

Review Article

The Impact of Government Expenditure and Income Inequality on Economic Growth: Simultaneous Model Approach

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Abstract - Fiscal transfers and income distribution are important factors that affect economic growth. This study aims to test the influence of regional expenditure and distribution of revenues on economic growth using the simultaneous equation model of the Two Stage Least Square (TSLS) method. The subject of the study was one of the provinces in Indonesia, namely Southeast Sulawesi. The results found a significant influence of regional expenditures on economic growth and insignificant revenue distribution. As a result of simultaneous tests with OLS, the study also found that there is a causality relationship between regional spending and economic growth. While the distribution of income is in a one-way relationship, namely significant economic growth to the distribution income.

Keywords - Government Spending, Income Distribution, Economic Growth.

I. INTRODUCTION

Fiscal transfer aims to address the problem of vertical fiscal inequality. Second, to address the problem of horizontal fiscal inequality. Third, another argument is about the role of transfer from central government in this context is the obligation to maintain minimum service standards in each region. Fourth, to address problems arising from the spread or impeachment of spill effects between jurisdictions. Fifth, for stabilization. The last reason for the need for central to regional transfer funds is to achieve the goal of stabilizing the central government. Related to the above objectives, fiscal transfer from central government to local government can overcome various things such as vertical fiscal inequality, horizontal fiscal inequality, achieving minimum service standards in the region and so on.

All this is expected to trigger the achievement of economic growth rate even in its function as a stabilization function, fiscal transfer is expected to be able to also maintain income equality. From various data showing that in

the last six (6) years (2014-2018) fiscal transfer to the Government of Southeast Sulawesi showed an annual increase from Rp. 1,160.90 billion in 2014 to Rp. The amount includes tax revenue share, non-tax revenue share, DAU and DAK. The increase in fiscal diversion directly caused regional revenues to increase, where in 2014 regional revenues increased from Rp. 1,197.56 billion to Rp.3,785.56 billion in 2018. This condition also encouraged government spending to increase from Rp. 2,176.24 billion in 2013 to 4,138.22 billion in 2018.

The theory of fiscal federalism pioneered by [1]. In the model developed, [1] makes the difference between national and regional public goods. The central government provides and distributes public goods of a national nature, while for public goods that can be provided by local governments, it will be more efficiently handed over to local governments, than when done by the central government with uniformity of output at all levels of government. Furthermore, [2] reinforced his argument, saying that local government, which is closer to the community so that it is more responsive to the preferences of its constituents and has the ability to find ways to provide better public services.

The application of the concept of decentralization within the framework of the endogenous economic growth model is put forward by [3], by establishing an endogenous economic growth model, by distinguishing between private investment and public investment, assuming that the economic growth model is a constant return. Another assumption used is that the source of government revenue comes from taxes and balanced budgets (taxes equal to government spending). [3] concluded that the increase in government spending was followed by an increase in the tax rate, and could affect economic growth. Development of government spending model by [3] refers to the theory of economic growth, with government spending as the main instrument of economic



growth and by using endogenous growth models that emphasize the difference in returns from public and private investment. Private goods investment is assumed to be a reduced return, while public investment is assumed to be a constant return or increased return, due to spills and externalities.

This model emphasizes the government's policy choices regarding the relationship between government size, savings rates, and economic growth rates. This model was built by showing the concept of endogenous growth related to household optimization, and government planning problems. This research was conducted based on recommendations from the study using a regression model of static and dynamic panel data. Some of the differences in this study are: (a) This research model uses a simultaneous equation model according to the recommendations of the [4]; (b) This study examines the effect of fiscal transfer on economic growth and the effect of economic growth on fiscal transfer to prove that there is or is no simultaneous relationship between the two variables; (c) This study delves deeper into fiscal transfers received by local governments in an effort to boost economic growth and reduce income inequality in Southeast Sulawesi.

This study aims to analyze the influence of regional spending and revenue distribution on economic growth by using the simultaneous equation model of the Two Stage Least Square (TSLS) method. In addition, this study also tested whether there is a simultaneous relationship between regional spending and income distribution and economic growth in Southeast Sulawesi.

II. LITERATURE REVIEW

According to public economic theory, the function of government in the economy (Musgrave, 1984) dalam [5], consists of three, namely: (a) Allocation, very closely related to the main authority of local government because it concerns the allocation of economic resources to the community. Allocation to the public especially for public goods of relatively very large value but the private sector can not provide; (b) Distribution, the role of the government in the economy in distributing economic resources (income) to all communities. So that in this case the government guarantees all groups of people can access economic resources and get a decent income. This distribution function is closely related to the proportional distribution of people's welfare in order to encourage optimal economic growth; and (c) Stabilization, the government's role in ensuring and maintaining macroeconomic (aggregate) stabilization such as controlling the rate of inflation, balance of payments, growth and others. Therefore, this function is closely related to the function of macroeconomic variables with various monetary policy instruments and fiscal policy. Thus this function is more owned by the central government than the local government.

Various studies on the impact of decentralization on the economy and the delivery of public services can be explained in terms of fiscal federalism theory. This theory is divided into two perspectives, namely traditional theory and new perspective theory (Second Generation Theory). In the view of First Generation theory there are two opinions that emphasize the advantages of decentralization.

The first is about the use of knowledge in the community, which according to [6] the decentralized decision-making process will be facilitated by the efficient use of information because local governments are closer to the community. In the context of public finances, local governments have better information than the central government about the condition of their respective regions, so that local governments will be better at making decisions about the provision of public goods and services than the provision of such matters by the central government. This situation is called allocation efficiency.

Second, [7] introduced a dimension of competition in government and regional interwi competition on the allocation of public spending that allowed people to choose a variety of public goods and services to suit their tastes and desires. This is not the case if the central government as a provider of uniform public goods and services.

III. METHOD

In accordance with the nature of the proposed problem, the form of the model used to analyze the results of this study is a model of simultaneous regression equations. This model is the development of the regression equation model. In the regression equation model the emphasis is given on estimating and or estimating the conditional average value of Y on the fixed value of variable X. Therefore the cause and effect relationship in such a model occurs from X to Y. However in situations where a one-way relationship or one-way causal relationship is meaningless, where Y is not only determined by X but several X is determined by Y, then it means there is a two-way or simultaneous relationship between X and multiple X that makes the difference between an independent variable and a variable that explains doubt. It is therefore necessary to collect shared variables that can be specified simultaneously by the remaining set of variables. This can be done through simultaneous equations.

According to [8], the assessment of simultaneous equation models using the TSLS method is carried out in two stages of calculation, namely: (1) applying the ordinary least square (OLS) method to reduce the equation of form; and (2) substitution of the approximate value of endogenous variables obtained from the calculation of the first stage into a simultaneous equation system so that each simultaneous equation undergoes transformation. Based on theoretical reviews, the models of simultaneous equations are as follows:

$$\begin{aligned} \text{Log}(\text{Growth}) &= \alpha_0 + \alpha_1 \text{Log}(\text{TRD}) + \alpha_1 \text{Log}(\text{EXD}) + \alpha_3 \text{Log}(\text{DISP}) \\ &+ e_1 \dots \dots \dots (1) \\ \text{Log}(\text{EXD}) &= \beta_0 + \beta_1 \text{Log}(\text{TRD}) + \beta_2 \text{Log}(\text{Growth}) \\ &+ \beta_2 \text{Log}(\text{EXD}_{-1}) + e_2 \dots \dots \dots (2) \\ \text{Log}(\text{DISP}) &= \gamma_0 + \gamma_1 \text{Log}(\text{Growth}) + \gamma_2 \text{Log}(\text{POP}) + \gamma_3 \text{Log}(\text{POV}) \\ &+ \gamma_4 \text{Log}(\text{TRD}) + e_3 \dots \dots \dots (3) \\ \text{TRD} &= \text{TAXD} + \text{RETD} + \text{LPDS} + \text{DAU} + \text{DAK} + \text{DBHP} \dots \dots \dots (4) \end{aligned}$$

Where:

- TRD = Regional Revenues
- EXD = Regional Expenditure
- PAD = Local Original Income
- DP = Balance Fund
- TAXD = Local Tax
- POP = Population
- POV = Poverty
- RETD = Local Retribution
- LPDS = Other Legitimate Regional Income
- DISP = Revenue Distribution
- Growth = GRDP
- DISPT-1 = Distribution of Revenues for the previous year

A. Reduced Form Equation

$$\begin{aligned} \widehat{\text{Growth}} &= \pi_{10} + \pi_{11} \text{TAXD} + \pi_{12} \text{RETD} + \pi_{13} \text{LPDS} + \pi_{14} \text{DAU} + \pi_{15} \text{DAK} \\ &+ \pi_{16} \text{DBHP} + \pi_{17} \text{EXD}_{-1} + \pi_{18} \text{POP} + \pi_{19} \text{POV} \\ &+ v_t \dots \dots \dots (5) \\ \widehat{\text{EXD}} &= \pi_{10} + \pi_{11} \text{TAXD} + \pi_{12} \text{RETD} + \pi_{13} \text{LPDS} + \pi_{14} \text{DAU} + \pi_{15} \text{DAK} \\ &+ \pi_{16} \text{DBHP} + \pi_{17} \text{EXD}_{-1} + \pi_{18} \text{POP} + \pi_{19} \text{POV} \\ &+ v_t \dots \dots \dots (6) \\ \widehat{\text{DISP}} &= \pi_{10} + \pi_{11} \text{TAXD} + \pi_{12} \text{RETD} + \pi_{13} \text{LPDS} + \pi_{14} \text{DAU} + \pi_{15} \text{DAK} \\ &+ \pi_{16} \text{DBHP} + \pi_{17} \text{EXD}_{-1} + \pi_{18} \text{POP} + \pi_{19} \text{POV} \\ &+ v_t \dots \dots \dots (7) \end{aligned}$$

B. Simultaneous Transformation Equation System

$$\begin{aligned} \text{Log}(\text{Growth}) &= \alpha_0 + \alpha_1 \widehat{\text{EXD}} + \alpha_2 \widehat{\text{DISP}} + \alpha_3 \text{Log}(\text{TRD}) \\ &+ e_1 \dots \dots \dots (8) \\ \text{Log}(\text{EXD}) &= \beta_0 + \beta_1 \widehat{\text{Growth}} + \beta_2 \text{Log}(\text{TRD}) + \beta_3 \text{Log}(\text{EXD}_{-1}) \\ &+ e_2 \dots \dots \dots (9) \\ \text{Log}(\text{DISP}) &= \gamma_0 + \gamma_1 \widehat{\text{Growth}} + \gamma_2 \text{Log}(\text{POP}) + \gamma_3 \text{Log}(\text{POV}) \\ &+ \gamma_4 \text{Log}(\text{TRD}) + e_3 \dots \dots \dots (10) \end{aligned}$$

C. Identification Test

The problem of identification in simultaneous equations is important to be able to achieve the process of parameter estimation and further economic analysis. The identification problem means that the approximate parameters of the structural equation can be obtained from the reduced form of the approximate coefficient. If this step can be solved, it means that the equation can be identified and if the steps above cannot be skipped, it means that the equation cannot be identified. Identification problems are done because from the same data set can be obtained approximate coefficients of various functions / models / hypotheses. To find out if the equations in simultaneous equations can be identified or cannot be tested can be reviewed through the order condition

testing method which is a required condition and a rating condition that is a sufficient condition.

D. Hypothesis Testing

The research hypothesis presented in the previous chapter was tested using a significance approach test that includes joint significance test (F-test), individual significance test (t-test) and goodness test (R-square) model.

IV. RESULT AND DISCUSSION

A. Government Spending on Economic Growth

The pattern of the relationship between government spending and economic growth is seen in the Figure below.

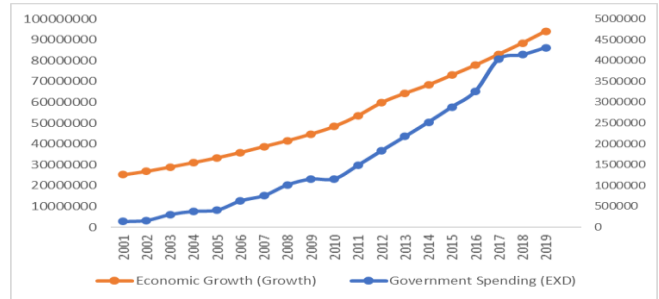


Fig. 1 The Relationship between Government Spending and Economic Growth

Fig. 1, shows that the pattern of relationship between regional spending and economic growth is unidirectional. This means that the higher the regional expenditure, the higher the economic growth.

B. Income Distribution on Economic Growth

The relationship between income distribution and economic growth is seen in the Figure below.

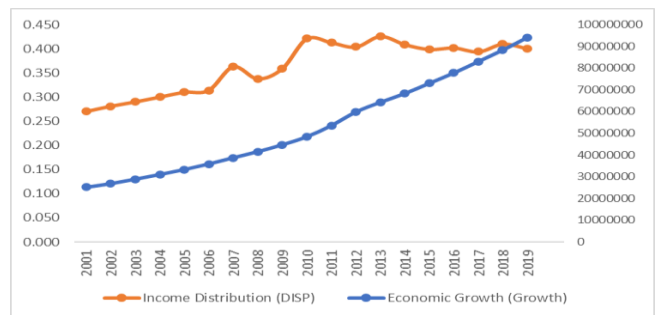


Fig. 2 The relationship between income distribution and economic growth

Figure 2, shows that the pattern of relationship between regional spending and economic growth is in the same direction. This means that the less distributed income, the higher the economic growth.

C. Identification Test Results

Simultaneous model with TSLS method requires that the model built must meet test order and rank condition requirements. Test results of orders and rank condition are seen in Tables 1 and 2.

Table 1. Order Condition Test Results

Structural Equations	K-k	m-1	Order Conditions
Economic Growth	4	3	over identified
Regional Expenditures	4	3	over identified
Income Disparity	4	3	over identified

Source: data processed by author (2021)

Table 2, test order condition result shows that all equations in the system of simultaneous equations are over identified so that it qualifies enough to use the simultaneous equation model. While hasi test rank condition seen in Table 3.

Table 2. Rank Condition Test Results

Endogen Variable	Determinant	Description
Economic Growth	0	Unidentified
Regional Expenditures	≠ 0	Identified
Income Disparity	≠ 0	Identified

Source: Data processed by author (2021)

Based on the results of identification test there is M-1 matrices with a determinant not equal to zero so it can be concluded that the equation in the system of simultaneous equations identified and this meets the requirements using the two stage least square (TSLS) method).

D. Simultaneous Relationship Results

Table 3. Simultaneous Test Results (OLS)

Endogen Variable	Probability Coefficient Residual			Conclusion
	Growth	EXD	DISP	
Growth	-	-	0.0695	There is no simultaneous relationship between growth and Regional Expenditure (EXD). Only one-way relationships from EXD to Growth
DISP	0.0098	-	-	
Growth	-	0.2344	-	There is no simultaneous relationship between growth and Regional Expenditure (EXD). Only one-way relationships from EXD to Growth
EXD	0.0973	-	-	

Source: Data processed by author (2021)

From the Table 3, it is known that the residual influence of economic growth on regional spending values has a statistical probability value of 0.0098. While the residual influence of regional spending on economic growth has a probability value of t-statistics of 0.0695 each both probability values are less than the alpha value of 10%. Thus, it can be concluded that there is a simultaneous (two-way) relationship between regional spending variables and economic growth in Southeast Sulawesi in 2001-2019. The results of this study are based on research, confirmed that the Transfer fiscal expenditure does not sign off on economic growth

Furthermore, based on the Table 3, it is known that the residual effect of economic growth on the predicted value of the income distribution has a t-statistical probability value of 0.0098. While the residual influence of income distribution on the predicted value of economic growth has a probability value of t-statistics of 0.0695 each. Both probability values are less than the alpha value of 10%. Thus, it can be concluded that there is a simultaneous (two-way) relationship between variable income distribution and economic growth in Southeast Sulawesi in 2001-2019. The results of this study confirmed, which found that there is a simultaneous relationship between income distribution and economic growth, while, found that there is no simultaneous relationship between income distribution and economic growth.

E. Model Regresi TSLS

$$\begin{aligned} \text{Log (Growth)} &= 13.07768 + 0.305815 \text{ Log (TRD)} + 7.87\text{E-}08 \widehat{\text{EXD}} \\ &+ 0.677916 \widehat{\text{DISP}} \dots\dots\dots 11 \\ (R^2 &= 99.36\%) (DW = 1.673544) \\ \text{EXD} &= -572555.5 + 0.022431 \widehat{\text{Growth}} + 0.287747 \text{ Log (TRD)} + \\ &0.426876 \text{ Log (EXD-1)} \dots\dots\dots 12 \\ (R^2 &= 93.38\%) (DW = 1.492196) \\ \text{DISP} &= -15.81608 - 5.60\text{E-}09 \widehat{\text{Growth}} + 1.279661 \text{ Log (POP)} - \\ &0.158681 \text{ Log (POV)} - 0.015596 \text{ Log (TRD)} \dots\dots\dots 13 \\ (R^2 &= 94.33\%) (DW = 2.174046) \end{aligned}$$

Based on the equation models 11, 12, and 13, the results of the influence test between variables are seen in Table 4.

Table 4. Hasil Uji Metode TSLS

Pengaruh Antar Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\widehat{\text{Growth}} \rightarrow \text{DISP}$	-5.60E-09	9.44E-10	-5.925	0.000
$\widehat{\text{Growth}} \rightarrow \text{EXD}$	0.0224	0.0085	2.652	0.019
$\widehat{\text{DISP}} \rightarrow \text{Growth}$	7.87.E-08	2.78.E-08	2.827	0.014
$\widehat{\text{EXD}} \rightarrow \text{Growth}$	0.678	0.664	1.020	0.325

Source: Data processed by author (2021)

F. The Effect of Government Spending on Economic Growth

Based on the results of simultaneous model analysis with TSLS method, in the model of simultaneous equation of economic growth found that the effect of government expenditure to economic growth is significant. The significant effect of government expenditure on economic growth is seen from the results of data processing, where the probability value of t-statistics is less than the alpha value of 5%.

The significant effect of fiscal transfer in terms of spending on economic growth is supported by the increasing realization of fiscal transfer from the revenue side, namely: Regional Native Income (PAD) reflected by the increasing local taxes, local levies, other legitimate PAD. In addition, it is also supported by the increasing Realization of Balance Fund (DP) reflected by the realization of Revenue Share Fund, General Allocation Fund and Special Allocation Fund. All fiscal transfer variables in terms of revenue, in fact in the model does not directly affect economic growth, but its influence through variable realization of regional spending in the simultaneous model of economic growth in Southeast Sulawesi.

According to Musgrave (1984), the allocation function is closely related to the main authority for local government because it concerns the allocation of economic resources to the community. The allocation to the community is primarily against public goods whose value is relatively very large but the private sector cannot provide. Musgrave (1959) and Oates (1972) emphasized the importance of expenditure assignments between levels of government. If the local government has the authority to make regulations on the local economy, then the central government's interference in the regional economy is limited. One of the mechanisms in aligning the interests of local governments with economic prosperity, horizontal interaction between local governments, vertical interaction between levels of government is: in the state of the market of goods and services mobility is high, competition between local governments is an important incentive tool for the provision of public services. Competition between local governments in providing services to the market will boost economic growth in the region.

The study found a causality between regional spending and economic growth (Table 4). The results of this study were conducted by [4]; [9]; [10]; [11]; [12]; [13]; [14]; [15]; [16]; [17]; [18]; [19]; [20] which found that the fiscal transfer was significant to economic growth. And not in line with [21]; [22]; .

G. The Effect of Income Distribution on Economic Growth

Based on the results of simultaneous model analysis with the TSLS method, in the simultaneous equation model of economic growth it was found that the effect of income distribution on economic growth is significant. Similarly, in

the equation model of income distribution simultan found that the influence of economic growth on the distribution of income is significant. The significant influence of income distribution and the influence of economic growth is seen from the results of data processing, where the probability value of t-statistik is less than the alpha value of 5%.

The significant influence of income distribution on economic growth is in accordance with the theory of economic growth kuznets. Kuznets (1955) states that the relationship between economic growth and income inequality in the form of A-shaped upside, which initially increased economic growth can increase income inequality. The statement and results of this study are in line with the opinion expressed by Todaro (2006), that the more uneven the pattern of income distribution, the higher the rate of economic growth because rich people have a higher savings ratio than the poor so that it will increase the aggregate saving rate followed by increased investment and economic growth.

The classic approach hypothesizes that inequality benefits growth. This theory states that marginal savings rates are increasing along with increased wealth, by directing more income to capital owners who save a lot (Lewis in Easterly, 2007, and Galor, 2009; Kaldor in Easterly, 2007, and Galor, 2009) in [23]. Inequality funnels resources towards individuals with a marginal tendency to save higher; this results in higher aggregate deposits and greater capital accumulation, thus boosting economic growth.

The results of this study confirmed the results of [17]; [24], but not in line with the [17]; [25], which found that the distribution of income is negative and significant to economic growth. The study also found that there isn't a causality relationship between economic growth and income distribution.

VI. CONCLUSION

This study concluded that there is a two-way influence between regional spending and economic growth, namely regional expenditures have a positive and significant effect on economic growth and economic growth on regional expenditures are also positive and significant. This means that increasing regional spending will stimulate economic growth, and increasing economic growth will increase regional spending.

While the relationship of income distribution and economic growth is only one-way, namely economic growth has a negative and significant effect on the distribution of income, while the influence of income distribution on economic growth is positive and insignificant. The one-way relationship between income distribution and economic growth indicates that increased economic growth will stimulate evenly distributed income, but the distribution of income does not necessarily increase economic growth.

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