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FACTORS AFFECTING INCOME INEQUALITY IN YOGYAKARTA (CASE STUDY 2010-2022)

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Abstract: *This study aims to determine the effect of population, education level, economic growth, minimum wage, and regional revenue on income inequality in Yogyakarta. The Special Region of Yogyakarta is one of the provinces in Indonesia that has a population of approximately 3.7 million people in 2022 with a diverse population composition. This study uses Panel Data Regression. The type of research used is quantitative research. The population in this study is people who live in Yogyakarta. The sample data in this study comes from BPS data. The case study in this research is from 2010-2022. The results of this study indicate that simultaneously, all independent variables simultaneously and significantly affect income inequality in Yogyakarta. And partially, the variables of population, education, and economic growth have a significant effect on income inequality in Yogyakarta. While the minimum wage and PAD do not have a significant effect on income inequality in Yogyakarta.*

Abstrak: Penelitian ini bertujuan untuk mengatahui prngaruh jumlah penduduk, tingkat pendidikan, pertumbuhan ekonomi, UMR, dan PAD terhadap ketimpangan pendapatan di Yogyakarta. Daerah Istimewa Yogyakarta merupakan salah satu provinsi di Indonesia yang memiliki jumlah penduduk kurang lebih 3,7 juta jiwa pada tahun 2022 dengan komposisi penduduk yang beragam. Penelitian ini menggunakan Regresi Data Panel. Jenis penelitian yang digunakan adalah jenis penelitian kuantitatif. Populasi dalam penelitian ini adalah masyarakat yang berdomisili di Yogyakarta. Sampel data dalam penelitian ini bersumber dari data BPS. Studi kasus dalam penelitian ini yaitu dari tahun 2010-2022. Hasil dari penelitian ini menunjukan bahwa secara simultan, seluruh variabel independent berpengaruh serentak dan signifikan terhadap ketimpangan pendapatan di Yogyakarta. Serta secara parsial variabel jumlah penduduk, pendidikan, dan pertumbuhan ekonomi berpengaruh signifikan terhadap ketimpangan pendapatan di Yogyakarta. Sedangkan UMR dan PAD tidak berpengaruh signifikan terhadap ketimpangan pendapatan di Yogyakarta.

INTRODUCTION

Yogyakarta province has the highest Gini index among other provinces in Indonesia. In fact, Yogyakarta's average Gini index is higher than the national average. This provides evidence that the level of income inequality in Yogyakarta is still high and needs to be addressed. Equitable development is a constitutional mandate where justice should be a priority in a democratic country like Indonesia. The Special Region of Yogyakarta still ranks first out of 34 provinces in Indonesia as the province with the highest inequality. This is shown in the Gini Index ranking table sourced from BPS in 2023. The Composite Stock Price Index (IHSG) in its interaction with Indonesia's economic growth has a very strong interaction (Hermansyah et.al., 2025). Economic growth is an indicator for assessing the economic conditions of a region (Rediansyah et.al., 2023). A house is a unique item with unique characteristics among all other items that are commonly used (Khoirudin, 2017). The large number of migrant workers in Indonesia is inseparable from the large number of migrant workers who leave illegally (Khoirudin et.al., 2023).

The Special Region of Yogyakarta is one of the provinces in Indonesia that has a population of approximately 3.7 million people in 2022 with a diverse population composition. As a student city, every year Yogyakarta is visited by people from outside Yogyakarta for educational purposes. These activities bring in new consumers and new business growth, causing economic growth in Yogyakarta to be even higher than the national average. Yogyakarta has become an economic centre based on the tourism sector, education sector, and manufacturing sector. According to (Castells-Quintana, 2015) high income inequality tends to occur in regions that are economic centres. With rapid economic growth, population increase, and human economic activities, there has been a negative impact on the environment, marked by an increase in carbon dioxide emissions (Khoirudin et.al, 2024).

Unequal income distribution among the population is caused by many factors, one of the most prominent being differences in background. Backgrounds can include educational backgrounds, economic backgrounds and family backgrounds. These background differences allow for differences in the ability to earn an average income. As a case in point, a family with a high educational background tends to receive a much higher income than a family with an uneducated background. Although not absolute, theory can prove this phenomenon. According to (Ariesta et al., 2022) education is an

element that can improve the quality of human life in economic terms. Humans who have high education will have high productivity as well.

In the last ten years, Yogyakarta's population growth has been increasing every year except in 2020. Population growth trends can cause a budget burden for the Government. Moreover, if the increase in population is not accompanied by an improvement in the quality of human life, it will lead to new problem clusters such as poverty and unemployment. Where poverty and unemployment are the main estuaries of the creation of inequality. In line with the theory (Solow, 1997), population growth can have negative impacts in addition to positive impacts. Differences in the general structure of the population also trigger income inequality (Kurniawati & Sugiyanto, 2021)

The DIY Provincial Government has a vital role in harmonising synergised and integrated development. So that the development carried out does not only provide benefits for certain parties but also equitably for every element of society. One of the efforts that can be made by the DIY Provincial Government in reducing income inequality is by maximising local own-source revenue or PAD. Local own-source revenue is revenue that comes from local taxes and levies (Ariyanti & Yudhaningsih, 2020).

Based on the above description of economic problems in Yogyakarta (inequality), Yogyakarta Province needs to further map the factors that influence inequality. So that it can be used as a reference in revamping the problem of inequality. This study aims to determine the determinants of inequality in Yogyakarta with the hope that it can be used as a scientific reference in the formulation of policies related to inequality. The novelty of this study lies in the use of several independent variables that are rarely found, such as PAD & MSE. In addition, this study uses the earliest observation, 2019-2022, to produce research findings that are actual and relevant to the current situation.

METHOD

Panel data regression is an analytical tool used to process panel dimension data. The panel data itself is data that contains cross-sectional & time-series in certain units of analysis. The advantages of using data regression can include, (1) can reduce the possibility of multicollinearity and heteroscedasticity, (2) can solve more complicated problems, (3) and can contain more comprehensive information. Referring to the variables used in this study, the panel data regression model in this study is as follows:

$$IG_{it} = \alpha + \beta_1 JP_{it} + \beta_2 PD_{it} + \beta_3 PE_{it} + \beta_4 UMK_{it} + \beta_3 PAD_{it} + e$$

With the following description:

IG : Gini Index

JP : Total Population

PD : Education

PE : Economic Growth

UMK : District Minimum Wage

PAD : Local Revenue

β : Beta Coefficient

α : Constant

it : Time Series t at cross-sectional i

e : Error Coefficient

RESULTS AND DISCUSSION

Result

Regression CEM

Table 4.1 CEM Regression Result

Variabel	Koefisien	Thitung	Probabilitas
JP	2.06e-08	1.94	0.021
EDU	-0.185	4.41	0.000
PE	0.008	2.05	0.000
UMR	1.76e-08	1.09	0.280
PAD	1.27e-14	0.31	0.759
Constanta	0.16	3.61	0.001

Table 2 shows that there is one independent variable that has a negative relationship with the level of income inequality, namely the education variable. According to the probability value, there are three independent variables that have a significant effect. Referring to the regression results, the model in this study can be formulated as follows:

$$GR_{it} = 0.16 + 2.06JP_{it} - 0.18EDU_{it} + 0.008PE_{it} + 1.76UMR_{it} + 1.27PAD_{it} + e$$

The regression model can be interpreted as follows:

a. When all independent variables are 0 or constant, the gini ratio in Yogyakarta is predicted to be 0.16.
b. When population increases by 1%, income inequality in Yogyakarta is predicted to increase by 2.06%.
c. When the average years of schooling increases by 1%, income inequality in Yogyakarta is predicted to decrease by 0.18%.
d. When economic growth increases by 1%, income inequality in Yogyakarta is predicted to increase by 0.008%.
e. When UMR increases by 1%, income inequality in Yogyakarta is predicted to increase by 1.76%.
f. When PAD increases by 1%, income inequality in Yogyakarta is predicted to increase by 1.27%.

Normality Test

The approach used in this normality test is the Shapiro-Wilk approach. Confirming that the nature of the residual data is normally distributed. This statement is known from the probability value of 0.35 which means greater than 0.05.

Multicollinearity Test

The approach used to test for multicollinearity symptoms is the variance inflation factor or VIF approach. Confirming that none of the independent variables have symptoms of multicollinearity. This is because the VIF value is less than 10 both for each variable and the average of all variables. The conclusion is that the attachment between the independent variables is weak so that it does not interfere with their attachment to the dependent variable.

Heteroscedasticity Test

The approach used to test for symptoms of heteroscedasticity is the Breusch-Pagan approach where the results show the absence of symptoms of heteroscedasticity or homogeneous residual variants. This is based on the probability value which shows above 0.05.

Uji Simultan

Table 4.2 Simultan Test Result

F (5, 59)	F_{tabel}	*Alpha*	*P-Value*
15.07	2.37	0.05	0.00

Based on table 3 above, it shows that the Fcount value is greater than Ftable. In addition, the probability value is less than alpha. So the results of the study can draw the conclusion that all independent variables in the model simultaneously and significantly affect the gini ratio in Yogyakarta.

Determination Coefficient Test

Table 4.3 Determination Coefficient Test Result

F (5, 59)	F_{tabel}	*Alpha*	*P-Value*
15.07	2.37	0.05	0.00

Based on table 4, it is known that the R coefficient value is 0.56 or equivalent to 56%. This means that the ability of all independent variables to explain the dependent variable is 56%, while the other 44% is explained by variables outside the model.

Parsial Test

Table 4.4 Parsial Test Result

Variabel	Koefisien	Thitung	Ttabel	Keterangan
JP	2.06	1.94	1.66	Signifikan
EDU	-0.018	4.41	1.66	Signifikan
PE	0.00	2.05	1.66	Signifikan
UMR	1.76	1.09	1.66	Tidak Signifikan

Based on Table 5, several research results or answers to the hypotheses can be concluded, including:

a) Total population has a significant effect on income inequality in Yogyakarta.
b) Education has a significant effect on income inequality in Yogyakarta.
c) Economic growth has a significant effect on income inequality in Yogyakarta.
d) Minimum wage has no significant effect on income inequality in Yogyakarta.
e) PAD has no significant effect on income inequality in Yogyakarta.

Discussion

Simultaneous Discussion

The findings of this study confirm that population, education, economic growth, minimum wage and regional revenue simultaneously have a significant effect on income inequality in Yogyakarta. This means that there is an interaction between the independent variables in the model and then the interaction forms a system which affects the Gini ratio. Gini ratio is an index that measures the evenness of income distribution. The level of income equality, according to the results of this study, is influenced by population quantity, average years of schooling, economic growth rate, prevailing wage standard and the level of regional revenue through local own-source revenue.

In our personal analysis, the relationship of all independent variables in the model in influencing income inequality is a structural issue. When the quality of an individual's education-which in this study is measured using average years of schooling-is good enough, the likelihood of getting a better job also increases. Then the population quantity represents the future dependency ratio. This means that as the population increases, unproductive ages emerge that will burden family finances and lead to social symptoms including income inequality. No matter how good the level of education that will bring individuals to the point of decent income, it becomes inappropriate when they have to finance unproductive generations (sandwich generation). Thus, birth control in the context of population control is important.

Furthermore, external factors outside the individual also play an important role in shaping a good system for income distribution. Reliable economic growth will provide investment encouragement for investors so as to create new jobs that will open up job opportunities for the jobless. In this way, income inequality can be minimised. Economic growth can be stimulated by maximising the realisation of local revenue and increasing the level of wages or UMR. With maximum realisation of own-source revenues - by maximising local potential and tax or levy revenues - the government's ability to fund social protection is also more likely.

Local revenue can be used as a source of social protection funding. Social protection funding is very important for vulnerable communities so as to minimise economic inequality. Social protection can be in the form of health insurance, employment insurance and other insurances that help solve social problems including inequality. The continuity of internal factors (education and fertility) and external

factors (PAD, UMR, economic growth) is a unified system that must be considered simultaneously. If education is good but not supported by a decent minimum wage, it is impossible to reduce income inequality. Similarly, if economic growth, UMR, and PAD are increased but not simultaneously with education, they may not be significant in influencing inequality. All the independent variables in this research model form a system that simultaneously affects income inequality in Yogyakarta.

According to Suryani & Woyanti (2021) with the same case study, namely in Yogyakarta, confirms the finding that economic growth and wage levels simultaneously and significantly affect income inequality, despite including another independent variable that is not relevant to this study, namely HDI. However, HDI is the output of the education variable included in this study. Yuliani et al (2021) confirmed that population, regional minimum wage, HDI and GRDP/capita simultaneously and significantly affect income inequality in Yogyakarta. Although this study does not include the GRDP/capita variable, the variable is closely related to economic growth because economic growth is also measured based on changes in GRDP each period.

Partial Discussion

Effect of Population on Income Inequality

This study confirms that population has a positive and significant effect on the Gini ratio. Another meaning is that as population increases, income inequality increases or income inequality becomes more massive. This result is supported by several previous studies. According to Yuliani et al (2021), population has a significant effect on income inequality with a case study of Yogyakarta. Although with a different case study, research Zhong (2021) confirms that changes in demographic patterns will give a different pattern to income inequality. This means that there is a causality between population and income inequality. A high population has its own consequences for social problems or symptoms.

The findings in this study have relevance to the theory developed by Thomas Malthus, or often referred to as Malthusian. Although Malthus did not directly mention inequality, his theory is sufficient to explain how population growth will increase inequality. According to Malthus, the population tends to grow exponentially every period, but not in line with the resources that remain relatively fixed or even do not increase (Todaro & Smith, 2015). The consequence of this is that competition between individuals intensifies, giving rise to resource-rich groups and resource-poor vulnerable

groups. So the assumption is that as the population increases, so does the competition for resources, which will increase the likelihood of inequality. The ratio of relatively fixed resources to an exponentially growing population is the reason why population growth causes income inequality to increase.

In another perspective, an increase in population means an increase in the ratio of unproductive age to productive age. Each new birth rate substantially increases the cost burden on households. Ages 0-14 are unproductive, and their lives depend on productive individuals. This phenomenon is often referred to as the dependency ratio. The dependency ratio is not only concerned with the elderly population, but also with new births. When the rate of new births is much higher than the rate of deaths (population increase), the dependency ratio will increase and it puts a burden on the productive age. Inequality is more likely to occur when the disposible income received must be distributed to more parties (children). To reinforce this idea, Omar & Inaba (2020) confirmed that the dependency ratio has a very significant influence on income inequality.

The Effect of Education on Income Inequality

In this study, education is measured using the average years of schooling, so the assumption is that when the average years of schooling increases, the quality of education also increases. Referring to the research results, education has a negative and significant effect on the Gini ratio. This means that when the average years of schooling of the population increases, it will lower the gini ratio or reduce the level of income inequality. Many relevant theories help to explain the negative causality between the level of education and the level of inequality. Generally, when individuals have a good quality of education, it brings several benefits, one of which is decent employment and higher wage rates. Higher wage levels are likely to reduce inequality in income distribution across social classes.

The most popular theory in explaining the causality of the two variables is the human capital theory developed by Gery Becker. According (Hadley, 2019), education is the basic capital in improving work skills and competence so that the capability to earn higher income also increases. This is because, the higher the individual's education, the higher the productivity. Thus, more educated individuals have a better chance of earning higher incomes, which can reduce income inequality.

Referring to the results of previous studies, although different regions were studied, (Brown & James, 2020) confirmed their findings that improving education performance and increasing the length of education (widening to higher education) can provide benefits in the form of escaping structural problems such as poverty and inequality. Using ARDL analysis tool, (Qazi et al., 2018) confirms the finding that receiving longer or higher education reduces future income inequality in the long run. Although the relationship is not direct, a person with higher education tends to be able to unravel economic inequality. These two recent studies reinforce the findings of this study, namely that higher average years of education reduce income inequality.

The Effect of Economic Growth on Income Inequality

Based on the research results, economic growth has a positive and significant effect on income inequality in Yogyakarta. This positive relationship means that an increase in economic growth will increase the gini ratio or income inequality in Yogyakarta. This is a structural case where the top one per cent of the population contributes more to the GRDP. The middle and lower social classes tend to contribute a small proportion to GRDP. Many findings actually confirm that economic growth has no significant effect on income inequality in Yogyakarta, such as by (Khoirudin & Musta'in, J, 2020). However, this study provides different results and perspectives.

According to the researcher's analysis, economic growth has resulted in an increase in income inequality in Yogyakarta due to several reasons. Firstly, sectoral growth in Yogyakarta is uneven and only dominated by certain sectors. In the last five years, the sectors that contributed the highest GRDP in Yogyakarta were the communication services sector and the manufacturing sector, each above 12%. On the other hand, there are many sectors that lag behind and contribute less than 3%, such as sector 2, sector 4, sector 5, sector 16 and sector 17. This sectoral inequality, according to the researcher's analysis, is the source of income inequality. Where economic growth is only supported by a few sectors, the growth represents the opposite picture (negative causality).

In relation to the Gini ratio, sectors with a large contribution to the economy tend to have higher wage levels than sectors with a small contribution. This is because sectors with large contributions have much higher productivity than sectors with low productivity. For example, individuals who work as programmers in the communication and services sector have higher wages than individuals who work in the

agriculture sector. The communication services sector is the most productive sector in Yogyakarta when looking at its nominal contribution to GRDP (2016-2022). Therefore, it can be concluded that the increase in economic growth in Yogyakarta has actually resulted in an increase in income inequality. The reason is unequal sectoral productivity, where a positive economy is only supported by a few sectors so that the wage level between sectors is very different and unequal. According to Rubin & Segal (2015) economic growth and income inequality are positively associated‖. According to Rubin, -high-income groups contribute the most to economic growth. As for the low-income group, it contributes very little to economic growth. So the economic growth that exists is the contribution of individuals with the top income. Therefore, an increase in the economy is equal to an increase in income inequality.

The Influence of UMP on Income Inequality

According to the results of this study, the regional minimum wage does not have a significant effect on income inequality in Yogyakarta. This means that an increase or decrease in wages will not be responded to significantly by income inequality in Yogyakarta. In other words, income inequality remains relatively constant and does not change even when there is a change in the regional wage level. In the study (Nasiruddin & Arif, 2023) the regional minimum wage also did not have a significant effect on income inequality in Yogyakarta. Similar to (Yuliani et al., 2021) that the regional minimum wage level does not have a significant effect on income inequality in Yogyakarta. Although both have different observation ranges, they provide sufficient support for the findings of this study.

The researcher's analysis, that the UMR does not have a significant effect on income inequality in Yogyakarta is based on several things. First, individual internal factors such as education level dominate their influence more than external factors such as wage levels set by the Government. No matter how high the UMR level set by the Government, if the majority of the population does not have sufficient competence and education, then the individual's ability to achieve UMR benefits is also limited. There is a barrier or obstacle to feeling the benefits of wage levels, namely access to education. Currently, the industry requires individuals to have sufficient competence and education so that the work output produced is of high quality.

Second, Yogyakarta is considered to have a low UMR and is not comparable to the existing standard of living (PSEK UGM, 2023). The increase in UMR each period

is not able to cover the standard of living which has increased quite significantly and exponentially. As a sample, during 2010-2022 the average increase in UMR in the City of Yogyakarta was only 8.8% (Bappeda DIY, 2022). Then the average inflation in the City of Yogyakarta during 2010-2022 was 4.2% (BPS DIY, 2022). This means that the increase in the real UMR is 4.6%. With the cost of living and needs that are increasing exponentially, it is impossible for economic inequality to be reduced by increasing real wages by only 4.6%. Moreover, there is a dependency ratio factor, where a relatively fixed wage level will not meet the needs of all family members who are relatively increasing both in terms of needs and the number of family members.

The conclusion is that income inequality will not be resolved simply by controlling wage levels. There are many other factors that are more dominant and more effective in reducing the level of inequality, such as the level of education of the population, control over birth rates, control of inflation (variables outside the model), and various other aspects.

The Influence of PAD on Income Inequality

Referring to the results of this study, PAD does not have a significant effect on income inequality in Yogyakarta. This means that the increase or decrease in local revenue is not sufficiently responded to by income inequality. The largest contributors to local revenue are local taxes and levies, the source of which is from the people and must be returned to the people in indirect or direct forms. Therefore, local revenue should be used as an instrument to reduce income inequality. However, in this study, PAD was not proven to be significant in influencing income inequality in Yogyakarta.

One of the researcher's analyses is that the inaccuracy of the Yogyakarta Government's policies is one of the main factors why local revenue does not affect income inequality. As a sample, the DIY APBD for the 2022 budget year spent around 718 billion for employee spending, but only around 16 billion for social assistance (jogjaprov.go.id, 2023). This means that most of the revenue, including PAD, is only used for the interests of public officials. So it makes PAD have no impact whatsoever on the level of inequality. PAD should be used for social protection instruments.

CONCLUSION

Based on the description of the results and discussion of the research, the following are the conclusions of this study, namely:

1. Simultaneously, all independent variables have a simultaneous and significant effect on income inequality in Yogyakarta.
2. Partially, population has a significant effect on income inequality in Yogyakarta.
3. Partially, education has a significant effect on income inequality in Yogyakarta.
4. Partially, economic growth has a significant effect on income inequality in Yogyakarta.
5. Partially, UMR does not have a significant effect on income inequality in Yogyakarta.
6. Partially, PAD does not have a significant effect on income inequality in Yogyakarta.

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