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Analysis of Economic Growth and Income Inequality Among Province in Indonesia 2018 – 2022

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Abstract: The success of economic development can be characterized by an increase in economic growth and equitable development. However, in reality, the increase in economic growth is not necessarily followed by equity. This is evidenced by the persistence of inequality in several aspects related to development between regions in Indonesia. One of them is income inequality by calculating the Williamson Index which shows an upward trend from 2018 - 2022. Therefore, it is necessary to conduct more in-depth research related to the causality between economic growth and income inequality, as well as the factors that influence these two aspects in the period 2018 - 2022. This study applies a simultaneous equation model through the use of the Inderect Least square (ILS) method. The results of the analysis show that (1) income inequality and IP-ICT have a significant negative effect on economic growth. (2) TPAK and PMTB significantly affect economic growth in a positive direction. (3) Income inequality is significantly positively affected by economic growth. (4) Total population, TPAK, and IP-ICT have a significant negative effect on income inequality. (5) There is a unidirectional causality from economic growth to income inequality.

Keywords: Economic Growth, Income Inequality, Williamson Index, TPAK, PMTB, IP-ICT, Total Population

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PENDAHULUAN

Economic growth accompanied by equitable development serves as a benchmark for the success of a country's development, including Indonesia. According to Todaro (2003), economic development aims to promote economic growth, social change, eradicate poverty and unemployment, and reduce income distribution inequality to bring about positive changes. Improved economic growth is usually indicated by an increase in GDP figures, whereas economic stagnation is marked by a decline in GDP.

Figure 1. Indonesia's GDP Growth Rate from 2018-2022
Source: Statistics Indonesia (2024)

BPS data from 2018–2022 shows that Indonesia's economic growth fluctuated significantly. From 2018 to 2019, there was a decline in the economic growth rate from 5.17 percent to 5.02 percent. This was followed by a sharp decline in 2020 due to the COVID-19 pandemic, with the growth rate falling to a negative 2.07 percent. Entering 2021, Indonesia's economy showed signs of recovery, with GDP growth reaching 3.7 percent. By 2022, GDP further increased to 5.31 percent. This improvement in economic growth reflects an increasingly favorable economic condition in Indonesia. However, in reality, improved economic growth does not necessarily translate to equitable development across regions in Indonesia. Inequality remains a challenge and a priority issue for national development in the 2020–2024 RPJMN.

The calculation of the Williamson Index is one tool used to measure income inequality among regions in a given area. Using the Williamson Index for 34 provinces in Indonesia in 2022, it was observed that the three provinces with the highest IW values are located in Eastern Indonesia: Papua, West Papua, and Southeast Sulawesi. The Williamson Index scores for these three provinces exceed 1, indicating that inter-regional disparities (between districts/cities) remain very pronounced. Essentially, income inequality refers to the uneven distribution of income among members of a society or population. According to BPS data, Indonesia's population has shown a rising trend from 2018 to 2022.

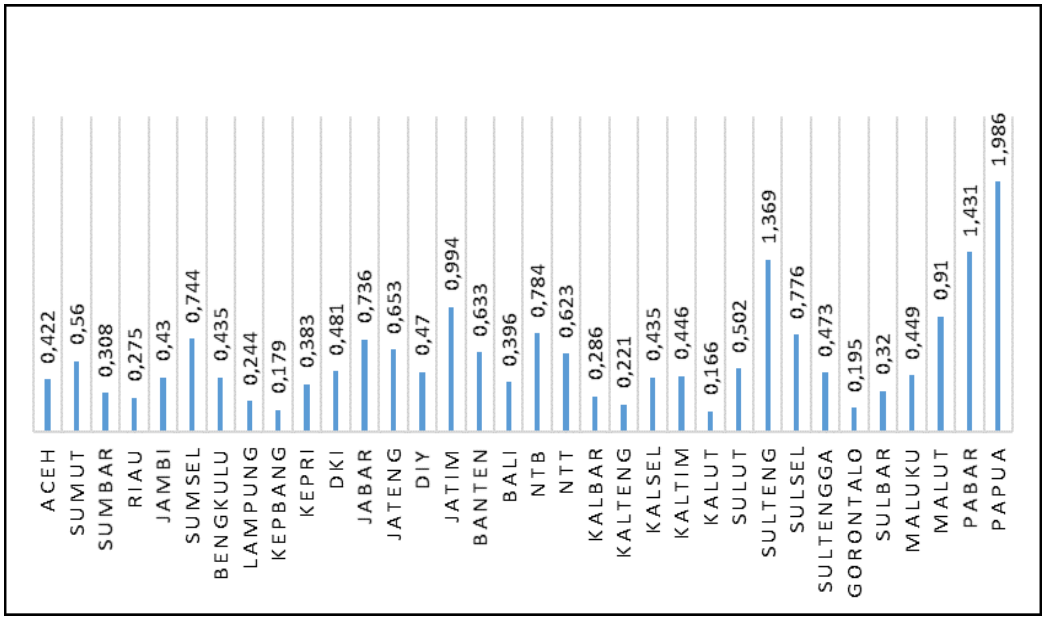

Figure 2. Williamson Index Scores of 34 Provinces in Indonesia, 2022
Source: Statistics Indonesia (2024)

On the other hand, the annual population increase can have both positive and negative impacts on economic growth. A larger population will increase the labor force. If effectively utilized to boost production, this can lead to economic growth and, in turn, reduce income inequality. Conversely, a rise in population without corresponding expansion in employment opportunities will result in higher unemployment and poverty levels, potentially worsening income inequality across regions. Kuznets (1955) explained that demographic dynamics are an implicit part of his analysis concerning economic growth and income inequality.

Figure 3. Indonesia's Population from 2018-2022
Source: Statistics Indonesia (2024)

In addition to being influenced by population size, technological advancements and investments also significantly impact economic growth. More developed regions are often characterized by technological progress. The growth of ICT development in a region can be represented by the

Information and Communication Technology Development Index (ICTDI). The ICTDI indicates a widening gap in ICT development in Indonesia from 2021 to 2022. According to BPS data, the range between the highest and lowest ICTDI scores increased from 4.31 to 4.42. Apart from technological advancements, investment is a crucial key for development capital in each region of Indonesia, as reflected in the value of Gross Fixed Capital Formation (GFCF). GFCF represents physical investment that indicates changes in fixed assets, including additions or reductions in production units. BPS data shows that the five provinces with the largest GFCF values in 2022 are still dominated by provinces in Western Indonesia, namely DKI Jakarta, East Java, West Java, Central Java, and North Sumatra.

Based on the explanation above, it is evident that increased economic growth does not necessarily result in reduced inequality between provinces. Conversely, rising income inequality does not always lead to reduced economic growth. Numerous studies have analyzed the relationship between economic growth and income inequality in Indonesia. For instance, a study by Fathonah (2020) demonstrated that economic growth negatively affects inequality in development. On the other hand, findings by Ningtyas and Dwiputri (2021) suggest a significant positive relationship between economic growth and income disparities. Similarly, Rukmana's (2012) study shows that economic growth is influenced by income inequality in a positive direction. However, this contrasts with the findings of Rahmadi and Parmadi (2019), which reveal a negative impact of income inequality on economic growth. Previous research shows that empirical studies on the relationship between economic growth and income inequality remain inconsistent. Therefore, the author is interested in conducting a more in-depth analysis of the causal relationship between economic growth and income inequality, as well as the factors influencing these two aspects across 34 provinces in Indonesia from 2018 to 2022. The factors analyzed in this study include the Labor Force Participation Rate (LFPR), Gross Fixed Capital Formation (GFCF), the Information and Communication Technology Development Index (ICTDI), and population size. The findings of this study are expected to serve as a guide for understanding the causal relationship between economic growth and income inequality, as well as the factors influencing them during the study period. This can assist in formulating economic policies that aim to achieve successful development, characterized by increased economic growth and equitable welfare distribution among provinces in Indonesia in the coming periods.

LITERATURE REVIEW

Solow Economic Growth

Economic growth is often associated with the economic development conditions of a region. National-level economic growth can be observed through Gross Domestic Product (GDP) figures, whether at current prices or constant prices. Todaro (2000) explains three main factors influencing economic growth are (1) Capital accumulation, which includes various forms of investment in land. (2) Human resources, represented by population growth in subsequent years. (3) Technological advancements.This perspective is based on the economic growth theory proposed by Robert Solow in 1956, expressed with the formula Y=f[(K,L)A]. The Solow Growth Model demonstrates the interaction between capital stock growth, labor force growth, and technological advancements in the economy, as well as their overall impact on a country's output of goods and services (Mankiw, 2010). In this study, these factors are represented by the variables LFPR, GFCF, and ICTDI.

Income Inequality

Disparities in economic development between regions can influence the welfare or prosperity of society. These disparities often lead to jealousy and dissatisfaction among the population, which can escalate into political and social unrest (Sjafrizal, 2014). Additionally, extreme income inequality results in economic inefficiency, weakens social balance and solidarity, and is commonly perceived as unjust (Todaro & Smith, 2006). Income inequality can be measured using various approaches, one of which is the Williamson Index calculation. The Williamson Index

(IW) is an index based on measuring deviations in per capita income across regions compared to national per capita income, using a modified standard deviation. IW can be used to analyze regional inequality, enabling the assessment of income inequality across provinces in Indonesia (Rubiarko, 2013). Formula for Calculating the Williamson Index:

$$IW = \sqrt{\frac{\sum(Yi - \bar{Y})^2 \ (fi/n)}{Y}}$$

Description:
IW = Williamson Index, Yi = GRDP per capita of a district/city, Y = GRDP per capita of the province, fi = Population of a district/city,
n = Population of the province
The results of IW measurements are typically represented by values ranging from 0 to greater than 1. A higher Williamson Index value indicates a higher level of income inequality in a region, and vice versa. A region is categorized as having very high inequality when IW > 1, high inequality when IW is between 0.7 and 1, moderate inequality when IW is in the range of 0.4–0.69, and low inequality when IW < 0.39. In this study, income inequality among provinces in Indonesia will be analyzed using the Williamson Index calculation. This approach aligns with the studies by Hartati (2019) and Ningtyas & Dwiputri (2021), which utilized the Williamson Index formula to analyze income inequality levels in Indonesia.

Research Framework

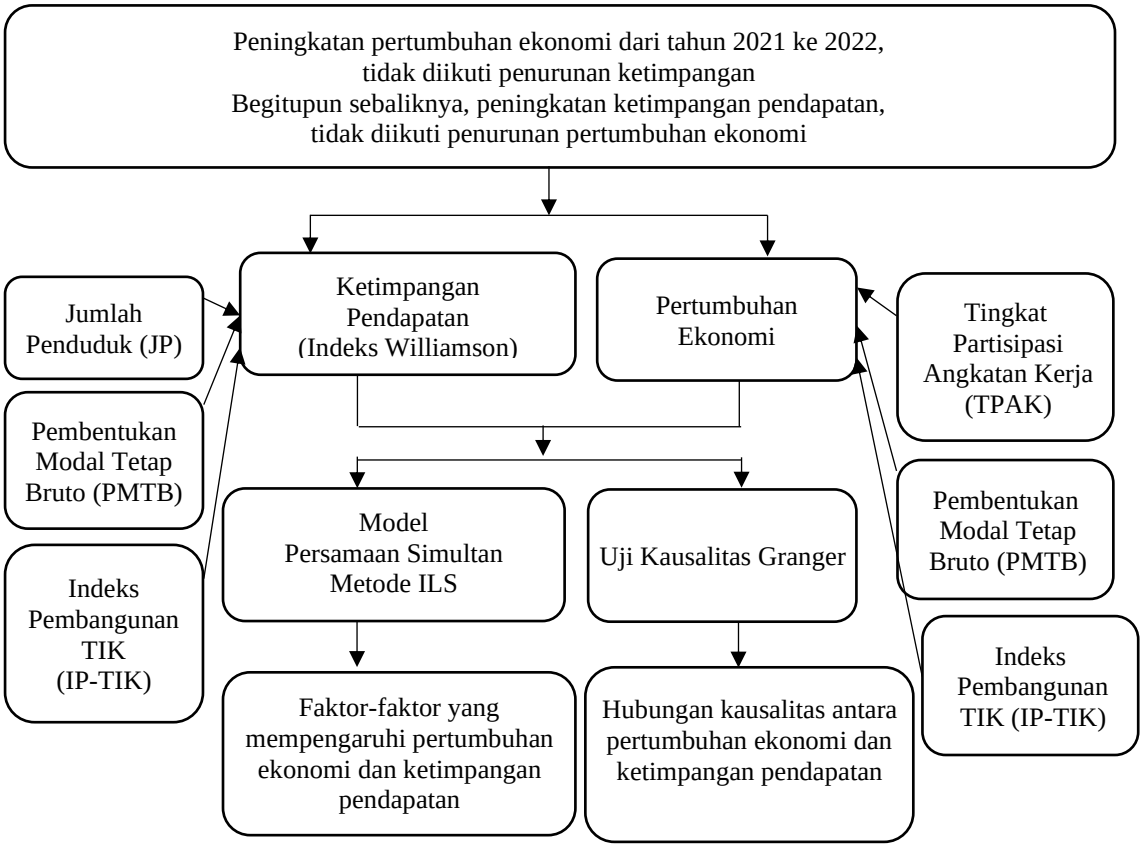

Figure 4. Research Framework
Source: Illustration by the author (2024)

Hypothesis Development

The causal relationship between income inequality and economic growth can occur in a unidirectional manner (unidirectional causality) or bidirectional manner (bidirectional causality) (Amri, 2017). The influence of economic growth on income inequality was first proposed by Kuznets in 1955. In his hypothesis, Kuznets stated that in the early stages of economic growth, income inequality tends to increase but will decline as development progresses (Todaro, 2000). This phenomenon is known as the "Inverted-U Hypothesis" of Kuznets, which links the Gini coefficient with per capita GNP growth, as illustrated in the following curve:

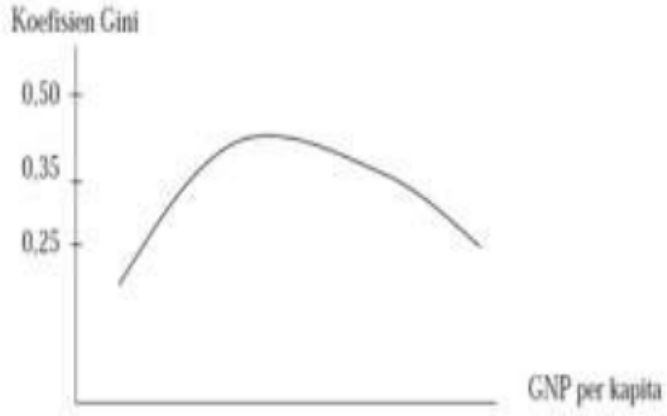

Figure 5. Kuznets Inverted-U Curve
Source: Arsyad, (1988)

In his other book, Todaro (2004) further strengthens his explanation, stating that in the short term, there appears to be a positive relationship between economic growth and income distribution inequality. This means that an increase in economic growth will be followed by an increase in income inequality. However, in the long term, the two show a negative correlation, meaning that increased economic growth will be followed by a reduction in income inequality. On the other hand, Stiglitz (2012) explains that high income inequality can hinder economic growth. This can occur because income inequality leads to reduced consumption, which lowers purchasing power, social and political instability that reduces investment, and limited access to education and economic opportunities for the poor, which in turn reduces productivity and long-term economic growth potential. Based on these explanations, the following hypotheses are developed:

H.1 It is suspected that income inequality has a significant impact on economic growth across provinces in Indonesia from 2018 to 2022.

H.2 It is suspected that economic growth has a significant impact on income inequality across provinces in Indonesia from 2018 to 2022.

H.3 It is suspected that there is a causal relationship between economic growth and income inequality across provinces in Indonesia from 2018 to 2022.

In the model developed by Solow, labor is one of the main factors of production, along with capital and technology. The Labor Force Participation Rate (LFPR) indicates the percentage of the working-age population in a country or region that is economically active. An increase in LFPR can boost economic output in the short term because more labor is involved in economic activities. Research by Rahmawati (2019) shows that LFPR has a significant positive impact on economic growth. In contrast, the study by Safitri & Ariusni (2019) reveals a significant negative impact of LFPR on economic growth. Based on this explanation, the following hypothesis is developed:

H.4 It is suspected that LFPR has a significant impact on economic growth across provinces in Indonesia from 2018 to 2022.

Solow views investment as the addition of capital, which plays a role in enhancing productivity and long-term output in the context of economic growth. Gross Fixed Capital Formation (PMTB) is one aspect of GDP or national output from the expenditure side, showing the amount of physical investment in a region over a given period (BPS Rembang, 2023). A study by Kesuma & Astuti (2018) indicates that economic growth is significantly and positively affected by PMTB. In contrast, the study by Asbiantari et al. (2016) shows that PMTB has a negative impact on economic growth. Based on this explanation, the following hypothesis is developed:

H.5 It is suspected that PMTB has a significant impact on economic growth across provinces in Indonesia from 2018 to 2022.

Robert Solow involved technology as an external factor influencing the rate of economic growth. Technology enables increased productivity and efficiency, which in turn drives economic growth. The development or adoption of technology can be one parameter to assess technological variables. The Information and Communication Technology Development Index (IP-TIK) is a measurement standard developed by the International Telecommunication Union to describe the level of technological development in a region (BPS, 2023). IP-TIK plays an important role as a standard for comparing the level of ICT development over time and across regions. A study by Oktavia (2020) shows evidence that IP-TIK has a significant positive impact on economic growth in Indonesia, while an analysis by Putri & Idris (2020) indicates a negative impact of IP-TIK on economic growth in Indonesia. Based on this explanation, the following hypothesis is developed:

H.6 It is suspected that IP-TIK has a significant impact on economic growth across provinces in Indonesia from 2018 to 2022.

Thomas Malthus (1798) argued that population tends to grow exponentially, while resources grow linearly. When the population grows faster than the economy's ability to provide jobs and resources, it can lead to poverty and greater income inequality. Research by Wahyuni & Adriyani (2022) shows a significant positive impact of population size on income inequality. In contrast, a study by Adipuryanti & Sudibia (2015) shows that the number of working individuals has an insignificant negative impact on income inequality. Based on this explanation, the following hypothesis is developed:

H.7 It is suspected that the population size has a significant impact on income inequality across provinces in Indonesia from 2018 to 2022.

The Endogenous Growth Theory, largely developed by economist Paul Romer (1986), focuses on internal economic factors that determine long-term economic growth. These factors include investments in physical capital (such as PMTB), innovation, and workforce skill development. Investment in PMTB increases the stock of physical capital, such as infrastructure, factories, and technology, which enhances labor productivity. However, if these productivity improvements are concentrated in specific sectors or regions, only certain groups or areas will benefit. This could worsen income inequality if other groups are left behind. A study by Maesza et al. (2022) shows that PMTB has a significant positive impact on income inequality. Conversely, a study by Wijayanti et al. (2023) shows a significant negative impact of PMTB on income inequality. Based on this explanation, the following hypothesis is developed:

H.8 It is suspected that PMTB has a significant impact on income inequality across provinces in Indonesia from 2018 to 2022.

The Substitute and Complementary Effects theory suggests that technology can function as a substitute or complement for human labor (Jan Tinberger, 1975). If technology functions as a substitute, then human labor in certain sectors may decrease, reducing income for workers in those sectors. However, if technology functions as a complement, the productivity of human workers may increase, which can raise income levels. Technological development, as represented by IP-TIK, can reduce income inequality when it is utilized for labor efficiency and increased production (Juhro & Trisnanto, 2018). However, it may lead to an increase in income inequality if technological progress reduces labor demand (Fuady, 2018). Based on this explanation, the following hypothesis is developed:

H.9 It is suspected that IP-TIK has a significant impact on income inequality across provinces in Indonesia from 2018 to 2022.

RESEARCH METHOD

This study adopts a descriptive associative research type with a quantitative approach. Descriptive research aims to provide an overview or exploration of a social reality phenomenon by describing various variables related to the issues and units being studied among the tested phenomena (Retnawati, 2015). Meanwhile, a quantitative approach is a research approach that uses specific populations or samples, data collection with research instruments, and quantitative or statistical data analysis, aimed at testing the predetermined hypotheses (Sugiyono, 2011). This study uses secondary data obtained from the Central Statistics Agency (BPS) publications in the form of panel data, which combines time-series and cross-sectional data, covering data from 34 provinces in Indonesia from 2018 to 2022. The econometric analysis applied to address the issues in this study is the simultaneous equation model using the Indirect Least Squares (ILS) method, with the following equation form:

$$LogY_{it} = \alpha_0 + \alpha_1 Z_{it} + \alpha_2 TPAK_{it} + \alpha_3 LogPMTB_{it} + \alpha_4 IP\_TIK_{it} + \varepsilon_1 \ldots. (1)$$

$$Z_{it} = \beta_0 + \beta_1 Y_{it} + \beta_2 LogJP_{it} + \beta_3 TPAK_{it} + \beta_4 IP\_TIK_{it} + \varepsilon_2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Description:

Y = Economic Growth, Z = Income Inequality, TPAK = Labor Force Participation Rate, PMTB = Gross Fixed Capital Formation, IP_TIK = Information and Communictition Technology Development Index, JP = Population, ε_1, ε_2 = Error Terms, α_0, α_1, α_2, α_3, α_4, β_0, β_1, β_2, β_3, β_4 = Constants

RESULTS AND DISCUSSION

Statistical Results

Below are the results of the simultaneous equation model estimation using the Indirect Least Squares (ILS) method and the Heteroskedasticity and Autocorrelation Consistent Covariance Matrix (HAC) method:

Table 1. Estimation Results of the New Simultaneous Equation (Using the HAC Method)

Equation Y		
Variable	**Coefficient**	**Probability T-Statistic**
C	-9.924122	0.0000
Z_FORECAST	-1.452124	0.0017
TPAK	0.051450	0.0027
LOGPMTB	1.147359	0.0017
IP_TIK	-0.209203	0.0148
Probability F-Statistic		0.000000
R-Squared		0.9634
Equation Z		
Variable	**Coefficient**	**Probability T-Statistic**
C	329.9433	0.0064
LOGY_FORECAST	72.69711	0.0063
LOGJP	-13.41743	0.0063

LOGPMTB	-59.34611	0.0064
IP_TIK	-6.384043	0.0054
Probability F-Statistic		0.000000
R-Squared		0.3235

Source: Data processed by the author (2024)

The R^2 value for equation Y is 0.9634, indicating that the variables Z_Forecast, TPAK, PMTB, and IP-TIK explain 96.34% of the variation in economic growth (Y), with the remaining 3.66% of the variance explained by other factors not included in the model. In contrast, the R^2 value for equation Z is 0.3235, suggesting that the variables Y_Forecast, JP, TPAK, and IP-TIK explain 32.35% of the variation in income inequality (Z), with 67.65% of the variance influenced by factors outside the variables included in the study. The F-statistic test results show that the Prob. F-statistics for both equations Y and Z are 0.000000, indicating that at the 5% significance level, the variables in each equation have a joint significant effect. Thus, Z_Forecast, TPAK, PMTB, and IP-TIK influence economic growth, while income inequality is affected by Y_Forecast, JP, TPAK, and IP-TIK.

Table 2. Granger Causality Test Results

Causality Direction	**Prob. F-Statistic**
Y → Z	0.0304
Z → Y	0.7714

Source: Data processed by the author (2024)

Hypothesis Test Results

Berdasarkan uji statistik yang telah dilakukan, dapat diperoleh hasil dari hipotesis sebagai berikut:

Table 3. Hasil Pembuktian Hipotesis

Hypothesis	**Accepted/ Rejected**	**Variable Relationship**
H1	Accepted	Negative Significant
H2	Accepted	One-Way Relationship
H3	Accepted	Hubungan Satu Arah
H4	Accepted	Positive Significant
H5	Accepted	Positive Significant
H6	Accepted	Negative Significant
H7	Accepted	Negative Significant
H8	Accepted	Negative Significant
H9	Accepted	Negative Significant

Source: Data processed by the author (2024)

Relationship between Variables

Factors Affecting Economic Growth

Based on the research findings, the Labor Force Participation Rate (TPAK) has a significant positive effect on economic growth, meaning that when TPAK increases, economic growth also rises. This indicates that an increase in TPAK in each province in Indonesia enhances the effectiveness of the production process, leading to higher output and ultimately contributing to economic growth. This result is supported by Syamsuddin et al. (2021), who explained that TPAK positively influences economic growth. However, different results were presented by Azzahro & Prakoso (2022), who found that TPAK negatively affects economic growth and is not significant. The significant positive effect of Gross Fixed Capital Formation (PMTB) on economic growth suggests that an increase in PMTB leads to higher economic growth. PMTB plays a key role in enhancing production capacity and efficiency, boosting productivity, creating jobs, and generating multiplier effects that stimulate broader economic activity. These factors contribute to sustained long-term economic growth. For instance, when companies or the government invest in infrastructure projects, this not only increases direct production capacity but also stimulates economic activity in related sectors like manufacturing, transportation, and services, ultimately driving growth across various economic sectors. This finding aligns with the research of Amri & Aimon (2017). However, a study by Ananda & Helman (2023) presented different results, showing a negative and insignificant effect of PMTB on economic growth.

Information and Communication Technology Development Index (IP-TIK) shows a significant negative effect on economic growth, meaning that an increase in IP-TIK is followed by a decrease in economic growth. Generally, the advancement of IP-TIK is considered a factor that can promote economic growth. However, this may not be the case if the benefits of technological development are unevenly distributed, which could hinder overall economic growth. This is supported by Hidayah & Faridatussalam (2023), who found that IP-TIK negatively affects economic growth. In contrast, Lazuardi & Mutaqin (2023) demonstrated a significant positive effect of IP-TIK on economic growth.

Factors Affecting Income Inequality

The analysis shows that the population has a significant negative effect on income inequality, meaning that an increase in population can reduce income inequality. This can happen because a higher population leads to a larger available labor force, allowing companies to increase production and offer more job opportunities. If these opportunities are available to previously underrepresented groups in the economy (such as the poor or minorities), it can help reduce income inequality. This is supported by Triarsa and Purbadharmaja (2021), who found a negative effect of population on income inequality, although not significant. However, Didia (2016) showed that population has a significant positive effect on income inequality. Gross Fixed Capital Formation (PMTB) has a significant negative effect on income inequality, meaning that an increase in PMTB leads to a reduction in income inequality. This occurs because PMTB includes investments in buildings, construction, and public infrastructure that can improve access to economic opportunities, education, and healthcare, thereby reducing inequality. Additionally, investments in machinery and equipment can enhance productivity and often lead to wage increases, especially for low-income workers, which ultimately reduces income inequality. This finding aligns with Adnyaswari & Purbadharmaja (2023), who showed that PMTB has a significant negative effect on income inequality. On the other hand, Nurfifah et al. (2022) found that PMTB positively and significantly affects income inequality.

Information and Communication Technology Development Index (IP-TIK) has a significant negative effect on income inequality, meaning that an increase in IP-TIK can reduce income inequality. This happens because technological development serves as a complement to human labor. The use of technology to create innovations and improve efficiency in the economic process can create new opportunities for previously marginalized communities, thus reducing income inequality. This is supported by Wijayanti et al. (2023), who found a significant negative effect of

IP-TIK on income inequality. In contrast, a study by Putri (2024) showed that IP-TIK has a significant positive effect on income inequality.

Causality between Economic Growth and Income Inequality

Based on the analysis, income inequality has a significant negative effect on economic growth, meaning that when income inequality increases, economic growth decreases. This occurs because income inequality can lead to a reduction in aggregate demand, investment in human capital (education and health) being uneven, political instability, lack of social mobility, and market inefficiencies, all of which ultimately result in slower economic growth. This aligns with the studies of Stiglitz (2012) and Desnasari (2020), which demonstrate a significant negative effect of income inequality on economic growth. However, Haya et al. (2022) found that income inequality positively affects economic growth. On the other hand, this study shows that economic growth has a significant positive effect on income inequality, meaning that when economic growth increases, income inequality also increases. This supports the Kuznets "inverted U" hypothesis. According to Kuznets' theory, this could happen because the period of study over five years may have placed economic growth at an early or middle stage of the Kuznets curve, where income inequality rises. During this phase, adjustments may still be occurring, causing income inequality to grow because not everyone immediately benefits from economic growth. This is supported by Istiqamah et al. (2018), who also found evidence of this relationship. However, Arka & Yasa (2015) provided contrasting results, showing that economic growth negatively affects income inequality.

The Granger causality test shows that the relationship between economic growth and income inequality occurs only one-way (unidirectional causality), from economic growth to income inequality. This supports the Kuznets "inverted U" theory in explaining the causality or relationship between economic growth and income inequality in this study. This is demonstrated by the average economic growth data from provinces in Indonesia during 2018–2022, which generally increased (except during the COVID-19 pandemic) and was followed by an increase in income inequality. This finding aligns with the study by Wishartama et al. (2022), which found unidirectional causality from economic growth to income inequality. However, it contradicts the findings of Amri (2017), which indicated a one-way relationship from income inequality to economic growth.

CONCLUSION AND SUGGESTIONS

Conclusion

This study aims to analyze the causal relationship between economic growth and income inequality, as well as the factors that can influence both aspects. Based on the analysis conducted by the author using a simultaneous equation model and applying the Indirect Least Squares (ILS) method, it can be concluded that the factors that significantly affect economic growth during the period of 2018–2022 include income inequality, TPAK, PMTB, and IP-TIK. Meanwhile, the variables that significantly influence income inequality during the same period are economic growth, population, PMTB, and IP-TIK. The results of the Granger causality test show a one-way (unidirectional causality) relationship from economic growth to income inequality, meaning that changes in economic growth in the present can help predict future changes in income inequality. This is consistent with the "Inverted U" Kuznets hypothesis.

Suggestion

Based on the findings of this study, the government is expected to focus its policies on improving the equitable development of IP-TIK, accompanied by training related to the utilization of these technological developments. On the other hand, the five-year research period may only predict and represent the conditions of economic growth and income inequality in the short term. Therefore, to obtain more representative results and identify long-term trends, future studies should be designed with a longer research period. Additionally, the relatively small R^2 value from

the income inequality variable analysis could be considered by future researchers to develop equation models that involve variables expected to influence income inequality, particularly those related to social and economic factors.

IMPLICATIONS

The findings of this study indicate that TPAK and PMTB have a positive impact on economic growth. Therefore, government policies that can drive these two factors are necessary. However, the results also show that IP-TIK has a negative effect on economic growth. Technological advancements represented by IP-TIK should ideally increase production in a region, which in turn could boost economic growth. Thus, further in-depth research is needed to more concretely examine the effect of IP-TIK on economic growth, to ensure the goals of boosting economic growth in Indonesia are achieved.

The study also reveals that population, TPAK, and IP-TIK have a negative impact on income inequality. This means that during the research period, increases in population, TPAK, and IP-TIK were able to reduce income inequality. This is undoubtedly linked to improvements in the quality of human resources in Indonesia, allowing the population to improve their living standards. Therefore, in response to population growth, there needs to be a capacity-building program for human resources, such as educational scholarships or skill training to prepare individuals for the workforce. Improving the quality of human resources will also affect the increase in the Labor Force Participation Rate (TPAK). However, it should be noted that as the population increases, the number of workers also increases, but it does not necessarily mean that the demand for labor by companies will increase at the same rate. Therefore, business-related knowledge should also be taught at the educational level, with the hope that more people will be motivated to start businesses and create job opportunities. Additionally, the equitable development of technology should continue to be promoted to reduce disparities across regions, as technology plays a crucial role in various aspects of life today.

LIMITATIONS

This study is limited to the period of 2018–2022 and only covers 32 provinces in Indonesia. On the other hand, the variables used are limited to economic factors (TPAK and PMTB), technology (IP-TIK), and demographic factors (Population).

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