement is that convergence occurs if the coefficient of variants is equal to zero.

\[
CV = \sqrt{\frac{1}{N} \sum \frac{(G_t - \bar{G})^2 P_t}{\bar{G}}} \tag{10}
\]

Convergent Beta Analysis

Beta is used to see the convergence speed between regions based on the Regional Revenue and Expenditure Budget (APBD) accompanied by other influencing factors. The analysis used in the convergent beta uses Least Square Panel (PLS) to find out the speed of convergence caused by other influencing factors. The convergent beta sample operated in this study modifies the research led by Coughlin, Garrett, & Hernandez-Murillo, (2007) and Dekiawan (2014), Dana (2018) as follows:

\[
Y_{FPit} = \left(\ln\left(\frac{FP_{it}}{\text{pop}_{it}}\right) - \ln\left(\frac{FP_{i,t-1}}{\text{pop}_i}\right)\right) / T \tag{11}
\]

\[
Y_{FPit} = \beta_0 + \beta_1 FP_{i,t-1} + \sum \beta_i X_{it} + \epsilon_{it} \tag{12}
\]

\[
\beta_1 = \left(1 - e^{-\frac{t}{T}}\right) \tag{13}
\]

Where \( Y_{FP} \) is the growth of the Regency/City revenue and expenditure variable, FP is the Regency/City income and expenditure variable. Pop is the number of residents in the Regency / City used in the study. While e is the natural logarithm and is the error term, and i,t is the district/city i at time t. This study also refers to Dana (2018)'s research by including control variables consisting of population growth, economic growth, and inflation.

The Estimation of the Panel Data Model

Equation (12) will be analyzed using the Least Square Panel (PLS) methodology. Three models are using Panel Least Square (PLS), namely Pooled Least Square (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM). The Common Effect Model is a panel data estimate that combines data time series and cross-section using the Ordinary Least Square (OLS) method. This approach does not pay attention to individual or time dimensions. There is an assumption that the intercept and regression coefficients are fixed for each object of research and time. In this estimation method, the Fixed Effect Model assumes that each object has a different intercept but has the same coefficient. To see the difference between one object and another, dummy variables or pseudo-variables are used, so this method is also called Least Square Dummy Variables (LSDV). The Random Effect Model in this method does not use dummy variables as used in fixed effects. This method uses residuals that are thought to
have a relationship between time and objects. The Random Effect Model assumes that each variable has a different intercept, but the intercept is random or stochastic. The three models were chosen to get the best model for estimation. The concept of the Pooled Least Square (PLS) model is to assume the same cross-section and time-series behavior (Maryaningsih et al., 2014). The three models will be selected as the model used to see the convergent beta through 3 tests, namely the Chow Test, Hausman Test, and Lagrange Multiplier Test. Chow test is used to select the best model between Pooled Least Square (PLS) and Fixed Effect Model (FEM). The hypotheses are: $H_0$: Common Effect Model is accepted and $H_a$: Common Effect Model is rejected, Fixed Effect is accepted. This test is done by looking at the $p$-value is significant (less than 5%) then the model used is the estimation of the Fixed Effect Model, on the contrary, if the $p$-value is not significant (greater than 5%), then the model used is the estimation of the Common Effect Model. Meanwhile, the Hausman test selects the Fixed Effect Model (FEM) and Random Effect Model (REM). The hypotheses used in the Hausman test are as follows: $H_0$: Random Effect Model is accepted and $H_a$: Random Effect Model is rejected, Fixed Effect is accepted. The condition of the Hausman test is by looking at the value of the probability of a random cross-section, if the probability value $> \alpha = 0.05$, $H_a$ rejected means that the best model is the Random Effect. Furthermore, vice versa, if the probability value $\leq 0.05$ then $H_0$ is rejected, which means that the best model is Fixed Effect. After determining the best model in panel data regression, the next step is to perform statistical testing (Widarjono, 2007).

**RESULTS AND DISCUSSION**

**Sigma Convergence ($\Sigma$) Realization of Regional Revenues and Expenditures**

The convergent Sigma used in this analysis desires to see the convergence between Regencies in DIY with local government revenue and expenditure data. Convergence conditions in convergence sigma analysis use measurement coefficients of variants. The coefficient of variants is an approach used to measure convergent sigma with a scheme if the coefficient of variants value is zero, then convergence occurs (Dekiawan, 2014).

![Figure 2. Average Value Coefficient of Variant on Revenues and Expenditure Budgets Regency / City in DIY Year 2011-2019](Source: Processed Data)
According to the table above, the average coefficient of variants of revenue realization Regency / City in DIY fluctuates but from 2011-2015 tends to increase. This increase indicates that Regency/City revenues in DIY are increasingly heterogeneous or unequal, or in other words, there is no convergence of revenues. However, in 2016-2019 the average coefficient of variants in revenue tends to decrease, which indicates a convergence of revenues. The average coefficient of variants in spending has increased from 2011-to 2014 but then tends to decrease until 2019. In general, the moderate value from the coefficient of variants in the realization of Regency/City APBD revenues and expenditures in DIY in 2011-2019 is three each. .51% and 3.29% are still far from zero, so it can be concluded that there has not yet been a convergence of the realization of district/municipality APBD revenues and expenditures in DIY and to achieve convergence still takes time. The less than optimal management of revenues APBD to improve regional development can be one of the factors causing this convergence not to occur. Research conducted by Rosoiu, (2015) and Babatunde, Ibukun, & Oyeyemi, (2017) explains that government revenues that are not used properly can cause problems in economic growth; thus convergence will not be achieved.

**Convergent Beta Realization of APBD Revenues and Expenditures**

Convergent beta is used to calculate the speed at which convergence conditions occur between regencies/cities in DIY by including factors that affect government revenues and expenditures. Below are the results of the Regency/City convergent beta analysis in DIY using panel data regression analysis techniques.

Table 1

**Results of Convergent Beta Estimation of Regency/City Revenue Realization in DIY**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pooled Least Squares</th>
<th>Fixed Effect Model</th>
<th>Random effect Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income Realization</td>
<td>-0.014850</td>
<td>-0.042071</td>
<td>-0.014850</td>
</tr>
<tr>
<td></td>
<td>(0.0000)*</td>
<td>(0.0000)*</td>
<td>(0.0000)*</td>
</tr>
<tr>
<td>Total Population</td>
<td>1.53E-05</td>
<td>0.000477</td>
<td>1.53E-05</td>
</tr>
<tr>
<td></td>
<td>(0.0005)*</td>
<td>(0.0011)*</td>
<td>(0.0001)*</td>
</tr>
<tr>
<td>Inflation</td>
<td>0.493227</td>
<td>0.735550</td>
<td>0.493227</td>
</tr>
<tr>
<td></td>
<td>(0.3642)</td>
<td>(0.1586)</td>
<td>(0.3113)</td>
</tr>
<tr>
<td>Economic Growth</td>
<td>0.677207</td>
<td>0.980738</td>
<td>0.677207</td>
</tr>
<tr>
<td></td>
<td>(0.2633)</td>
<td>(0.0981)**</td>
<td>(0.2122)</td>
</tr>
<tr>
<td>Chow test</td>
<td>0.0053</td>
<td>0.0075</td>
<td></td>
</tr>
<tr>
<td>Hausman Test</td>
<td><strong>0.00167</strong></td>
<td><strong>0.00478</strong></td>
<td><strong>0.00167</strong></td>
</tr>
<tr>
<td>Speed of Convergence</td>
<td>47.04</td>
<td>16.83</td>
<td>47.04</td>
</tr>
<tr>
<td>Half life</td>
<td>*significant =1%, *<em>significant =10%</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The model selection test will be conducted first to estimate the convergent beta on Revenue Realization Growth. The first test uses the Chow Test to select the most acceptable model between Pooled Least Squares and Fixed Effect Model. The Chow test obtained a Chi-square cross-section probability of 0.0053, which is smaller than the 5% alpha value, indicating that the Fixed Effect Model is better. The second test is the Hausman Test to choose between the Fixed Effect Model and the Random effect Model. The Hausman Test obtained a random cross-section probability of 0.0075 which is smaller than the 5% alpha value, indicating that the Fixed Effect Model is better.
Can be seen that the value of the variable lag coefficient of the estimation of conditional beta convergence using the fixed-effect model shows a negative number of less than one and is significant (table 1). So it can be concluded that there has been a trend of conditional beta convergence of Regency/City Revenue Realization in DIY with the speed of convergence, namely income inequality. Will be reduced annually by 0.478 percent, with the length of time required to cover half the gap in acceptance is 16.83 years. Conditional beta convergence occurs by including control variables in the form of macro variables, namely economic growth and inflation and demographic variables, namely population. The Population control variable significantly affects revenue growth at 5% alpha, meaning that the larger the population, the greater the regional revenue growth. The existence of a population will positively impact increasing the economic activities of a region and increasing regional revenues. If an area has a large population, it will utilize its resources efficiently. The results of this study are in line with the research of Dekiawan (2014), Ullah (2016), and Dana (2018), which explain that the population influences local revenue receipts.

Economic growth variable contains a positive and significant impact on alpha 10%, which indicates that an increase in economic growth can also encourage an increase in regional revenue growth. This indicates that development policies in districts/cities in DIY in the future should be prioritized in efforts to increase economic growth to encourage the achievement of revenue convergence between regions. The research of Desmawati, Zamzami, & Zulgan (2015), Dana (2018), and Dekiawan (2014) proves that economic growth influences regional income. The inflation variable accomplishes not impact the growth of district revenue in DIY or other words, and inflation is not a macro variable that affects regional revenue. The outcomes of this analysis are not in sequence with study from Dana (2018).

Table 2
Convergent Beta Estimation Results of Regency/City Expenditure Realization in DIY

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pooled Least Squares</th>
<th>Fixed Effect Model</th>
<th>Random Effect Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditure Realization</td>
<td>-0.012584</td>
<td>-0.037084</td>
<td>-0.012584</td>
</tr>
<tr>
<td></td>
<td>(0.0001)*</td>
<td>(0.0002)*</td>
<td>(0.0000)*</td>
</tr>
<tr>
<td>Population</td>
<td>1.19 E-05</td>
<td>0.01240.000431</td>
<td>1.19E-05</td>
</tr>
<tr>
<td></td>
<td>(*)</td>
<td>(0.0044)*</td>
<td>(0.0079)*</td>
</tr>
<tr>
<td>Inflation</td>
<td>-0.466889</td>
<td>-0.576899</td>
<td>-0.466889</td>
</tr>
<tr>
<td></td>
<td>(0.4611)</td>
<td>(0.3548)</td>
<td>(0.4316)</td>
</tr>
<tr>
<td>Economic Growth</td>
<td>0.128694</td>
<td>0.341394</td>
<td>0.128694</td>
</tr>
<tr>
<td></td>
<td>(0.8501)</td>
<td>(0.6206)</td>
<td>(0.8401)</td>
</tr>
<tr>
<td>Chow test</td>
<td>0.0312</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hausman Test</td>
<td>0.0481</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed of Convergence</td>
<td>0.00141</td>
<td>0.00420</td>
<td>0.00141</td>
</tr>
<tr>
<td>Half-life</td>
<td>55.44</td>
<td>19.04</td>
<td>55.44</td>
</tr>
</tbody>
</table>

*significant =1%, **significant =10%  
(...)= probability

Chow Test for model selection in the convergent beta estimation of Actual Expenditure Growth, obtained the Chi-square probability of 0.0312 is smaller than the 5% alpha value, which indicates that the Fixed Effect Model chosen. The Hausman Test's next test obtained a random cross-section probability of 0.0481 which is smaller than the 5% alpha value, indicating that the Fixed Effect Model is chosen. The value of the variable lag coefficient of the estimation of conditional beta convergence using the fixed-effect model shows a negative
number, or less than one and is significant so it can be concluded that there has been a trend of conditional beta convergence of Regency/City Expenditure Realization in DIY with convergence speed or spending inequality will be reduced annually by 0.420 percent with the length of time required to cover half the spending gap is 19.04 years. The conditional beta convergence of Regional Expenditure Growth also occurs by including control variables in the form of macro variables, namely economic growth and inflation, and demographic variables, namely population. The population control variable has a significant effect on spending growth at alpha 5%, meaning that the larger the population, the greater the growth in regional spending. This indicates that goods expenditures in the APBD are mostly public goods expenditures or goods expenditures carried out due to population growth factors. Macro variables, namely economic growth and inflation, do not affect the growth of district/municipal expenditures in DIY.

CONCLUSIONS
Based on the study results, it was figured that there was a tendency for sigma convergence (sigma convergence) between regencies/cities in DIY in 2011-2019 as indicated by a decrease in the coefficient of variants but not yet reached 0. Thus, efforts to optimize the management of the Regency/City APBD in DIY are still needed to improve development. From the results of panel data regression, it was found that there is a tendency for conditional beta convergence of Regency/City Revenue Realization in DIY with a convergence speed of 0.478 percent, with the length of time required to cover half the revenue gap is 16.83 years and a trend of conditional beta convergence of Regency/City Expenditure Realization. Cities in Yogyakarta with a convergence speed of 0.420 percent with the length of time needed to cover half the spending gap is 19.04 years. Control variable Population is proven to bear a powerful effect on revenue and expenditure growth, and the economic growth variable only has a powerful effect on revenue growth. In contrast, the inflation variable does not affect regional revenue and expenditure growth.

Based on the research results, local governments need to formulate policies that can encourage convergence both in terms of revenues and expenditures, for example, by creating economic sources to increase GRDP growth so that in the future, it can increase regional revenues through PAD. The population has a positive and significant effect on revenue and expenditure growth because the population is potential revenue from the tax sector; therefore, the government can increase revenue through taxes, such as personal income taxes and corporate income taxes, to encourage convergence between regions. The period of this study is minimal, and the use of control variables is still minimal too. There are very open opportunities for future researchers to increase the research period considering that convergence is a condition that requires a long period and also by adding several control variables.

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