Analysis of Economic Growth, Minimum Wage, Unemployment, and HDI on Income Distribution Inequality in Sulawesi

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Abstract

This study aims to analyze the influence of economic growth, minimum wage, unemployment, and the Human Development Index on income distribution inequality in 6 provinces in Sulawesi during the period 2013-2023. This study uses quantitative analysis with the panel data regression analysis method using the Random Effect Model (REM). The data for this research is secondary data obtained from the Central Statistics Agency of Indonesia. The research results show that simultaneously, independent variables have a significant effect on the dependent variable. However, partially, economic growth and the minimum wage have a negative and significant effect on income distribution inequality, while unemployment and the human development index do not affect income distribution inequality. The results of the coefficient of determination test show that the independent variables explain 49% of their influence on the income inequality variable, while the remaining 51% is explained outside the variables.

| *Keywords*	*Income Inequality, Economic Growth, HDI, Unemployment, Minimum Wage.*

INTRODUCTION

Each country has an alternate strategy for achieving prosperity, and this prosperity will result from the government implementing effective measures to accelerate economic growth. In macroeconomics, a problem arises related to income distribution, which leads to failure to achieve welfare in society. The challenge is income inequality, which is the disproportionate distribution of total national income among households or society (Todaro & Smith, 2015). This challenge has become the focus of every government to pay more attention to and control the level of income inequality to boost economic growth.

Indonesia, as a developing country, pays attention to this income inequality, as stated in Law Number 23 of 2014, where the central government grants each regional government the right to organize and develop the economy for their respective regions. This is due to the fact that during the development process, there may be areas with abundant natural resources but insufficient human resources, or vice versa. As a result, this causes income disparities in each region of a country (Nurpita & Nastiti, 2016).

A method used to measure income inequality is by using the Gini Coefficient, or what is called the Gini ratio (Al Aqilah et al., 2024). The Gini ratio is a measure of aggregate inequality or disparity (overall) with values ranging from 0 (perfect equality) to 1 (perfect inequality). The closer the value is to 0, the better the income distribution, but if the value approaches 1, it indicates income inequality. The Gini ratio in Indonesia is divided into three levels: low inequality (0 – 0.3), medium inequality (0.3 – 0.5), and high inequality (0.5 – 1) (Sekretatiat Kabinet Republik & Indonesia, 2016).

Figure 1. Gini Index Ratio in Indonesia
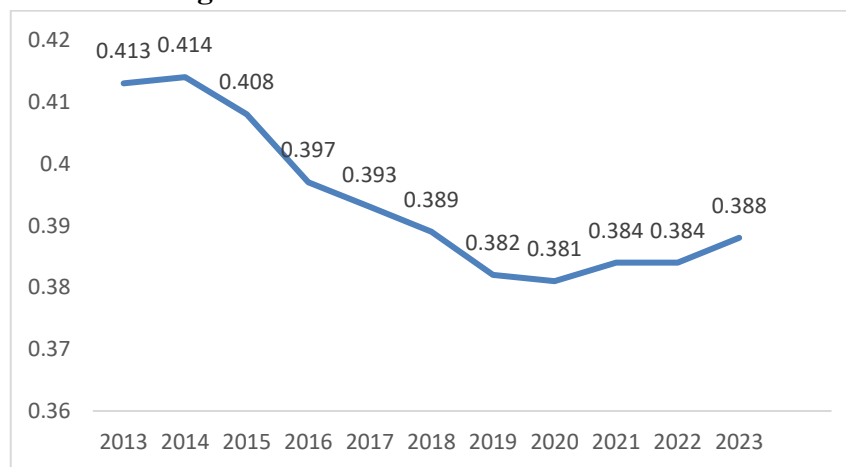
Source: (Badan Pusat Statistik, 2024)

Based on the image 1, Indonesia's Gini ratio from 2013-2023 has fluctuated between 0.41 and 0.37, indicating that Indonesia's Gini ratio is at a moderate level of inequality. The Gini ratio with the highest income inequality was in 2014 with a figure of 0.414 and the lowest in 2020 with a figure of 0.381 (Badan Pusat Statistik, 2024). In 2023, Indonesia's income inequality was at 0.388, which shows an increase in inequality compared to previous years.

**Figure 2. Gini Index Ratio Between Provinces In 2023**
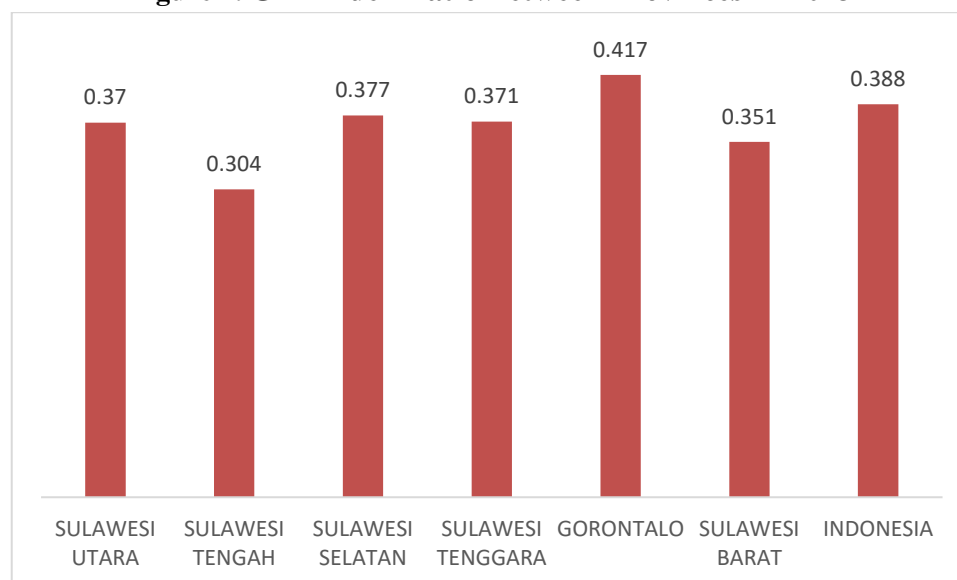
Source : (Badan Pusat Statistik, 2024)

Sulawesi Island, as the fourth-largest contributor to economic distribution (GDP) after Java, Sumatra, and Kalimantan, has a high level of income distribution inequality, with several provinces approaching the inequality value of Indonesia and some provinces exceeding the average income inequality in Indonesia. The highest income distribution

inequality value is found in Gorontalo province (0.417) and the lowest in Central Sulawesi province (0.304) (Badan Pusat Statistik, 2024).

Figure 3. Comparison Of Gini Ratio By Province For The Years 2013 - 2023
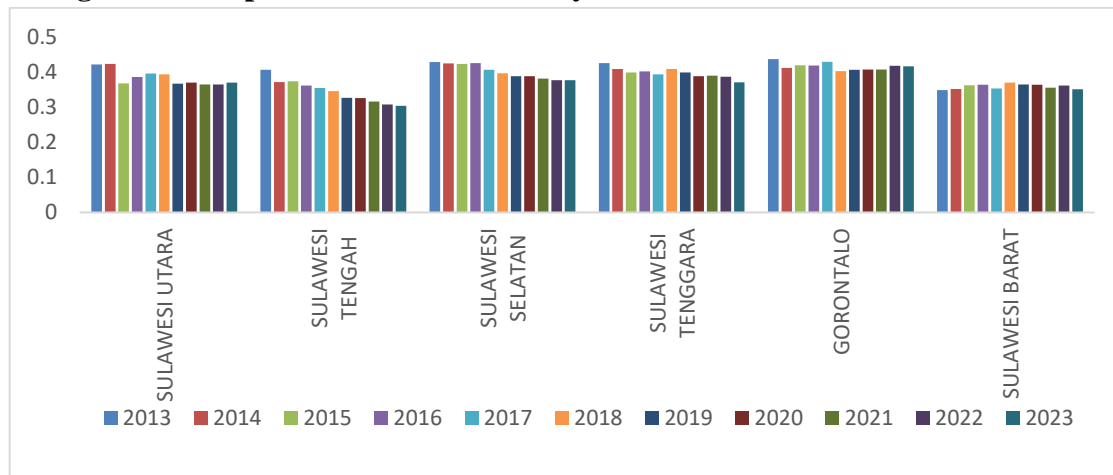
Source : (Badan Pusat Statistik, 2024)

Figure 3 shows that the provinces on the island of Sulawesi, namely North Sulawesi, Central Sulawesi, South Sulawesi, Southeast Sulawesi, Gorontalo, and West Sulawesi, have Gini index ratio values ranging from 0.340 to 0.437, which are categorized as medium income inequality. From 2013 to 2023, Gorontalo Province was recorded as the province with the highest income inequality on the island of Sulawesi, while West Sulawesi Province had the lowest.

Income distribution inequality is a problem of income disparity between advanced communities or regions and underdeveloped areas. The larger the income gap, the greater the variation in income distribution, which will lead to income disparity (Damanik et al., 2018). If this issue is not promptly addressed by the local government, other problems will arise, such as poverty and inequality. Factors that are suspected to influence income distribution inequality are economic growth, minimum wage, unemployment, and the Human Development Index.

Discussion about income distribution inequality is very important to be conducted further because inequality is one of the benchmarks for the success of development in a region. The Gini Index in each province on Sulawesi Island shows a very high level of inequality, indicating the presence of a complex problem. If not addressed, it will affect the decline in the equitable distribution of community welfare.

METHOD

This research is conducted using a quantitative approach. Quantitative research is a method of research based on numbers to collect data and analyze it statistically using specific samples and research instruments with the aim of analyzing the established hypotheses. This discussion uses the variable of income distribution inequality, viewed through the Gini ratio index as the dependent variable, and the variables of economic growth, minimum wage,

unemployment, and HDI as independent variables for the research period from 2013 to 2023. The data used are secondary data obtained by the researchers from the Central Statistics Agency (BPS) of Indonesia, scientific article publications, and literature studies. The secondary data used by the researchers are panel data, which is a combination of time series and cross-section data covering the period from 2013 to 2023, including provinces on the island of Sulawesi. (Sulawesi utara, Sulawawesi selatan, Sulawesi tenggara, Sulawesi tengah, gorontalo, Sulawesi barat). Then the econometric model used in the research is formulated as follows:

$$K = \beta_0 + \beta_1 PE_{it} + \beta_2 UMP_{it} + \beta_3 TPT_{it} + \beta_4 IPM_{it} + \varepsilon$$

Explanation:
K   = Gini Ratio (percent)
PE   = Economic Growth (GDP growth rate in percent)
UMP = Provincial Minimum Wage (UMP)
TPT = Open Unemployment Rate (percent)
IPM = Human Development Index (percent)

To test the suitability of the three methods in the panel data regression model estimation technique, the Chow Test, Hausman Test, and Lagrange Multiplier Test are used. The classical assumption tests include the Normality Test, Multicollinearity Test and Heteroskedasticity Test, while the regression test uses both partial and simultaneous tests. For measuring the independent variable, use the R2 coefficient of determination.

RESULTS AND DISCUSSION

Table 1. Descriptive Statistic

Variabel	Mean	Min	Max
K	0.384091	0.304000	0.437000
PE	6.306061	-2.340000	20.560000
UMP	2266660.	995000.0	3485000.
TPT	4.108182	1.290000	8.690000
IPM	68.99045	61.53000	74.36000

Descriptive analysis in the table will explain the magnitude of the values from the processed data. The processed data consists of income distribution inequality using the Gini ratio index, economic growth, minimum wage, unemployment, and HDI. The average value of inequality is 0.384091, which means it falls between 0.3 – 0.4, indicating that the level of inequality among the 6 provinces in Sulawesi Island during the 2013-2023 period is in the moderate category. However, the highest inequality during that period was 0.437000, which still falls within the moderate category. Next, the average economic growth rate is 6.306061 or 6%, indicating relatively stable economic growth for the provinces on the island of

Sulawesi during the period 2013-2023. The highest growth on the island of Sulawesi was in Central Sulawesi with a value of 20.560000 or 20%, which occurred in 2018.

The average minimum wage for all provinces in Sulawesi is 2,266,660, indicating that the economy on the island of Sulawesi is starting to improve, with the lowest being 995,000 in Central Sulawesi in 2013 and the highest being 3,485,000 in North Sulawesi in 2023.

For the average unemployment rate in 6 provinces in Sulawesi, it reached a value of 4.108182 or 4%, with the highest open unemployment rate being 8% in North Sulawesi province in 2015. The province with the lowest open unemployment rate was West Sulawesi province in 2019, with a figure of 1.2%. The Human Development Index variable in Sulawesi Island for the period 2013-2023 has an average of 68.99045 or 68%, indicating that the HDI level in the 6 provinces of Sulawesi from 2013-2023 falls into the medium Human Development Index category.

Panel Data Test

In the testing of panel data, it involves using the common effect, fixed effect, and random effect methods to conduct panel data analysis. The model selection process involves 3 tests: Chow Test, Hausman Test, and Lagrange Multiplier Test. The results of the tests are as follows:

Table 2. Panel Data Test

Test	P-Value	Explanation
Chow Test	0.0000	Fixed Effect Model (FEM)
Hausman Test	0.7470	Random Effect Model (REM)
Lagrange Multiplier Test	0.0000	Random Effect Model (REM)

The first test in panel data is using the Chow test to see the values indicated between the Fixed Effect Model and the Common Effect Model. This determination is based on the generated probability value; if the value is less than the alpha %5 value, it indicates the Fixed Effect Model (FEM), and if it is greater than the alpha value, it indicates the Common Effect Model (CEM). The value generated in the Chow test is 0.0000 or less than 0.05, so the result used is the Fixed Effect Model. (FEM).

The second test in panel data is using the Hausman test to see the values indicated between the Fixed Effect Model and the Random Effect Model. This determination is based on the generated probability value; if the value is less than the alpha value of 5%, it indicates the Fixed Effect Model (FEM), while if it is greater than the alpha value, it indicates the Random Effect Model (REM). The value generated in the Hausman test is 0.7470, which is greater than 0.05, so the result used is the Random Effect Model. (REM).

The final test is the Lagrange Multiplier Test to determine whether to use the Fixed Effect Model or the Random Effect Model, which was inconsistent in previous tests, and to

ensure the use of the Common Effect Model (OLS) and the Random Effect Model (GLS). This determination is based on the generated probability value; if the value is less than the alpha %5 value, it indicates the Random Effect Model (REM), and if it is greater than the alpha value, it indicates the Common Effect Model (CEM). The value shown in the test is 0.0000 or less than 0.05, indicating the use of the Random Effect Model. (REM)

Classic Assumptions

In the previous test, the Random Effect model was used, so in the classic assumption test, the autocorrelation test is not used because the Generalized Least Square (GLS) method is a method to eliminate first-order autocorrelation in a regression equation estimation. Therefore, in this classical assumption test, only 3 tests are used: Normality, Multicollinearity, and Heteroscedasticity.

Table 3. Normality Test

Test	P-Value	Explanation
Normality	0.560319	Data is normally distributed

In this study, the Jarque Bera test is used, and it can be considered normal if the resulting data is greater than 0.05 and the classical normality assumption conditions are met. From the above results, it can be concluded that the Jarque Bera value is greater than 0.05, indicating that the data used in this study is normally distributed.

Table 4. Multicollinearity Test

Multicollinearity	Explanation
PE	No Multicollinearity Problem
UMP	No Multicollinearity Problem
TPT	No Multicollinearity Problem
IPM	No Multicollinearity Problem

The multicollinearity test is a test to see the absence of a perfect or nearly perfect relationship between variables. In this study, the correlation matrix test is used, and if the results of this test yield less than 8, then there is no multicollinearity problem. Looking at the table above, there is no relationship between the variables with values exceeding 0.8, which means there is no issue with multicollinearity.

Table 5. Heterokedasticity Test

Test	P-Value	Explnation
PE	0.8163	No Heteroskedasticity Problem
UMP	0.9009	No Heteroskedasticity Problem

| TPT | 0.6578 | No Heteroskedasticity Problem |
| IPM | 0.8096 | No Heteroskedasticity Problem |

In the final classical assumption test, in the heteroscedasticity test, the researcher used the Glejser test. In this test, the assumption is that if it is greater than 0.05, then there is no heteroscedasticity problem. The table above shows that all the probability values of the independent variables are greater than 0.05, which means there is no issue of heteroskedasticity.

Result

The results of the panel data regression using the Random Effect Model (REM) are as follows:

Table 6. Panel Data Regression

Variabel	Coefficient	t-Statistic	Prob.
C	0.025641	0.089208	0.9292
PE	-0.001518	-2.253.725	0.0278
UMP	-4.75E-08	-3.214.104	0.0021
TPT	-0.002749	-1.032.219	0.3060
IPM	0.007060	1.505.427	0.1374
R2	0.498089		
F-statistik	1.712.627		
Prob(F-Statistik)	0.000000		

Based on the results of the data estimation that has been conducted, the following regression equation is obtained:

$$K = 0.0256410008321 - 0.00151816043336\,PE_{it} - 4.75401273547\text{e-}08\,UMP_{it} - 0.0027493926586\,TPT_{it} + 0.00706004649782\,IPM_{it} + \varepsilon$$

The results indicated by the F-statistic probability value show that all independent variables in this study collectively have a significant influence on income distribution inequality. However, when viewed from the coefficient of determination in this study, it shows a value of 0.498089 or 49%. This indicates that the independent variables in this study can only explain the dependent variable by 49%, while the remaining portion is explained by other variables.

The Influence of Economic Growth on Income Distribution Inequality

Based on the regression results in this study, it can be seen that the probability value for the economic growth variable is $0.0278 < 0.05$, and the t-statistic value is -2.253725. This means that economic growth has a negative and significant impact on income distribution inequality in 6 provinces in Sulawesi. This negative influence explains that a growing economy will reduce income distribution inequality. This is in line with the Kuznets

Curve hypothesis theory of the "inverted U," which explains that at a certain stage, as the economy grows, it will reduce income distribution inequality.

The results of this study are consistent with the hypothesis proposed by the researchers, and the findings align with the research conducted by (Kunenengan et al., 2023), which states that economic growth has a negative and significant impact on income inequality because as economic growth increases, the inequality in a region will decrease. which is supported by the research (Novia & Utomo, 2023) that economic growth has a negative impact on income inequality.

The Influence of Minimum Wage on Income Distribution Inequality

Based on the regression results in this study, it can be seen that the probability value for the minimum wage variable is $0.0021 < 0.05$, and the t-statistic value is -3.214104. This means that the minimum wage has a negative and significant effect on income distribution inequality in 6 provinces in Sulawesi. This negative influence explains that an increased minimum wage will reduce income distribution inequality. This explains that if the minimum wage is increased, it will enhance the welfare of the community, thereby reducing the likelihood of the community falling into poverty.

The results of this study align with the hypothesis proposed by the researchers, and this study is consistent with the research by (Sungkar et al., 2015) which explains that the minimum wage can reduce income inequality in society, as the establishment of a wage standard will create a more equitable distribution of wages and income. This result is also supported by the research of (Mudana & Purbadharmaja, 2024), which explains that the minimum wage has a negative and significant impact on income distribution inequality.

The Influence of Unemployment on Income Distribution Inequality

Based on the regression results in this study, it can be seen that the probability value for the unemployment variable is $0.3060 > 0.05$, and the t-statistic value is -1.032219. This means that unemployment does not have a significant impact on income distribution inequality in 6 provinces in Sulawesi. Not having an impact explains that in the island of Sulawesi, this is due to social assistance provided by the local government and programs that can help improve community skills, such as vocational training centers and workshops. Various factors mentioned above help alleviate the burden on the unemployed community because their basic needs can be met, although still unevenly. The results of this study do not align with the hypothesis proposed by the researchers. The study that corresponds with the test results is the research by (Farhan & Sugianto, 2022), which explains that unemployment does not have a significant impact on income distribution inequality.

The Influence of the Human Development Index on Income Distribution Inequality

Based on the regression results in this study, it can be seen that the probability value for the Human Development Index variable is $0.1374 > 0.05$, and the t-statistic value is -1.505427. This means that the HDI does not have a significant effect on income distribution inequality in 6 provinces in Sulawesi. The lack of influence explains that the HDI in the

economic sector of the 6 provinces does not require a high HDI level because the sectors that most contribute to economic growth in Sulawesi are agriculture, forestry, and fisheries, which require a large workforce. Therefore, the HDI level does not affect income distribution inequality. The results of this study do not align with the hypothesis proposed by the researchers. The study that corresponds with the test results is the research by (Ersad et al., 2022), which explains that the Human Development Index does not significantly affect income distribution inequality.

CONCLUSION

The results of this study can be concluded that unemployment and HDI do not have an influence on income distribution inequality on the island of Sulawesi, therefore the impact of these two variables is still limited. However, the variables of economic growth and minimum wage have a negative and significant relationship with income distribution inequality. This finding is consistent with the inverted U-curve theory introduced by Kuznets, which explains that in the early stages of economic growth, inequality will increase, but in the second stage of economic growth, it will decrease. On the UMP variable, it shows that an appropriate UMP becomes a policy that can reduce income inequality in Sumatra Island. Therefore, the appropriate policy recommendation to reduce the level of income distribution inequality is the implementation of an appropriate Minimum Wage policy and policies that enhance economic growth to create income equality among the community on the island of Sulawesi.

REFERENCES

Al Aqilah, M. R., Muchtar, M., & Robinson Sihombing, P. (2024). Analisis Determinan Ketimpangan Pendapatan Di Pulau Sumatera. *Journal of Law, Administration, and Social Science*, *4*(1), 13–24. https://doi.org/10.54957/jolas.v4i1.684

Badan Pusat Statistik. (2024). *Gini Ratio Menurut Provinsi dan Daerah*. https://www.bps.go.id/id/statistics-table/2/OTgjMg==/gini-rasio--maret-2023.html

Damanik, A. M., Zulgani, Z., & Rosmeli, R. (2018). Faktor-faktor yang mempengaruhi ketimpangan pendapatan melalui pertumbuhan ekonomi di Provinsi Jambi. *E-Jurnal Perspektif Ekonomi Dan Pembangunan Daerah*, *7*(1), 15–25. https://doi.org/10.22437/pdpd.v7i1.4533

Ersad, M. E., Amir, A., & Zulgani, Z. (2022). Dampak IPM, tingkat pengangguran dan tingkat kemiskinan terhadap ketimpangan pendapatan di Sumatera Bagian Selatan. *Jurnal Paradigma Ekonomika*, *17*(2), 425–438. https://doi.org/10.22437/jpe.v17i2.15614

Farhan, M., & Sugianto, S. (2022). Analisis Faktor-Faktor Yang Mempengaruhi Tingkat Ketimpangan Pendapatan Di Pulau Jawa. *SIBATIK JOURNAL: Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya, Teknologi, Dan Pendidikan*, *1*(4), 243–258. https://doi.org/10.54443/sibatik.v1i4.29

Kunenengan, R. M. ., Engka, D. S. ., & Rorong, I. P. F. (2023). Pengaruh Pertumbuhan Ekonomi Dan Kemiskinan Terhadap Ketimpangan Pendapatan Lima

Kabupaten/Kota Di Bolaang Mongondow Provinsi Sulawesi Utara. *Jurnal Berkala Ilmiah Efisiensi*, *23*(3), 133–144.

Mudana, I. W. E., & Purbadharmaja, I. B. P. (2024). Pengaruh Upah Minimum Dan Pertumbuhan Ekonomi Terhadap Ketimpangan Distribusi Pendapatan Dan Kesejahteraan Masyarakat Kabupaten/Kota Di Provinsi Bali. *Jurnal Review Pendidikan Dan Pengajaran (JRPP)*, *7*(3), 9601–9612. http://journal.universitaspahlawan.ac.id/index.php/jrpp/article/view/31044

Novia, T., & Utomo, Y. P. (2023). Analisis Pengaruh Pertumbuhan Ekonomi, Pengeluaran Pemerintah, Tenaga Kerja, Pekerja Berpendidikan Sma Ke Atas, Dan Investasi Terhadap Ketimpangan Pendapatan Di Provinsi Bali Tahun 2016-2020. *PARETO : Jurnal Ekonomi Dan Kebijakan Publik*, *5*(2), 1. https://doi.org/10.32663/pareto.v5i2.2765

Nurpita, A., & Nastiti, A. A. (2016). The Analysis of Development Disparities Inter Districts/ City in Special Region of Yogyakarta (DIY) Province 2003-2013. *JKAP (Jurnal Kebijakan Dan Administrasi Publik)*, *20*(1), 23. https://doi.org/10.22146/jkap.9934

Sekretatiat Kabinet Republik, & Indonesia. (2016). *Gini Ratio Membaik, Terjadi Penurunan Ketimpangan Pengeluaran di Masyarakat*.

Sungkar, S. N., Nazamuddin, & Nasir, M. (2015). Pengaruh Upah Minimum terhadap Ketimpangan Pendapatan di Indonesia. *Jurnal Ilmu Ekonomi Pascasarjana Universitas Syiah Kuala*, *3*(2), 40–53.

Todaro, M. P., & Smith, S. C. (2015). *ECONOMIC DEVELOPMENT ECONOMIC*.