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The Influence of Gross Regional Domestic Product Per Capita and Foreign Direct Investment on Income Inequality: An Empirical Study of 34 Provinces in Indonesia

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Abstract: The study investigates the correlation between Gross Regional Domestic Product (GRDP) per capita, Foreign Direct Investment (FDI), and the Gini coefficient using panel data from 34 provinces in Indonesia from 2015 to 2023. A panel data regression analysis method was employed for data processing to optimize estimation results. The results obtained from the analysis using the Fixed Effects Model (FEM) consistently show strong positive outcomes. The findings imply a direct connection between higher GRDP per capita, increased FDI, and a higher Gini coefficient, suggesting that more significant foreign investment and higher per capita GDP contribute to increased income inequality across the Indonesian provinces. The study emphasizes the critical role of regional governments in addressing these disparities. It suggests strategies such as implementing regional policies to boost investment, enhancing infrastructure, creating more business opportunities, and promoting tourism. The proposal to establish the National Capital City (IKN) in East Kalimantan is presented as a long-term solution to reduce income inequality among the provinces.

Keywords: Income Inequality; Gross Regional Domestic Product Per Capita; Foreign Direct Investment; Intra-Provinces

JEL Classification: D63; R12; I3

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Introduction

Globalization has emerged as a predominant force in recent decades, exerting its influence globally across diverse societal, economic, and political spheres. It is defined by the escalating interconnectedness of economies through international trade, foreign investment, capital movements, and the proliferation of technology and information. As seen in Figure 1, the trajectory of foreign direct investment (FDI) in Indonesia during the period from 2011 to 2023 reflects a dynamic interplay of global and domestic economic forces. Notably, during the early 2010s, Indonesia sustained robust economic expansion, culminating in a 6.9 percent growth rate in 2011, attracting foreign investors drawn by policy reforms designed to enhance the investment climate. The subsequent period, from 2013 to 2017, was characterized by fluctuations, albeit with continued growth in foreign investment.

In 2017, Indonesia achieved a record high in foreign investment receipts, reaching USD 32.2 billion. The pro-investment policies initiated by President Joko Widodo's administration, including deregulation, infrastructure project acceleration, and bureaucratic reform, have played a significant role in driving this growth. However, the global impact of the COVID-19 pandemic in 2019 led to a decrease in foreign direct investment (FDI) to around USD 28.2 billion, primarily due to worldwide travel restrictions. To mitigate the pandemic's effects, the Indonesian government implemented the Job Creation Law in 2020 to streamline regulations and attract more investment. As we entered 2021, foreign investment in Indonesia began to show signs of recovery, with figures reaching approximately USD 31.09 billion, in alignment with the gradual easing of the pandemic and the global economic recovery. The government's efforts to enhance the investment climate are yielding results. FDI is projected to increase significantly to USD 45.6 billion in 2022 and USD 50.2 billion in 2023, notwithstanding challenges such as geopolitical tensions and policy changes in several major countries.

Globalization is unequivocally recognized as a potent force for economic growth and advancing global prosperity. The integration of markets and enhanced access to cutting-edge technologies are poised to unlock new opportunities, expand labor markets, and elevate production efficiency. Nonetheless, it's imperative to acknowledge that the benefits of globalization are not uniformly distributed. Autor et al. (2013) conclusively demonstrate how the upsurge in imports from low-cost countries, such as China, has exerted pressure on labor markets in developed nations, particularly within the manufacturing sector, resulting in escalated income inequality. Amidst the extensive research on the ramifications of globalization on income distribution, findings are varied and, at times, conflicting. Setyadi (2017) unequivocally establishes that the escalation of globalization significantly intensifies income inequality within the Association of Southeast Asian Nations (ASEAN) countries, whereas Ghosh (2020) unambiguously reveals that economic growth volatility detrimentally affects income inequality in ASEAN countries.

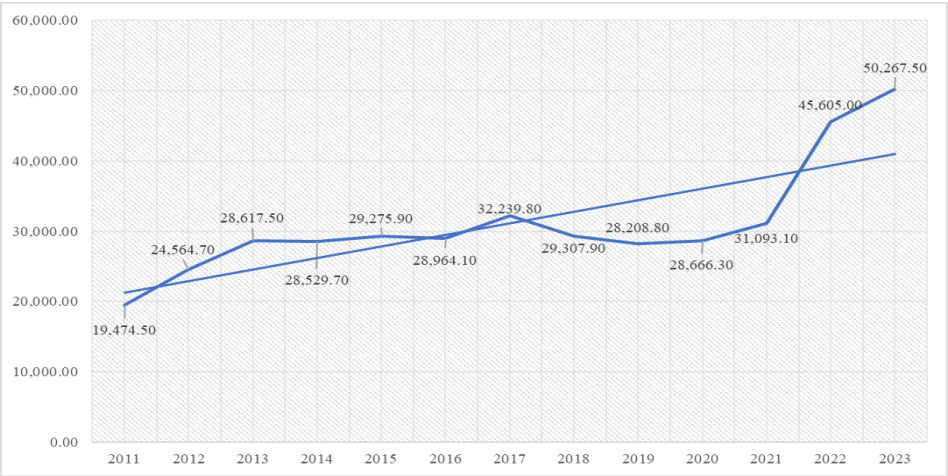

Figure 1 Realized Foreign Direct Investment (Million USD), 2011-2023. Source: Central Bureau of Statistics

According to Li et al. (2022), increasing export diversification in high-income Asian countries is associated with higher income inequality, while it has little impact on low-income Asian countries. Studies conducted in Korea suggest that the Gini coefficient tends to increase with trade liberalization and FDI inflows, indicating that globalization worsens income inequality in Korea (Mah, 2002). Globalization has resulted in a rise in income inequality, with the wealthiest members of society benefiting disproportionately (Milanovic, 2016). This has led to the emergence of a global elite experiencing significant income growth. In contrast, many low-income individuals, especially in developing countries, have not experienced similar economic improvement (Milanovic, 2016; Page & Pande, 2018). High levels of income inequality may hinder human capital formation as poor individuals often have to forgo education due to increased household expenses (Ghosh, 2020).

Research carried out by Zhou et al. (2011) revealed a negative correlation between the Kearney Globalization Index and the Gini coefficient across 60 studied countries, indicating that globalization reduces income inequality. Ariyasajjakorn et al. (2009) found that Free Trade Agreements (FTA) among ASEAN countries tend to elevate the wages of unskilled labor more than those of skilled labor, thereby narrowing the wage gap within each ASEAN member. Furthermore, FDI inflows have been shown to contribute to reducing income inequality by fostering economic and social development. Ean et al. (2020) demonstrated that foreign capital flowing into productive companies significantly enhances welfare and productivity in sectors that employ many workers. This increase in labor demand within productive industries creates employment opportunities for local residents, enabling them to transition between sectors in pursuit of higher-paying jobs and decreasing unemployment. A study by Verico & Pangestu (2021) examining the influence of globalization on the Indonesian economy found that trade liberalization has had a positive impact on Indonesia's economic growth, resulting in a reduction in wage inequality and child labor while also increasing overall labor participation, including that of women, in the job market.

In 2023, Indonesia's Gross Regional Domestic Product (GRDP) per capita at constant prices was IDR 44.13 million. During the same year, several provinces in Indonesia had GRDP per capita based on constant prices above the national average. The province of DKI Jakarta recorded the highest GRDP per capita of IDR 44.13 million, with an FDI realization reaching USD 4,830 million. Central Sulawesi had a lower GRDP per capita of IDR 62.58 million. Still, it attracted the highest FDI investment realization of USD 7,244.10 million. East Kalimantan had a GRDP per capita of IDR 137.51 million and an FDI investment of USD 1,332.7 million. Finally, West Papua had a GRDP per capita of IDR 71.9 million and foreign investment of only USD 28.8 million. It's interesting to note that provinces with high GRDP per capita tended to receive less foreign investment. In comparison, those with moderate GRDP per capita attracted higher foreign investment, as seen in the case of Central Sulawesi.

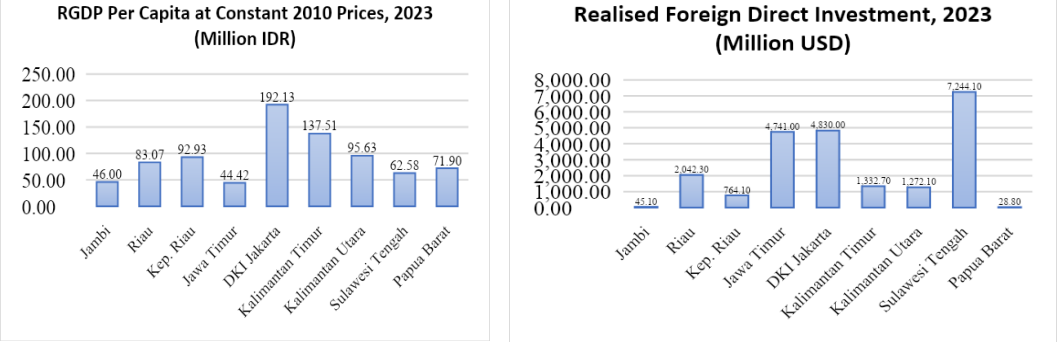

Figure 2 GRDP Per Capita at Constant 2010 Prices and Realised Foreign Direct Investment, 2023. Source: Central Bureau of Statistics

When comparing the Gini coefficient with GRDP per capita, DKI Jakarta has the highest Gini coefficient at 0.431, followed by East Java at 0.387, indicating significant income inequality compared to other provinces in these regions. This study aims to fill the gap in the research by Verico & Pangestu (2021), which focused on the impact of globalization on income inequality in the national context. The data presented in Figure 2 highlights the unequal distribution of GRDP per capita among provinces in Indonesia and the continued concentration of foreign investment in areas with natural resource potential in the mining sector or sufficient infrastructure readiness. The research question to be addressed in this study is whether an increase in foreign investment realization and GRDP per capita can reduce income inequality between provinces, as measured by the Gini coefficient. Therefore, this research aims to thoroughly examine the impact of FDI and GRDP per capita on income inequality using panel data from 34 provinces in Indonesia over the period 2015-2023.

Research Method

The model that will be applied to evaluate the impact of GRDP per capita and FDI on income inequality, as measured by the Gini coefficient, is as follows:

$$GINI_{it} = \alpha + b_1 GRDP\_PC_{it} + b_2 FDI_{it} + e_{it}$$

The Gini Coefficient (GINI) is an index that measures income inequality in an area, with a value ranging between 0 and 1. A value of 0 indicates perfect equality, where income or wealth is evenly distributed across the population. Meanwhile, a value of 1 indicates perfect inequality, where one individual or group has all the income or wealth, leaving others with nothing. GRDP-PC represents a region's total value of GRDP in a specific period, typically one year, divided by the region's population. GRDP per capita overviews an area's average per capita yearly income and is commonly denominated in thousands of rupiah. FDI is the concrete implementation of investment commitments made by foreign investors in a country. FDI is measured by the total funds foreign investors have transferred into the country within a certain period, as stated in millions of US dollars. The data used in this research is sourced from the Central Statistics Agency.

This study employed a panel data regression analysis method for data processing. Data transformation was conducted for the Gini coefficient and GRDP per capita variables to optimize estimation results. The selection of the transformation of the Gini coefficient and GRDP per capita is based on the ladder of powers measurement, which is the most optimal and statistically significant if prob Chi-Square above 5% (Usman et al., 2024). The Gini coefficient and GRDP per capita transformation based on the chi-square probability values is the square root of GINI (0.678) and 1/square root of GRDP per capita (0.263), as shown in Table 1.

Table 1 Ladder of Power Measurement

Transformation	Chi-Square	Prob Chi-Square
GINI	1,66	0,435
Square Root (GINI)	0,78	0,678
Log (GINI)	2,45	0,294
Log (GRDP-PC)	33,25	0,000
1 / Square Root (GRDP-PC)	2,67	0,263
1 / (GRDP-PC)	38,25	0,000
Square Root (FDI)	41,85	0,000
Log (FDI)	8,35	0,015

In the context of panel data regression analysis, three models can be utilized: the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Several tests were conducted to choose the most suitable model. Initially, a Chow Test is performed to select between CEM and FEM. Subsequently, the Hausman Test is employed to decide between REM and FEM. Lastly, the Lagrange Multiplier (LM) test is carried out to ascertain whether CEM or REM is the superior model. The results of the tests are as follows: the p-value in the Chow Test is 0.000, indicating that the FEM model is the most favorable. The Hausman Test yields a p-value of 0.0001, further endorsing the FEM model as the top choice. The LM test produces a p-value of 0.000, suggesting that the REM model is the superior option. After considering the outcomes of all tests, the Fixed Effect Model (FEM) is the most appropriate model for this research. The consistency in the Chow Test and Hausman Test results supports this determination.

In panel data regression analysis, conducting classic assumption tests of the estimated parameters in the Fixed Effect Model (FEM) is essential. In this study, the normality test used the Shapiro-Wilk Normality test, yielding a p-value of 0.04754 < 0.05, indicating that the residuals in this study are not normally distributed. According to (Gujarati & Porter, 2009), while residual normality is one of the requirements for the validity of results in regression analysis, the consistency and efficiency of parameter estimation in FEM models are more affected by heteroscedasticity and autocorrelation problems than by residual non-normality.

The multicollinearity test assessed the independent variables' Variance Inflation Factor (VIF). The VIF values for the GRDP-PC and FDI variables were both found to be 1.32 < 10, indicating no multicollinearity issues in the study's model. The Glejser test was utilized for the heteroscedasticity test. The test revealed that the p-values for the GRDP-PC and FDI

variables on Residual ABS were 0.438 and 0.118, respectively, both exceeding 0.05, which suggests the absence of heteroscedasticity problems. However, the Autocorrelation test showed a p-value of 0.0439, indicating the presence of autocorrelation issues in the research model. As a robustness test to address this, parameter estimation was conducted using the FEM autoregressive model of order one disturbance method (FEM AR1-DIS) to overcome these assumption violations in the central FEM model estimation.

Result and Discussion

Table **2** provides insights into the average values of the GINI coefficient, GRDP per capita, and FDI categorized by island. Java Island holds Indonesia's second-highest GRDP per capita, following the island of Kalimantan, with an average GRDP per capita of 59.4 million Rupiah from 2015 to 2023. Over the same period, Java boasted Indonesia's highest average foreign direct investment value, totaling 3.75 billion US dollars. This highlights the continued concentration of economic activity on the island of Java. With the highest economic activity in Indonesia, Java also exhibits the highest average Gini coefficient at 0.46, signifying greater income inequality compared to other islands.

Table 2 Mean GINI Coefficient, GRDP-PC, and FDI based on Islands in Indonesia, 2015-2023

	GINI	GRDP-PC	FDI
Sumatra	0.32	41,335.70	541.23
Jawa	0.46	59,436.42	3,757.69
Bali	0.37	34,347.85	585.01
Nusa Tenggara Timur & Barat	0.36	15,445.11	242.46
Kalimantan	0.32	61,582.95	577.11
Sulawesi	0.38	31,746.02	828.91
Maluku	0.31	20,036.40	986.91
Papua	0.39	51,119.56	659.46

The estimation results presented in Table indicate a strong positive influence of GRDP-PC and FDI on GINI, as evidenced by the FEM and FEM AR1-DIS models. Both models yield consistent results, with GRDP-PC (20.9) being significant at 5% and FDI (0.000000256) significant at 1%, positively affecting the GINI coefficient. This suggests that an increase in GRDP-PK and PMA will lead to greater income inequality among provinces in Indonesia. The provinces in Indonesia vary in their ability to attract foreign investment, with Java standing out due to its progress and complete infrastructure, while Kalimantan, Sumatra, Sulawesi, and Papua attract foreign investment due to the wealth of natural resources in their areas. According to Barro's (2008) findings, increased GDP per capita indicates that enhanced trade can reduce poverty despite rising income inequality. In the context of Indonesia's economy, Barro emphasizes that regions capable of attracting foreign investment are likely to experience enhanced economic growth, leading to an increase in GDP per capita. However, this can exacerbate income inequality, as only certain Indonesian provinces possess the necessary infrastructure, wealth, and natural resources to attract foreign investment. While foreign investment can create new job opportunities

and spur economic activity, it's important to note that not everyone will have equal access to these benefits of economic growth.

Table 3 Estimation Results

Model	CEM	FEM	REM	FEM AR1-DIS
α	0.5715623***	0.481935***	0.5140342***	0.4748972***
(t-stat)	(65.25)	(29.5)	(34.24)	(32.43)
PDRB-PK	2.607005* (1.78)	19.74337***	13.99947***	20.91692** (4.70)
(t-stat)		(6.89)	(5.73)	
PMA	0.0000064***	0.00000202*	0.00000142	0.00000256***
(t-stat)	(4.62)	(1.79)	(1.29)	(2.03)

Note: *** Significant at 1%, ** Significant at 5%, * Significant at 10%.

The research findings are consistent with studies conducted by Kuncoro & Murbarani (2016) and Walujadi et al. (2022), which also indicate a positive correlation between GRDP per capita and increasing income inequality among regions in Indonesia. The rise in GRDP per capita contributes to growing income inequality, leading to uneven distribution of individual incomes (Kuncoro & Murbarani, 2016). This underscores the ongoing need to address the issue of income inequality across Indonesian provinces. Kuncoro & Murbarani (2016) emphasized the significant and influential role of the DKI Jakarta province in national export activities. Even today, DKI Jakarta continues to have the highest export value in Indonesia. The Tanjung Priok port in DKI Jakarta recorded the highest non-oil and gas export value at 54.6 billion US dollars. This was followed by the Tanjung Perak port in Surabaya, East Java, with an export value of 16.9 billion US dollars, and the Bahodopi port in Morowali Regency, Central Sulawesi, with an export value of 15 billion US dollars. The high export value of the Bahodopi Port is due to its location in one of Indonesia's largest nickel mining exploration areas.

Cheong & Wu (2012) studied regional inequality and found that intra-provincial regional inequality contributed approximately 60 percent to overall inequality in China in 2007. Moreover, they observed that intra-provincial regionalism contributed around 63 percent to the overall increase in regional inequality from 1997 to 2007. The study highlights that inter-regional income inequality is a global phenomenon observed in various countries worldwide (Milanovic, 2005). Cheong & Wu (2012) suggest that addressing inter-regional income inequality initially requires a localized rather than a national approach. If implemented effectively, this approach would enable local governments to understand the needs of their regions better and formulate public policies that align with the requirements of their local communities. Local governments can subsidize low-income communities and invest in regional infrastructure projects to mitigate inequality and hope for a more equitable future (Meza, 2015).

Addressing the income disparity between Indonesia's affluent western region and its impoverished eastern region has emerged as a critical policy focus (Akita, 2003). Migration has been proposed to mitigate income inequality between these regions (Phan & Coxhead, 2010). As part of this initiative, constructing a new National Capital City (IKN) in East Kalimantan is considered a strategic measure to combat regional income inequality. This move aims to foster more equitable distribution of infrastructure and

economic development across Indonesia, particularly in the underserved eastern region. Establishing the new city is anticipated to draw significant investments from the government and private sectors, leading to numerous employment opportunities in the construction and related sectors. The envisioned IKN is poised to become a new catalyst for economic growth, attracting residents and enterprises from other regions and facilitating a more balanced distribution of population and financial activities.

Enhancing the infrastructure around IKN, including roads, ports, airports, and other public facilities, will improve connectivity and accessibility to the surrounding areas, fostering economic growth in previously underdeveloped regions. The establishment of IKN will significantly elevate the quality of human resources in the area by providing increased access to education, training, and improved health facilities, thereby boosting productivity and welfare. Furthermore, with the presence of IKN in East Kalimantan, public services such as education, health, and government administration will be more equitably distributed, catering to the needs of regions beyond the island of Java.

While IKN development holds promise in addressing inequality, it faces challenges such as meticulous funding planning, considering environmental impacts to preserve Kalimantan's nature, and the influence of local social and cultural dynamics on government centers and populations. With thorough planning and effective implementation, IKN development can play a pivotal role in reducing income inequality between regions in Indonesia and fostering more just and sustainable development.

Conclusion

This study delves into the impact of GRDP per capita and FDI on the Gini coefficient using panel data from 34 provinces in Indonesia from 2015 to 2023. The data analysis employing the FEM model yields consistent and robust results. The result underscores a positive correlation between GRDP per capita and FDI with the Gini coefficient, signifying that increased economic growth from foreign investment and rising GRDP per capita contribute to income inequality among Indonesian provinces. This inequality primarily stems from the dominance of Java Island, which boasts the country's highest economic activity and population concentration, with 56.1% or 151.59 million residents. Moreover, income inequality among provinces can also be attributed to varying abilities to attract foreign investment, with provinces rich in natural resources finding it relatively easier to secure foreign investment. Java Island recorded the highest average FDI value during 2015-2023.

Regional governments play a crucial role in addressing income inequality between provinces. The government can implement regional policies to increase investment in their regions, including infrastructure development to enhance business access and promote tourism. These policies can significantly contribute to economic growth in areas with natural resources, such as the mining sector. Developing the National Capital City in East Kalimantan is viewed as a long-term solution to income inequality between

provinces. IKN is anticipated to balance economic activities across Indonesia, shifting away from the current Java-centric focus on financial and infrastructure development.

Akita (2003) employs a two-stage nested Theil Decomposition method to discern and isolate the impact of various factors that may influence income inequality, such as differences in income distribution among groups or regions. By analyzing two stages, this method helps determine whether specific factors directly or indirectly contribute to income inequality. This approach can be valuable for future research in analyzing income inequality among regions in Indonesia. Additionally, future researchers should consider incorporating the human development index as a variable that can influence income inequality among regions.

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