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# Inclusive Growth Analysis in Central Sulawesi, The Eastern Province of Indonesia 2015-2019

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## Abstract

**Purpose:** This study aims to analyze the inclusive growth in Central Sulawesi Province, an eastern province of Indonesia, up to the districts/cities level. The inclusive growth is analyzed by using Ramos, Ranieri, and Lammens' index that has three indicators which are employment, poverty, and income inequality. **Research design, data, and methodology:** This study uses panel data of 13 districts/cities in Central Sulawesi Province from 2015 to 2019. The statistical regression used is the panel regression method to analyze the determinants of inclusive growth there. **Results:** The study found that the average inclusive growth of districts/cities in Central Sulawesi is increasing from the low-level in 2015 to mid-level in 2019. The panel's data regression using fixed effect model FGLS-SUR found Investment (GFCF), Road Infrastructure, HDI, and Processing Industry have a significant positive effect. Regional minimum wage (RMW) has a significant negative effect. Government Expenditure on Education and Health Function has no significant positive effect on inclusive growth. **Conclusions:** throughout the study period, gini coefficient and poverty rate is slowly decreasing, while employment to population ratio remains volatile in districts/cities of Central Sulawesi.

**Keywords :** Economic Growth, Indonesia, Inclusive Growth, Panel Regression, Trickle-down Effect

**JEL Classification Code :** C33, C52, O11, O20, O40

## 1. Introduction

The successful development of a region is always the main objective of every government policy to improve and ensure the welfare of its people. In general, the success of regional development is reviewed from the success of its economic development through economic growth indicator (Nuraini, 2017). This is because economic growth is an indicator of changes in the economic capability of a region that is reviewed from the added value of the production of goods and services. Economic growth is a testament to a

country's ability to meet the needs of goods and services on a large scale for the society that will allow for an increase in living standards and welfare. In essence, an improvement in public welfare can be seen through high economic growth, as it is explained in the theory of trickle-down effect.

According to the trickle-down effect idea, economic expansion can indirectly solve concerns of welfare and equality. According to Sukarnoto (2020), the trickle-down effect causes a group's development to trickle down to generate jobs and different economic possibilities, which in turn fosters diverse circumstances in order to achieve an

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equitable distribution of economic growth. But the problem is, economic growth is a measure of aggregate results of all lines of society, so it is not known who is increasing the growth, whether all levels of society or only a part of the group. Thus, high economic growth does not guarantee that the whole society will benefit equally. Therefore, the measurement of economic growth alone is not enough to measure the improvement of welfare and equality as a result of successful economic development. Furthermore, some studies are stating that trickle-down effect theory does not apply to all regions, as research by Febrianingrum (2019) states that in South Sulawesi, trickle-down effect theory has not been proven. When high economic growth has been achieved, it turns out that the problems of poverty, unemployment, and improvement of the quality on human resources can not necessarily be solved (Hapsari, 2019).

In this case, appropriate additional measurements are needed in measuring the success of a region's economic development, according to Todaro and Smith (2015) development must be viewed from a multidimensional process. The success of development must also be viewed from its success in reducing poverty, unemployment, and inequality between community groups in the region. Therefore, additional multidimensional measurement is needed so that development can run in an inclusive and sustainable manner through the concept of inclusive growth. Inclusive growth, according to Ramos, Ranieri, and Lammens (2013), is an economic process characterized by the equitable distribution of the benefits of this growth and the comprehensive participation of the entire community in the growth process.

**Table 1:** Ten Provinces with the Highest Average Economic Growth and Poverty Rate in Indonesia in 2015-2019

10 Provinces with the Highest Average of Economic Growth in 2015-2019		10 Provinces with the Highest Average of Poverty Rate in 2015-2019	
Province	Percent	Province	Percent
Central Sulawesi	9,20%	Papua	27,71%
South Sulawesi	7,16%	West Papua	23,58%
North Maluku	6,72%	NTT	21,52%
Southeast Sulawesi	6,62%	Maluku	18,48%
Gorontalo	6,48%	Gorontalo	16,81%
Central Kalimantan	6,38%	Aceh	16,03%
West Sulawesi	6,32%	Bengkulu	16,02%
North Sulawesi	6,05%	NTB	15,22%
DKI Jakarta	6,01%	Central Sulawesi	13,85%
Bali	5,98%	Lampung	13,15%

Source: Statistics Indonesia (processed)

Central Sulawesi Province, an eastern province of Indonesia, is the province with the highest average economic growth in Indonesia from 2015 to 2019, as can be seen from table 1. Based on Statistics Indonesia data, the average economic growth of this province during 2015-2019 is the highest in Indonesia with a figure of 9.2% and is above the national average, which is only at 5.14%. However, high economic growth does not mean the province of Central Sulawesi is able to overcome the welfare problems there. Based on trickle-down effect theory high economic growth can indirectly overcome welfare problems in the province. However, the statistics found the opposite fact, the poverty rate in Central Sulawesi in 2019 is still in the double digits at 13.18% and is above the national figure of 9.22%. In addition to the very high poverty rate, income distribution inequality reviewed from the gini coefficient in Central Sulawesi increased from 0.317 in 2018 to 0.33 in 2019. Although Central Sulawesi has a fairly low open unemployment rate, at 3.15% in 2019, it means that there are roughly 96 thousand unemployed persons out of a total population of 3.04 million people.

Based on the empirical explanations above, it can be concluded that Central Sulawesi Province has very high economic growth, but the welfare problems in Central Sulawesi are, in fact, unresolved, which proves that the trickle-down effect theory has not yet occurred in the Central Sulawesi region. In other words, economic growth in Central Sulawesi has not been inclusive. Therefore, this study aims to analyze the level of inclusiveness and factors that affect it in Central Sulawesi Province from 2015 to 2019 by examining up to the districts/cities level.

## 2. Literature Review

Inclusive growth according to Ramos, Ranieri, and Lammens (2013) is seen as an economic process characterised by an equitable distribution of its benefits and by comprehensive participation of the population in the process. What is important in the analysis of inclusive growth is not how much growth a country experiences, but rather how much inclusiveness is produced in that time period. There are two dimensions of inclusive growth in this definition, namely the dimension of benefit-sharing and participation. Based on the definition of both dimensions, inclusive growth is analyzed into two stages. The first part focuses on the dimension of benefit-sharing through an analysis of indicators of inequality and poverty. The second part incorporates the dimension of participation into the analysis by adding employment indicator. The benefit-sharing dimension is seen to ascertain whether the growth process leads to reduced poverty and income inequality. As for the participation dimension it is seen to know how

society is involved in the growth process, given that such engagement is essential to promote social coherence and for capacity building, which is essential for the sustainability of inclusive growth process.

Based on several previous studies, there are many variables that significantly affect inclusive growth. Research that was conducted by Sholihah (2014) by using panel data regression, obtained results that government revenues, government investment in physical capital, school participation figures, agriculture, and economic growth have a positive and significant effect on inclusive growth. Meanwhile, the gini coefficient, inflation, population, and the number of unemployed people have negative and significant effect. Furthermore, there is research by Whajah, Jennifer, Bokpin, Godfred, and Kuttu (2019) using panel data regression that obtained, the size of government, Gross Fixed Capital Formation (GFCF), and worker productivity have a positive effect on inclusive growth. While public debt and population growth have a negative effect on inclusive growth. Then inflation and trade openness have no effect on inclusive growth. The third study was conducted by Febrianingrum (2019) using panel data regression with the result that life expectancy, contribution of processing industry, GFCF, percentage of households with access to clean water, and percentage of households with the main electric lighting source have a positive and significant effect on inclusive growth, while contribution of agriculture sector has no significant effect on inclusive growth. The fourth study was conducted by Long (2019) using spatial regression with the result that inflation affects inclusive growth negatively but insignificant. GFCF has positive and significant effect on inclusive growth. Regional Minimum Wage (RMW) has negative and significant effect on inclusive growth. The latter is a research by Hidayat et al. (2020) using the two-staged least square method that obtains the results that household consumption, export of services/goods, foreign investment, domestic investment, per capita income, and the average years of schooling positively influenced the inclusive growth, while the open unemployment rate and imports of goods/services negatively affected inclusive growth.

### 3. Research Methods and Materials

This study uses panel data of 13 districts/cities in Central Sulawesi Province from 2015 to 2019. The data are secondary data collected from official publications of Statistics Indonesia, Directorate General of Financial Balance (DJPB), and Department of Manpower and Transmigration of Central Sulawesi Province (Disnakertrans). The data used in this study are inclusive index, regional minimum wage in hundred thousand rupiahs,

percentage of gross fixed capital formation to total GRDP, Human Development Index, percentage of the well-conditioned road to the total length of the road, percentage of government spending on education function to the total spending, percentage of government spending on health function to the total spending, and contribution of the processing industry sector to total GRDP. The inclusive index built in this study is using Ramos, Ranieri, and Lammens (2013) formula which is conducted from a simple average of the min-max normalization of data on poverty, inequality, and the inverse of the Employment to Population Ratio.

This study used descriptive and inferential analysis. Descriptive analysis is used to analyze an overview of the inclusive growth rate of districts/cities in Central Sulawesi from 2015 to 2019 and their forming components based on the formulation of inclusive indexes by Ramos, Ranieri, and Lammens (2013) using a thematic map, tables, and graphs. The classification of inclusiveness levels is based on their inclusive index ( $II$ ) according to Ramos, Ranieri, and Lammens (2013) as follows:  $0 < II \leq 0,2$ : very high level of inclusiveness;  $0,2 < II \leq 0,4$ : high level of inclusiveness;  $0,4 < II \leq 0,6$ : medium level of inclusiveness;  $0,6 < II \leq 0,8$ : low level of inclusiveness;  $0,8 < II \leq 1$ : very low level of inclusiveness.

Inference analysis used panel data regression analysis to analyze the determinants of inclusive growth of districts/cities in Central Sulawesi from 2015 to 2019. The model used in this study is as follows:

$$II_{it} = \alpha + \beta_1 HDI_{it} + \beta_2 RoadInf_{it} + \beta_3 Ind_{it} + \beta_4 Health_{it} + \beta_5 Edu_{it} + \beta_6 GFCF_{it} + \beta_7 RMW_{it} + u_{it} \quad (1)$$

where  $II$  is the inclusive growth index.  $HDI$  is the human development index.  $RoadInf$  is the percentage of the well-conditioned road to the total length of the road.  $Ind$  is the contribution of processing industry sector to total GRDP.  $Health$  is the percentage of government spending on health function to the total spending.  $Edu$  is the percentage of government spending on education function to the total spending.  $GFCF$  is the percentage of gross fixed capital formation to total GRDP.  $RMW$  is the regional minimum wage.  $u$  is the residual.  $\alpha$  is the intercept.  $i = 1, 2, \dots, 13$ ;  $N$  is the 13 districts/cities in Central Sulawesi Province.  $t = 1, 2, \dots, 5$ ;  $T$  is the period of 2015-2019. The stages of analysis using data panel regression are as follows:

- 1) Forming an inclusive index ( $II$ ) and a panel data format;
- 2) Selecting the best panel regression model using Chow Test to test which is the best between common effect model and fixed effect model. Continue with Hausman Test if fixed effect model is chosen in previous test.

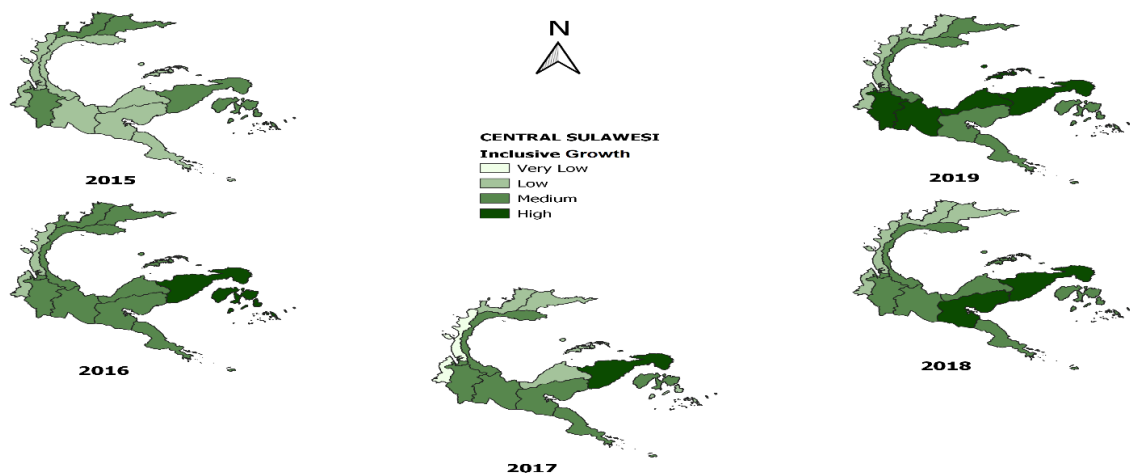
Hausman Test is used to determine which model is the best between fixed effect model and random effect model. This study has found that the fixed effect model is the best model;

- 3) Testing the residual variance-covariance structure using Lagrange Multiplier (LM) test and  $\lambda_{LM}$  test. The LM test is performed to determine if residuals are homoscedastic or heteroscedastic. If the residuals are homoscedastic, the estimation method used is Ordinary Least Square (OLS), but if the residuals are heteroscedastic, then continue to the  $\lambda_{LM}$  test to determine if there is a correlation between the residuals. If there is no correlation, the estimation method used is Weighted Least Square with cross-sectional weight, but if there is a correlation, then the estimation method used is Feasible Generalized Least Square with Seemingly Uncorrelated Regression. This study found that the best estimation method is Feasible Generalized Least Square

- with Seemingly Uncorrelated Regression;
- 4) Performing classic assumption testing;
- 5) Testing the goodness of fit;
- 6) Interpreting model.

## 4. Results and Discussion

As stated in the literature review, inclusive growth is used to measure the influence of economic growth in addressing welfare problems such as unemployment, inequality, and poverty in a region. This study used the inclusive index by Ramos, Ranieri, and Lammens (2013) as an indicator of inclusive growth. the index's lower values represent better performances; while the index's higher values represent poorer performances. Which means, the closer to 0 the index, the more inclusive the district, and vice versa. the lower the index's value, the lower the poverty rate and gini index, and the higher the EPR.



**Figure 1:** Thematic Map of the Development of Inclusive Growth Rate of Districts/Cities in Central Sulawesi from 2015 to 2019

Figure 1 shows the development of districts/cities' inclusive growth in Central Sulawesi from 2015 to 2019 reviewed from the thematic map. The result is that in 2015, most districts/cities in Central Sulawesi were dominated by low inclusive growth, namely, in Morowali, Poso, Donggala, Parigi Moutong, Tojo Una-Una, Morowali Utara, and Palu City. There are also districts/cities with medium inclusive growth in 2015, namely, in Banggai Islands, Banggai, Tolitoli, Buol, Sigi, and Banggai Laut. However, there are no districts that have high inclusive growth.

There is an increase in the number of districts/cities with medium and high inclusive growth in 2016, with only Donggala District having low inclusive growth. Meanwhile, districts/cities that have medium inclusive growth are Morowali, Poso, Tolitoli, Buol, Parigi Moutong, Tojo Una-Una, Sigi, Morowali Utara, and Palu City. Furthermore, districts/cities that have high inclusive growth are Banggai

Kepulauan, Banggai, and Banggai Laut. In 2017, there is a decrease in the number of districts/cities whose region has medium and high inclusive growth, and there is an increase in the number of regions that have low and very low inclusive growth. This particular year has one district that has a very low inclusive growth, namely, Donggala District. The districts/cities that have low inclusive growth are Tolitoli, Buol, Tojo Una-Una, and Banggai Laut. Meanwhile, districts/cities that have medium inclusive growth are Banggai Kepulauan, Morowali, Poso, Parigi Moutong, Sigi, Morowali Utara, and Palu City. Furthermore, the district/city that has high inclusive growth is Banggai District.

There is a decrease in the number of districts/cities whose region has a very low and low inclusive growth, and there is an increase in the number of regions that have medium and high inclusive growth in 2018. Districts/cities

that have low inclusive growth are Donggala, Tolitoli, and Buol. Meanwhile, districts/cities that have medium inclusive growth are Banggai Kepulauan, Morowali, Poso, Parigi Moutong, Tojo Una-Una, Sigi, Banggai laut, and Palu City. Furthermore, there are two districts with high inclusive growth, namely, Banggai and Morowali Utara. By 2019, there have been an increase in the number of districts/cities whose regions have high inclusive growth and a decrease in the number of regions that have low inclusive growth. Districts/cities that have low inclusive growth are Donggala and Tolitoli. Meanwhile, districts/cities that have medium inclusive growth are Banggai Kepulauan, Morowali, Buol, Parigi Moutong, Banggai Laut, Morowali Utara, and Palu City. Furthermore, districts/cities that have high inclusive growth are Banggai, Poso, Tojo Una-Una, and Sigi.

It can be known descriptively that there is an influence between regions on inclusive growth occurring in Central Sulawesi. Districts around Banggai District tend to improve a fairly good increase in inclusive growth from 2015 to 2019, such as Poso, Tojo Una-Una, and Sigi, Districts such as Donggala District that are far from Banggai District tend to experience a slower increase in inclusive growth. Donggala District, which has always been in the category of low inclusive growth, should be a concern for the local district and provincial governments. The geographical location of Donggala District, which is included in the disaster-prone zone along with Palu City and Sigi District, makes the three areas very vulnerable to various natural disasters such as floods, earthquakes, tsunamis, and liquidation that make development a challenge in itself. However, Palu City and Sigi District have managed to develop to be more inclusive at the end of the study period, contrary to Donggala District.

The changes on the inclusive growth rate of districts/cities in Central Sulawesi at the beginning to the end of the study period are varied. Districts/cities that are experiencing a transition of inclusive growth rate from medium to high are Banggai and Sigi. This indicates that both districts have an improved inclusive growth condition. Banggai and Sigi District have a coefficient of gini that

continues to decline from 2015 to 2019, which indicates that the distribution of people's income in the districts are increasingly evenly distributed. Furthermore, there is one district that is experiencing a setback of inclusive growth from medium to low, namely Tolitoli. This indicates that Tolitoli District has a declining condition of inclusive growth. Tolitoli District has experienced an increase in the gini coefficient and a decrease in the EPR number from 2015 to 2019, which indicates that the distribution of people's income in the district is increasingly uneven and that the ratio of working population to population is decreasing.

Poso and Tojo Una-Una are district that are transitioning from a low to a high inclusive growth rate. This indicates that both districts are experiencing better inclusive growth. Poso and Tojo Una-Una District have experienced a decrease in the gini coefficient and poverty rate as well as an increase in the EPR rate from 2015 to 2019. It can be known that both districts are progressing from the three indicators of inclusive growth, where the distribution of income of the community is increasingly evenly distributed, the poverty rate is falling, and the proportion of working individuals in the population is rising.

Furthermore, Morowali, Parigi Moutong, Morowali Utara, and Palu City are districts/cities that are transitioning from low to medium inclusive growth rates. This shows that the districts/cities' inclusive growth situation has also improved. The gini coefficient and the percentage of poor people in the districts/cities decreased from 2015 to 2019, indicating that the distribution of people's income is increasingly evenly distributed and that the poverty rate is decreasing. There are also districts/cities that are not experiencing any transition of inclusive growth rate throughout the study period, such as Banggai Kepulauan, Buol, and Banggai Laut District that stay in the medium category and Donggala District that stays in the low category from the beginning to the end of the study period. These districts have a coefficient of gini, the percentage of poor people, and EPR that tend to stagnate.

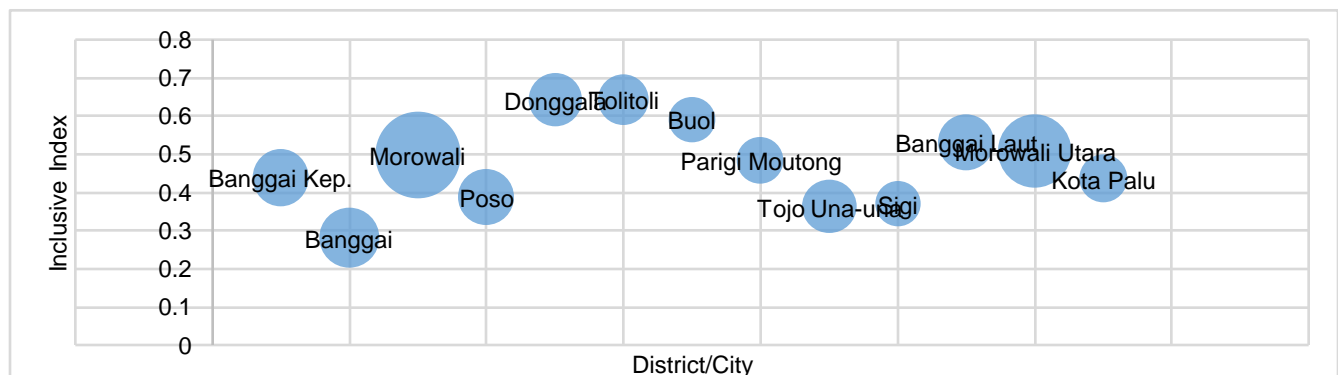


Figure 2: Comparison of Inclusive Index and Economic Growth of Districts/Cities in Central Sulawesi in 2019

Figure 2 shows that the magnitude of economic growth that occurs in a region does not necessarily make the growth that occurs in the region inclusive, or it can be said that high economic growth does not necessarily solve the welfare problems that exist. This is in line with research conducted by Ramos, Ranieri, and Lammens (2013), which has stated that economic growth alone cannot reduce poverty and inequality, or increase employment participation. For

example, Morowali district has a high economic growth of 14.51% but only has an inclusive index of 0.50, which is classified as medium inclusive growth. On the other hand, Banggai district's economic growth is only at 7.15% but has an inclusive index of 0.28, which is classified as high inclusive growth. Furthermore, Tojo Una-una district has economic growth of only 4.87% but has an inclusive index of 0.36, which is also classified as high inclusive growth.

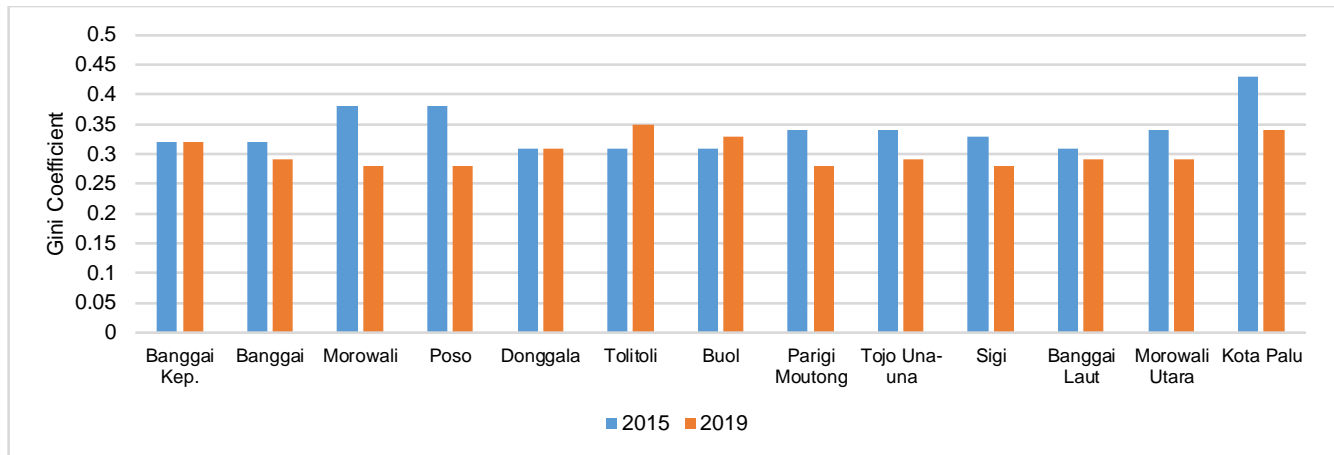


Figure 3: Gini Coefficient of Districts/Cities in Central Sulawesi 2015-2019

High economic growth in 2019, as occurred in Morowali district, was contributed mostly by the processing industry sector. This is because Morowali district has been planned by the government as a priority industry region, especially in the processing industry and nickel mining that aims to equalize industry regions so as to cause a multiplier effect for the regional economy and the welfare of the people. However, although the economic growth of Morowali district is very high, the inclusiveness is still below the districts that have small economic growth but have high inclusive growth. According to Ramos, Ranieri, and Lammens (2013), the focus should shift from how much economic output is increased to how economic output is generated. This needs to be a special concern for the government to better observe whether the existence of companies that cultivate natural resources in the region has provided welfare for the general public or just for some groups of people or even has caused damage to nature and loss of work of locals.

#### 4.1 Overview of Inclusive Index Component

There are two dimensions in the components of inclusive index according to the definition of inclusive growth by Ramos, Ranieri, and Lammens (2013) which are the benefit-sharing dimension and the participation dimension. The

dimension of benefit-sharing is analyzed through indicators of inequality and poverty. This dimension corresponds to the notion of relative pro-poor growth. The growth can be said to be pro-poor, if and only if the poor people benefit from it. Which states that for growth to be pro-poor, the poor must increase at a higher rate than the affluent, reducing inequality.

Based on the graph in figure 3, it can be determined that the development of income distribution inequality of districts/cities in Central Sulawesi from 2015 to 2019 tends

to decrease. For 2015, Palu City has the highest income distribution inequality with a gini coefficient of 0.43, while Donggala, Tolitoli, Buol, and Banggai Laut District have the lowest income distribution inequality with a gini coefficient of 0.31. For 2019, Tolitoli District has the highest income distribution inequality with a gini coefficient of 0.35. Meanwhile, Morowali, Poso, Parigi Moutong, and Sigi District have the lowest distribution inequality with a gini coefficient of 0.28. Palu City tends to have a high coefficient of gini from 2015 to 2019, which means that Palu City has an income distribution inequality that tends to be higher than other districts/cities in Central Sulawesi. Urban areas do tend to have a higher income distribution inequality because the characteristics of urban areas are more heterogeneous than rural areas, so the income gap between residents becomes larger. Figure 4 shows that the development of the

poverty rate in Central Sulawesi from 2015 to 2019 tends to decrease with Palu City consistently having the lowest poverty rate from 2015 to 2019, followed by Banggai District. For 2015, Tojo Una-Una District has the highest

poverty rate at 18.79%, while Palu City has the lowest poverty rate at 7.42%. For 2019, Donggala District has the highest poverty rate at 18.4%, while Banggai and Palu City have the lowest poverty rate at 7.8% and 6.83%, respectively.

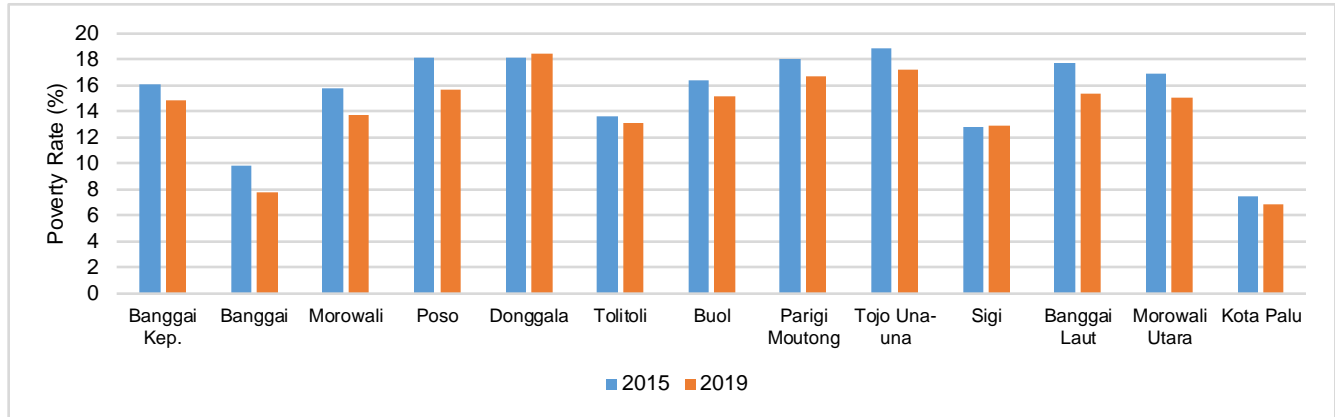


Figure 4: Poverty Rate Districts/Cities in Central Sulawesi 2015-2019

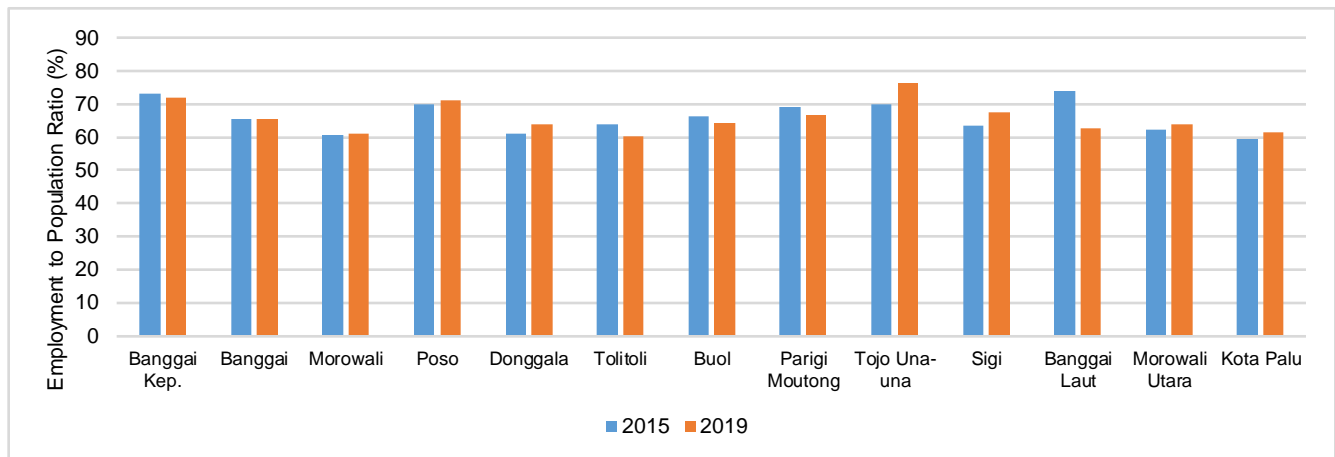


Figure 5: Employment to Population Ratio of Districts/Cities in Central Sulawesi 2015-2019

The dimension of participation is analyzed through an indicator of the ratio of working population to working-age population (Employment to Population Ratio). This dimension of participation looks at how society contributes to the growth process because it is important in developing

social coherence and for capacity building, which is critical to the sustainability of the inclusive growth process. Based on figure 5, it can be acknowledged that the development of EPR districts/cities in Central Sulawesi from 2015 to 2019 tends to be volatile. For 2015, Banggai Laut District has the highest EPR of 73.84%, while Palu City has the lowest EPR of 59.31%. However, for 2019, Tojo Una-Una District has the highest EPR of 76.43%, while Tolitoli District has the lowest EPR of 60.44%.

The Central Sulawesi government's effort to improve inclusiveness in its territory, in general, is well enough. This can be proven in the observed indicators of inclusive index, such as the gini coefficient and poverty rate, which have decreased on average from the start to the end of the research period. Nevertheless, the development of EPR in Central Sulawesi has remained volatile throughout the study period. Although the development of the poverty rate in Central Sulawesi continues to decline, Central Sulawesi Province, when compared to other provinces, still has a very high

poverty rate population of 13.18% and is still above the national figure of 9.22% in 2019. The Central Sulawesi government's objective in the LGMDP (Local Government Medium-Term Development Plans) for 2020 to 2024 to

reduce the poverty rate to single digit demands greater efforts to accomplish the intended goal.

## 4.2 The Determinants of Inclusive Growth in Central Sulawesi Province Using Panel Data Regression

To determine the influence of independent variables on dependent variables in this study, which aims to analyze the factors that affect inclusive growth in Central Sulawesi Province from 2015 to 2019, the panel data regression method will be used. Diagnostics in selecting the best model used for estimation are through up to three testing procedures, namely, Chow Test, Hausman Test, or Breush-Pagan LM Test. Furthermore, diagnostics related to the structure of the residual variance-covariance matrix will be using LM Test and  $\lambda_{LM}$  Test.

Based on table 2, it can be acknowledged that the most effective model and estimation method used is Fixed Effect Model (FEM) with Feasible Generalized Least Square - Seemingly Uncorrelated Regression because there is cross-sectional correlation in residual. After the best model and estimation method is obtained, classic assumptions testing must be conducted, However, according to Greene (2012), the fixed effect model using the FGLS method with cross-sectional weight has accommodated heteroscedasticity and autocorrelation in the model, thus the only assumptions that must be satisfied are normality and non-multicollinearity. Based on the examination of residual normality assumptions through the Jarque-Bera test, which obtained the p-value of  $0.4916 > 0.05$ , it leads to the conclusion that there is no violation of the assumption of normality. Furthermore, based on the examination of non-multicollinearity assumptions through Variance Inflation Factor (VIF) centered, it has been obtained that all variables have a VIF centered value of  $< 10$ , and it is concluded that the model

**Table 2:** Diagnostics of Panel Regression

Diagnostics	Null hypothesis	Result	Conclusion
Chow Test	CEM is better than FEM	p-value cross section F = 0.0000 < $\alpha = 0.05$	FEM is better than CEM
Hausman Test	REM is better than FEM	p-value cross section random = 0.0000 < $\alpha = 0.05$	FEM is better than REM
Lagrange Multiplier Test	Residual is homoscedastic	LM = 31.5112 > $\chi^2_{(0,05;12)} = 5.2260$	Residual is heteroscedastic
$\lambda_{LM}$ Test	There is no cross-sectional correlation in residual	$\lambda_{LM} = 118.9470 > \chi^2_{(0,05;78)} = 58.6539$	There is cross-sectional correlation in residual

**Table 3:** Estimation of Panel Regression

Independent Variables	Coefficient	t-statistics	t-table
(intercept)	6.8919*	4.8723	1.6794
HDI	-0.1013*	-4.4432	-1.6794
RoadInf	-0.0017*	-2.7488	-1.6794
Ind	-0.0152*	-4.4360	-1.6794
Health	0.0065	1.5161	-1.6794
Edu	0.0095	2.3429	-1.6794
GFCF	-0.0052*	-3.6279	-1.6794
RMW	0.0271*	2.5046	1.6794
Statistical Summaries			
R-squared	0.9018		
Adjusted R-squared	0.8603		
F-statistic	21.7495		
Prob(F-statistic)	0.0000		

\*Significance at  $\alpha = 5\%$



obtained meets the assumption of non-multicollinearity. As a result, the model obtained has met all of the classical assumptions.

After all the assumptions are met, the best panel regression model estimates are presented on table 3.

Based on table 3, The simultaneous test F can be concluded that independent variables simultaneously have a significant effect on dependent variable. Based on the partial t-test, it can be acknowledged that the variable HDI, Road Infrastructure, Processing Industry, and GFCF significantly have negative effect on inclusive index which means it has significant positive effect on inclusive growth. RMW partially has significant positive effect on inclusive index or significant negative effect on inclusive growth.

Government spending on education function and health function partially do not have significant negative effect on inclusive index or positive effect on inclusive growth. Based on table 3, the adjusted R-squared on the model obtained a value of 0.8630, which means that independent variables in the equation model are able to explain the diversity of dependent variable by 86.03 percent and the remaining 13.97 percent described by other variables that do not fit into the equation model. The estimated results can be written in the form of equations as follows:

$$\begin{aligned}
 II_{it} = & (6,8919 + \mu_i)^* - 0,1013 \text{ HDI}_{it}^* - \\
 & 0,0017 \text{ RoadInf}_{it}^* - 0,0152 \text{ Ind}_{it}^* + \\
 & 0,0065 \text{ Health}_{it} + 0,0095 \text{ Edu}_{it} - 0,0052 \text{ GFCF}_{it}^* + \\
 & 0,0271 \text{ RMW}_{it}^* \quad (2)
 \end{aligned}$$

**Table 4:** Individual Effects

Districts/Cities	$\mu_i$
Banggai Kepulauan	-0,3637
Banggai	0,2722
Morowali	0,8803
Poso	0,1190
Donggala	-0,2314
Tolitoli	-0,3764
Buol	0,0970
Parigi Moutong	-0,3503
Tojo Una-Una	-0,5108
Sigi	-0,2254
Banggai Laut	-0,3907
Morowali Utara	-0,1311
Palu City	1,2111

Furthermore, when reviewed through its individual

effects on table 4, it can be acknowledged that Palu City has the largest individual effect of 1.2111. This means that if all independent variables are equal for all districts/cities, then Palu City will have the highest inclusive index value, which means that Palu City will be the city with the least inclusive growth when compared to all the districts/cities in Central Sulawesi. Tojo Una-Una, on the other hand, has the smallest individual effect of -0.5108. It means that if all independent variables are equal for all districts/cities, then Tojo Una-Una will be the most inclusive district when compared to all districts/cities in Central Sulawesi.

Table 3 shows a partial review of each variable's effect on inclusive growth. For HDI variable, the results showed that the Human Development Index (HDI) positively and significantly affects inclusive growth with a regression coefficient of -0.1013. A regression coefficient of -0.1013 means that if the HDI increases by one unit, then the inclusive index will decrease by 0.1013, assuming *ceteris paribus*. The decline in the value of inclusive index indicates that growth in the region is increasingly more inclusive and vice versa. The improvement of HDI means that the achievements of the development of people's quality of life that are reviewed from three basic dimensions, namely, longevity & healthy living, knowledge, and decent living standards, are getting better. If education and public health are improved, the quality of human resources will increase as well. Human capital theory states that the better the education, the higher the quality of human resources that can drive economic growth and increase people's access to the economy. And if public health improves, then the community can be more productive in carrying out economic activities to meet the standard of living so that poverty can be reduced.

The estimation shows that the variable regression coefficient of road infrastructure is -0.0017 and positively also significantly affects inclusive growth. The regression coefficient of -0.0017 means that if the percentage of the well-conditioned road to the total length of the road increases by 1%, then the inclusive index will decrease by 0.0017, assuming *ceteris paribus*. The decline in the value of inclusive index indicates that growth in the region is increasingly more inclusive and vice versa. In this study, the infrastructure aspect is reviewed through road infrastructure because the availability of connectivity between regions is important in the sustainability of economic growth of a region. The government of President Joko Widodo also has a focus on building infrastructure with the aim of boosting new jobs and accelerating the added value of the people's economy. Research by Panjaitan et al. (2019) also states that the more roads are built, the greater the chances of the population to work and reduce income inequality. However, aside from the total length of roads, the most essential factor that needs to be considered is the road's quality, since if the

road is damaged, it will be difficult to access, obstructing the region's economic flow. Many natural catastrophes, like earthquakes, tsunamis, and liquefaction, struck Central Sulawesi in 2018, particularly in Palu City, Donggala, Sigi, and Parigi Moutong District, causing damage to many accessible facilities. Based on the Statistics Indonesia (2018), it can be recognized that almost all districts/cities in Central Sulawesi have experienced a significant decrease in the availability of good and moderate quality of road infrastructure in 2018. This needs to be a concern for local authorities to urgently repair the damaged infrastructures, especially road infrastructure. As the number of well-maintained roads connecting rural places grows, it becomes simpler for people at all levels of society to access resources for conducting economic activities, which can help to equalize income distribution and solve employment issues.

Continue to the next variable, the regression results show that the variable regression coefficient of the processing industry sector is -0.0152, and the t-test has found that this variable has a positive and significant effect on inclusive growth. The regression coefficient of -0.0152 means that if the contribution of the processing industry sector to the total GDP increases by 1%, then the inclusive index will decrease by 0.0152, assuming *ceteris paribus*. The decline in the value of inclusive index indicates that growth in the region is increasingly more inclusive and vice versa. The processing industry sector is one of the most important sectors in economic development because it is one of the sectors with the largest labor absorption in Indonesia and can provide higher added value to various commodities produced through various stages of processing.

Central Sulawesi Province has become one of the largest processing industry centers in Indonesia due to the potential of natural resources like nickel and natural gas. When reviewed from the average contribution of the processing industry sector during 2015-2019, Morowali, Banggai, Buol, Tojo Una-Una, and Palu City are the districts/cities with the largest contribution, which means that these districts/cities have great processing industry potential and need to continue to be developed. Based on Bappenas (2014), Morowali District and Palu City have been designated as a priority industrial area. Additionally, according to Republic of Indonesia Council for Special Economic Zone (2017), Palu City has been designated as a special economic area that is planned to be an integrated logistics center and mining processing industry in the Sulawesi economic corridor. So based on Hirschman's theory, if the industrial sector provides more output indicated by the increasing total production or the increasing number of industrial sectors growing in the Central Sulawesi region, the growth that occurs will be more inclusive because of investment opportunities, employment, and higher labor wages.

The variable of government spending on health function

has a regression coefficient of 0.0065 as well as the results of statistical testing t, which states that government spending on health function does not have significant positive effect on inclusive growth. The regression coefficient of 0.0065 means that if the percentage of government spending on health function to total spending in APBD increases by 1%, then the inclusive index will increase by 0.0065, assuming *ceteris paribus*. The increasing value of the inclusive index indicates that growth in the region is increasingly less inclusive and vice versa. The study's findings indicate government spending on health function does not have a substantial beneficial impact on the inclusive growth of districts/cities in Central Sulawesi from 2015 to 2019, it might be due to an ineffective and inefficient implementation method in enhancing health care system. Based on Statistics Indonesia (2019), residents who have health problems that interfere with their everyday activities, which indicated by the proportion of morbidity, tend to increase even though government spending on health functions also increases every year. According to Anand (2019), this negative result could be due to the government's failure to improve the ease of access to basic health facilities to the poor.

Furthermore, the results show that the variable regression coefficient of government spending on education function is 0.0095. The results of the t statistics show that government spending on education function does not significantly positively affect inclusive growth. The regression coefficient of 0.0095 means that if the percentage of government spending on education function to total expenditure in APBD increases by 1%, then the inclusive index will increase by 0.0095, assuming *ceteris paribus*. The increasing value of the inclusive index indicates that growth in the region is increasingly less inclusive and vice versa.

Government spending on education function is one form of investment in human resources. However, the results show that government spending on education has not been able to increase the inclusiveness of districts/cities in Central Sulawesi during the period of 2015-2019. Based on the Statistics Indonesia (2019), the publication obtained a fact that the higher the level of education, the more children who drop out of school. It means many students do not continue their education to a higher level, whereas in fact, the number of schools in Central Sulawesi as educational facilities and infrastructure is always increasing every year. This can be due to the implementation that has not been effective or efficient in improving the quality of education. According to Azwar (2016), negative influence means that adequate services or access to education has not been widely affordable to the poor. The process of validating poverty data is carried out on a regular basis, but the accuracy of the data still has to be checked because there are still many non-poor individuals who get government education support,

making it inaccurate.

The panel's regression results show that the regression coefficient of the GFCF is -0.0052 and that GFCF positively and significantly affects inclusive growth. A regression coefficient of -0.0052 means that if the percentage of GFCF to the total GRDP increases by 1%, then the inclusive index will decrease by 0.0052, assuming *ceteris paribus*. The decline in the value of inclusive index indicates that growth in the region is increasingly more inclusive and vice versa.

Investment reflected through GFCF is important in promoting inclusive growth. According to Sholihah (2014), an attractive investment setting for capital owners can increase employment opportunities, especially in the labor-intensive sector. The labor-intensive sector is a sector that focuses more on using human labor than technology in carrying out its projects. Conversely, if the investment focuses on capital-intensive projects, it will make less absorption of labor so that it will lead to unemployment. Simplification of bureaucracy, such as licensing system, is also important in creating a conducive investment setting. Damanik et al. (2016) have stated that the fragmentation of arrangements in business licensing in the region, which out of sync between one institution and another, makes existing regulations unclear. This can make investors uninterested in investing due to convoluted regulations that can take a long time to be completed. Hence, by creating a supportive yet easy investment environment, especially in the labor-intensive industry, it may overcome employment issues such as unemployment and hence can increase the inclusiveness of the region.

Lastly, the results show that the coefficient of variable regression of RMW is 0.0271 with the results of the t-test stating that RMW has a significant and negative effect on inclusive growth. The regression coefficient of 0.0271 means that if the regional minimum wage increases by one hundred thousand rupiahs, then the inclusive index will increase by 0.0271, assuming *ceteris paribus*. The increasing value of the inclusive index indicates that growth in the region is increasingly less inclusive and vice versa. Borjas (2013) theory of labor demand for firms argues that the connection between wages and labor is always inversely proportional, both in the short and long run settings. An increase in RMW will cause companies to hire fewer workers or reduce the number of workers employed and replace them with other production factors. This is because the company's production costs will rise if it continues to use the same number of workers, because at the end of the day, the company will try to maximize profit. Hence, the absorption of labor will decrease, which makes inclusive growth also decrease.

## 5. Conclusions

Based on the results and discussions in this study, the conclusions obtained are (1) The inclusive growth rate of districts/cities in Central Sulawesi Province from 2015 to 2019 has risen on average. In 2015, there are seven districts/cities with low inclusive growth and six medium-categorized districts/cities. At the end of the research period, there are two districts/cities with low-categorized inclusive growth, seven medium-categorized districts/cities, and four high-categorized districts/cities. (2) Based on the inclusive index components of districts/cities in Central Sulawesi Province from 2015 to 2019, the results are that the coefficient of gini and the poverty rate have a declining average, but EPR development tends to be volatile. (3) The Human Development Index (HDI), road infrastructure, the contribution of the processing industry sector, and gross fixed capital formation (GFCF) have a positive and significant effect on inclusive growth. The Regional Minimum Wage (RMW) negatively and significantly affects inclusive growth. Meanwhile, government spending on education and health function has no significant positive effect on inclusive growth. (4) It is expected that inclusive growth indicator will be used in measuring the success of development as an additional indicator besides economic growth.

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