ORIGINAL ARTICLE

The Effect of Foreign Direct Investment, Labor, Manufacturing Industry and Government Expenditure on Economic Growth in Indonesia

Qanita Qanita and Muhammad Nasir[*]

Department of Development Economics, Faculty of Economics and Business, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia

*   Correspondence: nasirmsi@usk.ac.id

Abstract

Progressive economic growth is a fundamental objective for all countries, including Indonesia, as it serves as a key indicator of national development and a means to enhance prosperity and public welfare. This study examines the impact of foreign direct investment, labor, the manufacturing industry, and government spending on economic growth in Indonesia. It utilizes secondary panel data from 34 provinces over the period 2018-2023 and applies a panel data regression method using the Common Effect Model (CEM). The estimation results show that both foreign direct investment and the manufacturing industry have a positive and significant effect on Indonesia's economic growth, while labor and government spending exhibit an insignificant impact. Based on these findings, the study recommends the development of policies that attract foreign investment, particularly in the manufacturing sector, supported by adequate infrastructure development. Moreover, improving workforce quality through targeted education and training programs is essential. Government spending should be directed toward critical sectors and routinely evaluated to ensure that budget allocations effectively promote inclusive and sustainable growth.

Introduction

Economic growth remains a fundamental responsibility of a nation, characterized by fluctuating trends over time. In order to promote economic growth that improves public welfare in Indonesia, a range of strategic initiatives has been developed, covering regulations, policy commitments, and practical measures. As a primary indicator of a country's economic success, economic growth is assessed through multiple dimensions, including growth rates, income levels, and productivity improvements [1,2]. The government plays a pivotal role in driving economic expansion as part of its broader mandate to achieve national development objectives. According to Donaldson [3], stable and sustainable economic growth is essential in addressing critical socio-economic challenges, such as poverty, unemployment, income disparity, social injustice, and inflation. Therefore, achieving sustainable economic growth is crucial for advancing national prosperity.

Indonesia is one of the largest economies in the world, with the fourth largest population in the world after China, India, and America. The large population has implications for the increase in goods and services. This contributes greatly to the increase in national Gross Domestic Product (GDP). In 2023, Indonesia's total GDP was recorded at around US\$1.4 trillion, or equivalent to 1.4 percent of global GDP [4]. This makes Indonesia the only ASEAN representative at the G20 economic forum. The following presents data on Indonesia's economic growth rate for the period 2018 to 2023.
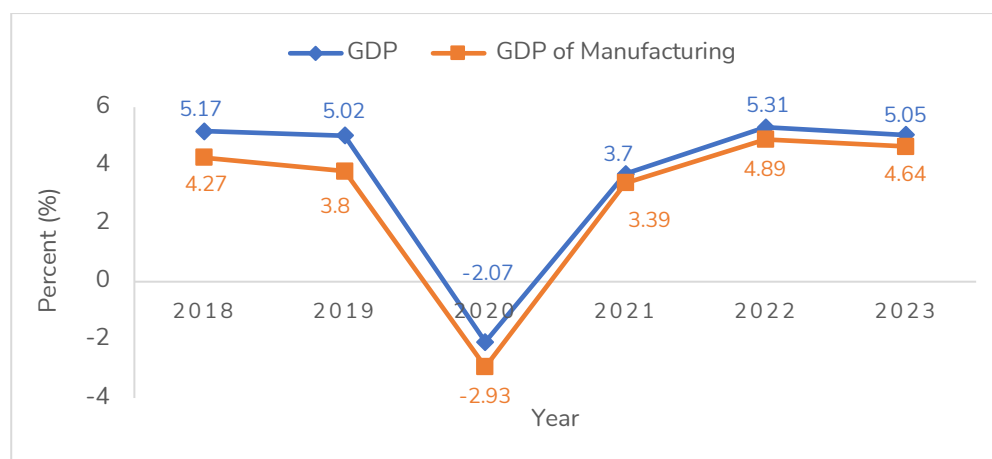
Figure 1. GDP and GDP Growth Rate of Manufacturing Industry in Indonesia 2018-2023 (Source: Statistics Indonesia, 2023).

Figure 1 illustrates the fluctuating trends in economic growth and Gross Domestic Product (GDP) of the manufacturing industry sector in Indonesia from 2018 to 2023. In 2018, economic growth was recorded at 5.17 percent, while the manufacturing industry sector grew by 4.27 percent. However, in the following years, both indicators showed a decline, with the sharpest decline occurring in 2020. In that year, economic growth experienced a significant decline to -2.07 percent, while the GDP of the manufacturing industry sector fell drastically by -2.93 percent. This significant decline was the worst in the last two decades, caused by the direct impact of the COVID-19 pandemic, which disrupted economic activity and caused a shock in recovery for investment at both the national and global levels. However, in the following year, the Indonesian economy recovered and increased to reach 5.05 percent, and manufacturing GDP reached 4.64 percent in 2023. Of course, this provides a great opportunity for potential economic growth with various sectors that continue to be developed, especially the manufacturing industry.

The manufacturing industry in Indonesia faces major challenges due to the Industrial Revolution 4.0, which has the potential to replace human labor with robots and weaken the competitiveness of local companies. The International Labor Organization [5] projects that automation has the potential to replace around 56 percent of jobs in various ASEAN countries, including Indonesia. In addition, the level of technology-driven productivity in Indonesia's manufacturing sector is still relatively low compared to the productivity generated by capital and labor factors [6,7]. This has the potential to exacerbate market structure inequality and encourage the dominance of certain businesses in the manufacturing subsector [8].

In parallel, foreign direct investment has emerged as a critical catalyst for economic development. According to Immurana [9] [7], foreign direct investment plays an important role in promoting economic growth in developing countries by not only providing additional capital flows but also facilitating technology transfer that can increase national income. Quoting United Nations Conference on Trade and Development (UNCTAD) data entitled World Investment Report 2023 [10] [8], the value of foreign direct investment in Indonesia was recorded at USD 21.96 billion in 2022, or Indonesia ranked second in the Southeast Asia region. Of course, this large number will have a considerable impact on Indonesia.

Figure 2 shows a significant upward trend in foreign direct investment in Indonesia from 2018 to 2023. In 2018, foreign direct investment was recorded at 29,307 million USD but experienced a slight decline to 28,208 million USD in 2019. This decline was caused by the shock of recovery from global investment, including in Indonesia. However, in the period 2020 to 2023, foreign direct investment figures again experienced a significant increase, and by 2023, foreign direct

investment had reached 50,267 million USD. Foreign direct investment brings not only capital stock but also technology and managerial skills that are very beneficial in promoting economic growth.
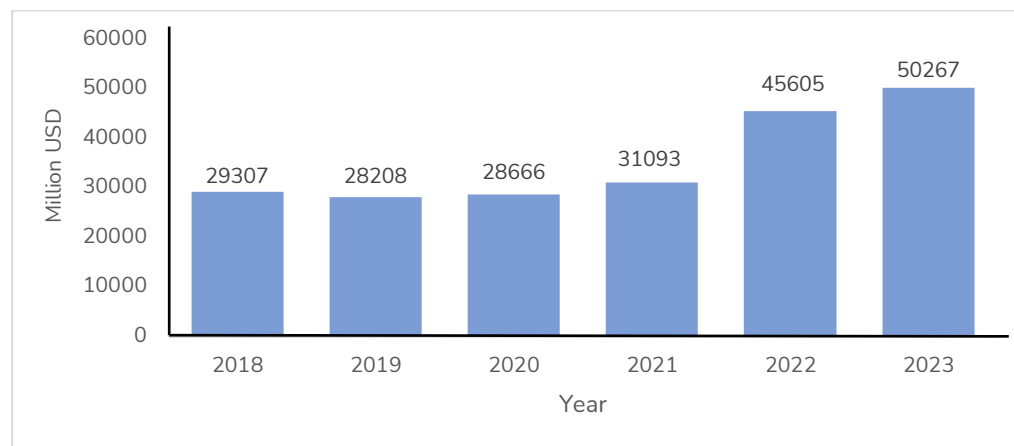

Figure 2. Foreign Direct Investment in Indonesia 2018-2023 (Source: Statistics Indonesia, 2023).

Foreign direct investment plays a multifaceted role in economic growth by directly influencing market environments and indirectly promoting broader developmental benefits. Widiastuti et al. [11] emphasize that foreign investment opens opportunities for local industries to grow, expand their reach, and enhance product quality and quantity. Defined as investments made by individuals or companies in enterprises outside their home country with the objective of earning profit through managing operations in the host country, foreign direct investment contributes significantly to economic development by facilitating the flow of capital, technology, and knowledge. Such investments can occur through the acquisition of local companies or by expanding existing operations [12].

Beyond market effects, Nehemia & Prasetyia [13] notes that foreign direct investment supports inclusive growth by generating employment opportunities for local communities, women, and people with disabilities while also bolstering productivity, Corporate Social Responsibility (CSR) initiatives, and linkages with micro and small, and medium enterprises (MSMEs). Furthermore, indirect benefits such as foreign direct investment spillovers occur when domestic industries absorb advanced technology and new knowledge from foreign firms, thereby enhancing productivity and spurring innovation [14,15]. In Indonesia, foreign direct investment not only improves labor force productivity through technology transfer but also faces challenges; foreign firms often rely on expatriate labor, which can limit domestic labor absorption and potentially impede broader economic development. Addressing this issue is critical, particularly in the manufacturing sector, where leveraging Indonesia's demographic advantage could significantly drive economic growth.
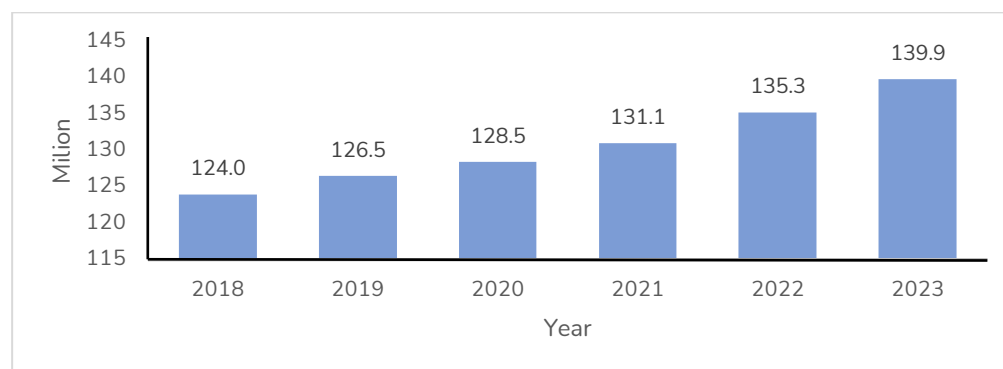

Figure 3. Number of Workforce in Indonesia 2018-2023 (Source: Statistics Indonesia, 2023).

Figure 3 illustrates the trend of the increasing workforce in Indonesia between 2018 and 2023. In 2018, the workforce was recorded at 124,004,950 individuals, and this number steadily increased each year, reaching 139,852,377 individuals in 2023. Over this period, there was an addition of 15,847,427 individuals. Most of this increase comprises educated individuals who are still in the process of job searching, commonly referred to as frictional unemployment. The duration of the job search varies depending on the education level of the workforce. Generally, there is a tendency that the higher the education level of the workforce, the longer the waiting time required to secure employment [16].

Building on these dynamics, the government's fiscal policies complement the positive effects of foreign direct investment and labor market developments. Several efforts have been undertaken by incorporating fiscal measures in the form of government expenditure. Government expenditure is an essential component of fiscal policy, reflecting the government's actions to regulate the economy through budgetary instruments. Such spending is vital for augmenting physical capital, including basic infrastructure and public facilities [17,18]. Investments in infrastructure are expected to enhance production capacity and generate a multiplier effect on the economy. The development of infrastructure will connect remote regions, reduce production costs, stimulate the emergence of new economic centers such as industries and markets, create additional job opportunities, and boost the purchasing power of communities.
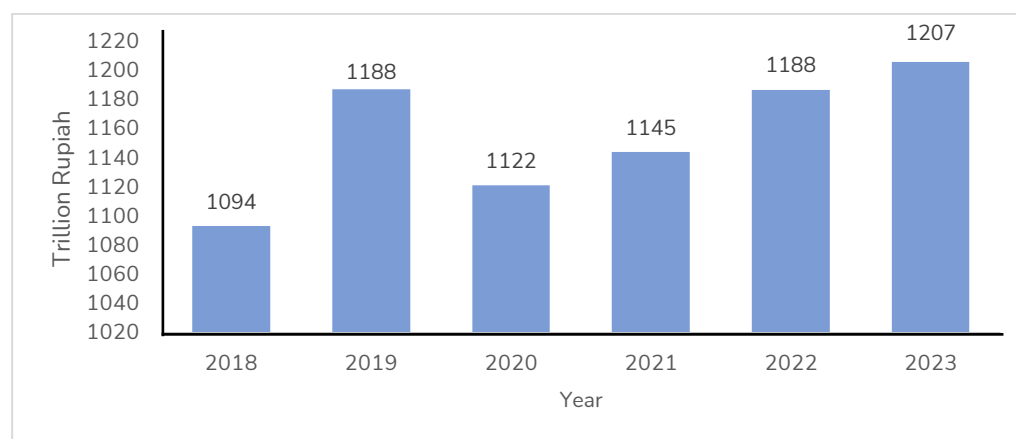

Figure 4. Government Expenditure in Indonesia 2018-2023 (Source: Ministry of Finance of Indonesia, 2023).

Figure 4 illustrates significant fluctuations in government expenditure. It shows that government spending increased markedly between 2018 and 2019, with an increase of 94 trillion Rupiah. However, during the period from 2019 to 2020, there was a substantial decrease of 66 trillion Rupiah. Subsequently, between 2021 and 2023, government expenditure once again experienced a significant rise, with the total expenditure reaching 1,207 trillion Rupiah in 2023.

Economic growth is driven by a complex interplay of interdependent factors, including foreign direct investment, government expenditure, labor productivity, and the structure of the manufacturing sector. Traditional neoclassical models emphasize capital accumulation, labor productivity improvements, and technological advancement as the primary drivers of economic growth [19]. Hymer [20] posits that foreign direct investment not only brings capital but also facilitates technology transfer and market expansion. Endogenous growth theory further highlights the critical role of strategic government spending in infrastructure development and human capital investment [21]. Additionally, structuralist perspectives argue that industrialization, particularly through the manufacturing sector, is the key pathway to long-term development [22].

Empirical evidence indicates that foreign direct investment can stimulate growth through technology diffusion, productivity gains, and enhanced export activity. A study in Albania suggests that, in the short term, economic growth may attract foreign direct investment rather than the reverse [23]. Conversely, research in Spain shows that foreign direct investment's positive impact depends on complementary structural and institutional factors [24]. Long-term analyses in the Eurozone confirm that foreign direct investment complements domestic investment and drives technological progress [25]. Cross-country studies also reveal a bidirectional relationship between foreign direct investment and economic growth, moderated by labor quality, trade openness, and institutional policies [26]. In Indonesia, while foreign direct investment occasionally exhibits positive effects on GDP, its impact is often insignificant compared to domestic investment [27]. Furthermore, foreign direct investment is often deemed more effective than foreign aid in transferring technology and managerial expertise [28].

Research by Pelinescu [29] reveals that even marginal improvements in education can yield significant gains in productivity and overall economic output, as education not only raises individual incomes but also fosters innovation and facilitates the diffusion of new technologies across industries. Historically, the manufacturing sector has been a primary engine of economic growth, as outlined in Kaldor's hypothesis and supported by rapid industrialization in East Asia [30]. However, its role is evolving amid global value chains and the rising dominance of the service sector. Recent studies suggest that manufacturing's growth potential increasingly hinges on complementary investments in human capital and supportive policies [31].

Fiscal policy also plays a vital role in driving economic growth. Keynesian theory argues that expansive government spending can boost aggregate demand and stimulate growth, as evidenced in Tanzania, where fiscal measures such as grants, recurrent and development expenditures, and tax revenues positively impact GDP [32]. In contrast, Wagner's law posits that government spending tends to rise as a consequence of economic growth itself. However, recent research in developing countries aligns more closely with Keynesian frameworks [33].

Most existing literature still examines these variables in isolation or at a national scale, overlooking provincial heterogeneity and post-pandemic dynamics. Few studies integrate foreign direct investment, labor, manufacturing, and fiscal policy within a comprehensive analytical framework, particularly in the context of Indonesia's decentralized governance. This study aims to address these gaps by analyzing panel data from 34 provinces (2018–2023) to uncover local drivers of economic growth and policy interactions. Utilizing advanced analytical methods and up-to-date data, the research seeks to provide precise recommendations for policymakers and stakeholders to advance sustainable economic development in Indonesia.

Materials and Methods

Data and Variables

This study uses secondary data in the form of panel data consisting of cross-sections and time series. The study period covers 2018 to 2023 in 34 provinces in Indonesia. The main data sources in this study were obtained from various official institutions, such as the publications of BPS-Statistics Indonesia [34–36] and the Ministry of Finance [37]. In addition, supporting data is also collected from relevant literature, including academic journals, to enrich the analysis and delve deeper into the dynamics affecting economic growth in Indonesia.

This study examines several macroeconomic factors that influence economic growth in Indonesia, including foreign direct investment, labor, manufacturing industry, and government spending. Table 1 presents a comprehensive overview of the key variables employed in this study. These variables form the basis for the empirical analysis and ensure a clear understanding of the data sources and constructs used in this research.

Table 1. Description of variables.

Variables	Description	Unit
Economic Growth	The annual growth rate of Gross Regional Domestic Product (GDP) is measured at constant 2010 base year prices.	Percent
Foreign Direct Investment	The total inflow of foreign investment into the region.	Million USD
Labor	The number of individuals aged 15 and over who are actively employed.	Number of Workers
Manufacturing Industry	The annual growth rate of the Manufacturing Industry's contribution to regional GDP	Percent
Government Expenditure	The annual realization of APBD (Regional Budget) expenditures adjusted for inflation	Billion Rupiah

Model Specification and Method

This study is quantitative and uses panel data regression. Panel data regression is a regression technique that combines time-series data with cross-section data [38–40]. In other words, panel data consists of cross-sectional observations that are repeatedly measured over different time periods for the same individual units [41,42]. This method allows for analyzing both cross-sectional and time-series variations, making it a robust approach for examining dynamic relationships over time [43–46].

For this study, panel data regression is particularly suitable because it fits the type of data used and allows for the examination of cross-sectional differences and temporal dynamics among observed units. By utilizing panel data, this study can capture individual-specific effects while analyzing how the main variables evolve over time, thereby increasing the reliability and depth of the findings.

The general equation model for panel data multiple regression is represented by Equation 1:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 X_{it} + \beta_3 X_{it} + \cdots + \varepsilon_{it} \tag{1}$$

Where Y_{it} represents the value of the dependent variable for individual i in period t, where i = 1, 2, …, N and t = 1, 2, …, T; β_0 is the intercept term; β_1, β_2, β_3, … are the estimated coefficients corresponding to each independent variable included in the model; X_{it} denotes the values of the independent variables for individual i in period t (with repetition implying distinct regressors); and ε_{it} is the error term capturing unobserved factors.

Based on Equation 1 above, it is transformed into a research model written in Equation 2 of the panel data regression as follows:

$$GDP_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_2 L_{it} + \beta_3 MI_{it} + \beta_4 G_{it} + \varepsilon_{it} \tag{2}$$

This model is used to test the effect of gross domestic product, foreign direct investment, labor, manufacturing industry, and government spending on economic growth in Indonesia. Where GDP_{it} is a gross domestic product, FDI_{it} is foreign direct investment, L_{it} is labor, MI_{it} is manufacturing industry, G_{it} is government spending, ε_{it} is an error term, i is a province, and t is time series.

In this study, panel data estimation is conducted using the Common Effect Model (CEM), selected based on the results of the Chow Test and the Lagrange Multiplier (LM) Test. The Chow Test assesses whether the Fixed Effect Model (FEM) provides a better fit than the CEM, while the LM Test evaluates whether the Random Effect Model (REM) is more appropriate than the CEM. Both test results suggest that the simpler CEM is preferred over the FEM and REM, supporting the initial choice. The consistent outcomes of these tests indicate that the CEM is the most appropriate regression model for this panel data analysis.

Results and Discussion

Descriptive Statistics

Descriptive statistics describe the relationship between variables in a sample and are used to collect scattered data that is important for conducting research with inferential statistical comparisons. This study uses four variables, consisting of 34 cross-sections and 6 time series, with a total research sample of 204. GDP and IM are expressed in percent. Then, G and FDI are in the form of Rupiah. Finally, L is expressed in terms of the number of people.

Table 2. Descriptive statistics.

Variable	Mean	Median	Max.	Min.	Std. Dev
GDP	4.079167	4.805000	22.94000	-15.74000	4.115657
IM	5.156225	3.675000	106.2900	-50.35000	13.16155
L	3,848,892	2,122,354	23,503,598	323,400	5,456,140
G	33827.33	25130.66	134919.0	7456.000	30155.59
FDI	1039.224	378.7500	8283.700	5.900000	1539.751

In Table 2, it can be observed that the variable L has the highest mean, at 3,848,892 people, while GDP has the lowest mean, at only 4.079167 percent. Furthermore, L also has the highest median value, at 2,122,354, whereas the lowest median is found in IM, at just 3.675000. The highest maximum value is recorded in L, at 23,503,598, while the lowest minimum value is found in IM, at -50.35000. Additionally, the highest standard deviation is observed in L, at 5,456,140, and the lowest is in GDP, at 4.115657.

Chow Test

The model selection process involved a series of statistical tests to ensure that the chosen model provides the most reliable and accurate representation of the relationships among the analyzed variables. The Chow test is a test to compare the best model between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). This test has the following basic hypothesis.

H_0: If the probability value> 0.05, then the right model is CEM

H_1: If the probability value <0.05, then the right model is FEM

Table 3. Chow test.

Effects Test	Stat.	d.f	Prob.
Cross-section F	0.538117	(33,166)	0.9810
Cross-section Chi-square	20.732754	33	0.9523

Based on the Chow Test results in Table 3, the chi-square probability value is 0.9523> 0.05, so H_0 is accepted, and H_1 is rejected, so it can be concluded that the Common Effect Model (CEM) regression model is the best model in the Chow test. To further substantiate the justification for employing the CEM model in this research, additional re-testing using the Lagrange multiplier methodology will be undertaken.

Lagrange Multiplier Test

The model selection process involved a series of statistical tests to ensure that the chosen model provides the most reliable and accurate representation of the relationships among the analyzed variables. The Lagrange Multiplier test is a test to compare the best model between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). This test has the following basic hypothesis.

H_0: If the probability value> 0.05, then the right model is CEM

H_1: If the probability value <0.05, then the right model is REM

Table 4. Lagrange Multiplier test.

Lagrange Multiplier test	Test Hypothesis		
	Cross-section	**Time**	**Both**
Breusch-Pagan	6.751338 (0.0094)	491.7949 (0.0000)	498.5462 (0.0000)
Honda	-2.598334 (0.9953)	22.17645 (0.0000)	13.84382 (0.0000)
King-Wu	-2.598334 (0.9953)	22.17645 (0.0000)	19.72352 (0.0000)
Standardized Honda	-2.268648 (0.9884)	24.52450 (0.0000)	10.92857 (0.0000)
Standardized King-Wu	-2.268648 (0.9884)	24.52450 (0.0000)	18.72475 (0.0000)
Gourieroux et al.	-	-	491.7949 (0.0000)

Based on the Lagrange Multiplier Test results in Table 4, The majority of the tests (Honda, King-Wu, and their standardized forms) suggest that there is no significant evidence of random effects across the cross-sectional dimension, as indicated by the high p-values. So, it can be concluded that the Common Effect Model (CEM) regression model is the best model in the Chow test. Therefore, it can be confirmed that this study uses the Common Effect Model (CEM) as the best model.

Panel Data Regression

The Common Effect Model (CEM) was chosen as the appropriate regression model for the panel data, as confirmed by the Chow Test consistently in Indonesia. This method is the most basic panel data modeling approach as it only combines time series data and cross-section data. This model technique does not see changes between time and people. Therefore, the behavior of the data is considered the same over time [47].

According to the CEM regression results in Table 5, it is found that only foreign direct investment and the manufacturing industry significantly impact economic growth in Indonesia. The variables FDI and IM have positive coefficients, indicating that an increase in FDI or an increase in the manufacturing industry will lead to an increase in economic growth in Indonesia. Specifically, for every one million US dollar increase in foreign direct investment, economic growth in Indonesia will increase by 0.000394 percent. In contrast, for every additional labor force, economic growth in Indonesia will decrease by -0.0000000736 percent. Additionally, an increase of one percent in the manufacturing industry will result in a 0.178378 percent increase in economic growth in Indonesia. These findings highlight the importance of foreign direct investment and the manufacturing industry for promoting economic growth in the country.

Table 5. Common effect model.

Variable	Coeff.	Std. Err.	t-stat.	Prob.
FDI	0.000394**	0.000196	2.010898	0.0457
L	-7.36E-08	1.42E-07	-0.519951	0.6037
IM	0.178378*	0.018842	9.466833	0.0000
G	2.26E-06	2.63E-05	0.085731	0.9318
Constant	2.956635*	0.462573	6.391709	0.0000

Note: ** indicates significance at the 5% level, and * indicates significance at the 1% level.

The statistical test results in Table 6 indicate that the independent variables - Foreign Direct Investment, Labor, Manufacturing Industry, and Government Spending - collectively have a significant impact on economic growth in 34 provinces of Indonesia. The F-statistic probability value of 0.00000, which is smaller than the significance level of 0.05, confirms this finding. The four variables can explain a significant portion of the changes in economic growth. The

coefficient of determination (R-Square) in Table 7 of 0.391205 suggests that approximately 39.12% of the variation in Indonesia's economic growth can be explained by these variables. However, the remaining 60.88% of the variation is attributed to other factors not included in the regression model. Therefore, while the four factors play a significant role, there are still other external factors that should be considered when analyzing Indonesia's economic growth.

Table 6. Results of F-test.

Model	F-Stat.	Prob.
GDP	31.96881	0.000000

Table 7. Results of coefficient of determination (R^2) test.

Model	R-squared	Adjusted R-squared
GDP	0.391205	0.378968

Discussion

The Impact of Foreign Direct Investment on Economic Growth

The regression results obtained show that the Foreign Direct Investment variable has a significant positive relationship with economic growth in Indonesia. These results confirm that the greater the inflow of foreign capital, the higher the potential economic growth that can be achieved.

The presence of foreign capital in a region can accelerate the rate of economic growth through various mechanisms, such as industrial sector development, job creation, technology transfer, and the development of other economic sectors. Research by Rahardhani & Wijayanti [48] confirmed the positive relationship between increased foreign direct investment and increased production of goods and services in the economy, which in turn encourages economic growth. This finding is in line with the results of research by Ferdian & Satrianto [49], which also shows that foreign direct investment has a positive and significant impact on Indonesia's economic growth. Both studies emphasize the important role of foreign direct investment in strengthening the country's economy, both through increased production and improvements in the quality of long-term economic growth.

The Impact of Labor on Economic Growth

The regression results obtained show that labor has an insignificant negative relationship with economic growth in Indonesia. The contribution of labor to economic growth in Indonesia is limited by its suboptimal quality. The dominance of high school graduates in the composition of the labor force, as well as the low percentage of diploma and university graduates between 2015 and 2019, indicates that the skills and productivity of the workforce are not in line with the required market standards [50].

Haq's [51] research supports this finding by showing that labor has minimal impact on economic growth, particularly in the Special Region of Yogyakarta, which is further exacerbated by the increasing use of technology that replaces the role of human labor. On the other hand, Arifin [52] identified a negative impact on economic growth in Makassar City due to the dominance of labor from outside the region with skills that do not match the needs of the local market. Further research by Swastika [53] reinforced these results, showing that although labor had a negative impact on Indonesia's economic growth in the 2017-2022 period, the impact was not statistically significant.

The Impact of the Manufacturing Industry on Economic Growth

The regression results obtained show that the manufacturing industry has a significant positive relationship with economic growth in Indonesia. This finding is consistent with economic theory,

which states that investment in the manufacturing sector plays a crucial role in economic development.

This sector increases production capacity and output, which in turn drives economic growth and improves people's welfare. Sholihah et al. [54] research reinforces this finding, confirming that the growth of the manufacturing industry contributes significantly to the Indonesian economy. In addition, Putri et al. [55] found that the manufacturing industry sector has a positive impact on economic growth, with certain subsectors making a greater contribution. This was analyzed using Location Quotient and Shift Share methods to dig deeper into the impact of each subsector. Based on these results, the manufacturing sector clearly serves as a key pillar in the Indonesian economy, which requires more attention in the formulation of economic policies, given its large contribution to national economic growth.

The Impact of Government Expenditure on Economic Growth

The regression results obtained show that government spending has an insignificant positive relationship with economic growth in Indonesia. In the context of macroeconomic theory, government spending serves as a stimulus for the economy, especially through budgeting for productive activities. Efficient and targeted expenditure management in strategic sectors can strengthen economic activity and encourage growth rates. Research by Dev & Sengupta [56] in India shows that government spending can increase aggregate demand and consumption, which in turn has a positive impact on economic growth.

Similar findings were also found by Fiorentina & Ajeng [57] in Central Java, which revealed that government spending has a positive impact on economic growth, although the effect is not always significant in the short term. In general, although government spending can have a positive influence on economic growth, its impact is highly dependent on the effectiveness of fiscal policy, budget allocation, and other factors that affect economic dynamics, both at the local and national levels. Therefore, to maximize the positive impact of government spending, there is a need for efficient budget management and targeted policy implementation.

Conclusions

This study concludes that foreign direct investment and the manufacturing industry significantly contribute to Indonesia's economic growth. The findings highlight the crucial role of foreign investment in enhancing production capacity and output, particularly within the manufacturing sector, which serves as a key driver of economic development. In contrast, the labor force and government expenditure did not show statistically significant effects on economic growth in Indonesia. The lack of significance for the labor force may be due to a mismatch between available skills and the specialized demands of the modern manufacturing sector, while government expenditure might not be efficiently allocated towards projects that directly enhance productivity or stimulate economic expansion.

To optimize economic growth in Indonesia, the government should focus on attracting foreign investment, particularly in the manufacturing sector, through measures like tax incentives and simplified regulations. It is also important to develop infrastructure that supports economic activities. Additionally, improving the quality of the workforce is crucial and can be achieved through relevant education and training programs that align with technological advancements and industry needs. This will enhance productivity and national competitiveness. Government spending should prioritize vital sectors such as infrastructure, education, and health, with regular evaluation of budget allocations to ensure effective contributions to inclusive and sustainable economic growth.

While this study provides insights into the topic, certain limitations remain. The analysis is restricted to Indonesia and primarily utilizes cross-sectional data, which may not fully capture

dynamic, long-term economic trends or the influence of other emerging market conditions. Moreover, the reliance on traditional econometric techniques could limit the exploration of complex interrelationships among variables. Future research should consider a panel country approach to facilitate cross-country comparisons and better understand the broader determinants of economic growth. Additionally, employing more advanced methods, such as the Autoregressive Distributed Lag (ARDL) model, among others, would enhance the robustness and precision of the analysis by capturing both short-run fluctuations and long-run relationships.

Data Availability Statement: The data is available for free download on the official website of the Central Bureau of Statistics and the Ministry of Finance.

Conflicts of Interest: All the authors declare that there are no conflicts of interest.

References

[1] Lee C-C, Wang E-Z. Economic Complexity and Income Inequality: Does Country Risk Matter? *Social Indicators Research* 2021;154:35–60. https://doi.org/10.1007/s11205-020-02543-0.

[2] Suwandaru A, Alghamdi T, Nurwanto N. Empirical Analysis on Public Expenditure for Education and Economic Growth: Evidence from Indonesia. *Economies* 2021;9:146. https://doi.org/10.3390/economies9040146.

[3] Donaldson JA. Growth Is Good for Whom, When, How? Economic Growth and Poverty Reduction in Exceptional Cases. *World Development* 2008;36:2127–43. https://doi.org/10.1016/j.worlddev.2007.10.020.

[4] International Monetary Fund. Navigating Global Divergences 2023. http://imf.org/en/Publications/WEO/Issues/2023/10/10/world-economic-outlook-october-2023.

[5] Chang J-H, Huynh P. The Future of Jobs at Risk of Automation. International Labour Office Bureau for Employers Activities Regional Office …; 2016.

[6] Yasin MZ. Technical Efficiency and Total Factor Productivity Growth of Indonesian Manufacturing Industry: Does Openness Matter? *Studies in Microeconomics* 2022;10:195–224. https://doi.org/10.1177/23210222211024438.

[7] Olomola PA, Osinubi TT. Determinants of Total Factor Productivity in Mexico, Indonesia, Nigeria, and Turkey (1980–2014). *Emerging Economy Studies* 2018;4:192–217. https://doi.org/10.1177/2394901518795072.

[8] Adam Cobb J. How Firms Shape Income Inequality: Stakeholder Power, Executive Decision Making, and the Structuring of Employment Relationships. *Academy of Management Review* 2016;41:324–48. https://doi.org/10.5465/amr.2013.0451.

[9] Immurana M. How Does FDI Influence Health Outcomes in Africa? *African Journal of Science, Technology, Innovation and Development* 2021;13:583–93.

[10] UNCTAD. World Investment Report 2023 2023. https://unctad.org/system/files/official-document/wir2023_en.pdf.

[11] Widiastuti T, Mawardi I, Sukmaningrum PS, Ningsih S, Al Mustofa MU, Ardiantono DS. Do Foreign Investments and Renewable Energy Consumption Affect the Air Quality? Case Study of ASEAN Countries. *Journal of Security and Sustainability Issues* 2020;9:1057–63.

[12] Abdul Bahri EN, Wye C-K. Nonlinearity in Energy–Employment Nexus: The Role of FDI, Trade and Growth in ASEAN-5. *Journal of Social and Economic Development* 2024;26:963–91. https://doi.org/10.1007/s40847-023-00288-3.

[13] Nehemia SD, Prasetyia F. Analisis Pengaruh Penanaman Modal Dalam Negeri Dan Penanaman Modal Asing Terhadap Pertumbuhan Ekonomi Inklusif Di Indonesia. *Journal of Development Economic and Social Studies* 2023;2:26–37. https://doi.org/10.21776/jdess.2023.02.1.3.

[14] Takii S. Do FDI Spillovers Vary among Home Economies?: Evidence from Indonesian Manufacturing. *Journal of Asian Economics* 2011;22:152–63. https://doi.org/10.1016/j.asieco.2010.12.002.

[15] Newman C, Rand J, Talbot T, Tarp F. Technology Transfers, Foreign Investment and Productivity Spillovers. *European Economic Review* 2015;76:168–87. https://doi.org/10.1016/j.euroecorev.2015.02.005.

[16] Scandurra R, Kelly D, Fusaro S, Cefalo R, Hermannsson K. Do Employability Programmes in Higher Education Improve Skills and Labour Market Outcomes? A Systematic Review of Academic Literature. *Studies in Higher Education* 2024;49:1381–96. https://doi.org/10.1080/03075079.2023.2265425.

[17] Mao L. Fiscal Vertical Imbalance and Income Inequality: A Threshold Effect Analysis Based on Government Expenditure. *PLOS ONE* 2025;20:e0317537. https://doi.org/10.1371/journal.pone.0317537.

[18] Sosvilla-Rivero S, Ramos-Herrera M del C, Rubio-Guerrero JJ. Public Expenditure and Economic Growth: Further Evidence for the European Union. *Economies* 2025;13:60. https://doi.org/10.3390/economies13030060.

[19] Solow RM. A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics* 1956;70:65. https://doi.org/10.2307/1884513.

[20] Hymer SH. The International Operations of National Firms, a Study of Direct Foreign Investment. *MIT Press, Cambridge, Massachusetts* 1976.

[21] Barro RJ. Government Spending in a Simple Model of Endogeneous Growth. *Journal of Political Economy* 1990;98:S103–25.

[22] Dutt AK. Structuralists, Structures, and Economic Development. Palgrave Handb. Dev. Econ., Cham: Springer International Publishing; 2019, p. 109–41. https://doi.org/10.1007/978-3-030-14000-7_4.

[23] Hobbs S, Paparas D, E. AboElsoud M. Does Foreign Direct Investment and Trade Promote Economic Growth? Evidence from Albania. *Economies* 2021;9:1. https://doi.org/10.3390/economies9010001.

[24] Bermejo Carbonell J, Werner RA. Does Foreign Direct Investment Generate Economic Growth? A New Empirical Approach Applied to Spain. *Economic Geography* 2018;94:425–56. https://doi.org/10.1080/00130095.2017.1393312.

[25] Pegkas P. The Impact of FDI on Economic Growth in Eurozone Countries. *The Journal of Economic Asymmetries* 2015;12:124–32. https://doi.org/10.1016/j.jeca.2015.05.001.

[26] Iamsiraroj S. The Foreign Direct Investment–Economic Growth Nexus. *International Review of Economics & Finance* 2016;42:116–33. https://doi.org/10.1016/j.iref.2015.10.044.

[27] Jufrida F, Syechalad MN, Nasir M. Analisis Pengaruh Investasi Asing Langsung (FDI) Dan Investasi Dalam Negeri Terhadap Pertumbuhan Ekonomi Indonesia. *Jurnal Perspektif Ekonomi Darussalam (Darussalam Journal of Economic Perspec* 2016;2:54–68.

[28] Panayotou T. Instruments of Change: Motivating and Financing Sustainable Development. Routledge; 2013.

[29] Pelinescu E. The Impact of Human Capital on Economic Growth. *Procedia Economics and Finance* 2015;22:184–90. https://doi.org/10.1016/S2212-5671(15)00258-0.

[30] Haraguchi N, Cheng CFC, Smeets E. The Importance of Manufacturing in Economic Development: Has This Changed? *World Development* 2017;93:293–315. https://doi.org/10.1016/j.worlddev.2016.12.013.

[31] Szirmai A, Verspagen B. Manufacturing and Economic Growth in Developing Countries, 1950–2005. *Structural Change and Economic Dynamics* 2015;34:46–59. https://doi.org/10.1016/j.strueco.2015.06.002.

[32] Kingu J. Does the Keynesian Theory Matter on Economic Growth? Insights from Tanzanian Economy. *African Development Finance Journal* 2024;7:1–22.

[33] Ahuja D, Pandit D. Public Expenditure and Economic Growth: Evidence from the Developing Countries. *FIIB Business Review* 2020;9:228–36. https://doi.org/10.1177/2319714520938901.

[34] BPS-Statistics Indonesia. Foreign Direct Investment Realization by Province, 2021–2023 2024. https://www.bps.go.id/en/statistics-table/2/MTg0MCMy/foreign-direct-investment-realization-by-province--million-us--.html.

[35] BPS-Statistics Indonesia. Growth Rate of GDP by Industry (2010=100), 2018–2023 2024. https://www.bps.go.id/en/statistics-table/2/MTA0Izl=/-seri-2010--laju-pertumbuhan-pdb-seri-2010--persen-.html.

[36] BPS-Statistics Indonesia. Population Aged 15 Years To Top by Province and Type of Activity During the Previous Week, 2008–2024 2024. https://www.bps.go.id/en/statistics-table/1/MTkwNyMx/penduduk-berumur-15-tahun-ke-atas-menurut-provinsi-dan-jenis-kegiatan-selama-seminggu-yang-lalu--2008---2024.html.

[37] Ministry of Finance of the Republic of Indonesia. APBD Data 2024. https://djpk.kemenkeu.go.id/portal/data/apbd.

[38] Ghozali I. Aplikasi Analisis Multivariete Dengan Program IBM SPSS 23 2018.

[39] Husna PA, Nasir M. The Role of Corruption, FDI, and Unemployment in ASEAN-5 Economic Growth. *Grimsa Journal of Business and Economics Studies* 2024;1:75–85. https://doi.org/10.61975/gjbes.v1i2.28.

[40] Ringga ES, Hafizah I, Idroes GM, Amalina F, Kadri M, Idroes GM, et al. Long-Term Impact of Dirty and Clean Energy on Indonesia's Economic Growth: Before and During the COVID-19 Pandemic. *Grimsa Journal of Business and Economics Studies* 2024;2:66–76. https://doi.org/10.61975/gjbes.v2i1.49.

[41] Gujarati DN. Basic Econometrics 5th ed. New York: McGraw–Hil; 2008.

[42] Sasmita NR, Phonna RA, Fikri MK, Khairul M, Apriliansyah F, Idroes GM, et al. Statistical Assessment of Human Development Index Variations and Their Correlates: A Case Study of Aceh Province, Indonesia. *Grimsa Journal of Business and Economics Studies* 2023;1:12–24. https://doi.org/10.61975/gjbes.v1i1.14.

[43] Irwandi H, Jamal A, Nasir M. How Investment Mediates Infrastructure Effect on Economic Growth in Indonesia. *Grimsa Journal of Business and Economics Studies* 2025;2:89–103. https://doi.org/10.61975/gjbes.v2i2.59.

[44] Idroes GM, Hardi I, Hilal IS, Utami RT, Noviandy TR, Idroes R. Economic Growth and Environmental Impact: Assessing the Role of Geothermal Energy in Developing and Developed Countries. *Innovation and Green Development* 2024;3:100144. https://doi.org/10.1016/j.igd.2024.100144.

[45] Hardi I, Idroes GM, Hamaguchi Y, Can M, Noviandy TR, Idroes R. Business Confidence in the Shift to Renewable Energy: A Country-Specific Assessment in Major Asian Economies. *Journal of Economy and Technology* 2025;3:44–68. https://doi.org/10.1016/j.ject.2024.08.002.

[46] Idroes GM, Afjal M, Khan M, Haseeb M, Hardi I, Noviandy TR, et al. Exploring the Role of Geothermal Energy Consumption in Achieving Carbon Neutrality and Environmental Sustainability. *Heliyon* 2024;10:e40709. https://doi.org/10.1016/j.heliyon.2024.e40709.

[47] Widarjono A. Ekonometrika Pengantar Dan Aplikasinya. *Yogyakarta: Upp Stim Ykpn* 2013.

[48] Rahardhani AR, Wijayanti DL. Pengaruh Transaksi Alat Pembayaran Menggunakan Kartu, Tabungan Masyarakat, Dan Foreign Direct Investment Terhadap Pertumbuhan Ekonomi Di Indonesia Tahun 2014Q1-2022Q3. *JER (Jurnal Ekonomi Regional)* 2024;16:11–7.

[49] Ferdian F, Satrianto A. Pengaruh Infrastuktur Ekonomi, Sosial Dan Foreign Direct Investment Terhadap Pertumbuhan Ekonomi Indonesia. *Jurnal Pembanguan Ekonomi Dan Keuangan Daerah* 2022;23.

[50] Sari J, . I, . R. Analysis of the Influence of the Amount of Labor, Level of Education and Government Spending on Economic Growth in North Sumatera. *International Journal of Research and Review* 2021;8:211–9. https://doi.org/10.52403/ijrr.20210428.

[51] Haq FS. Analisis Pengaruh Investasi, Tenaga Kerja dan Tingkat Pendidikan Terhadap Pertumbuhan Ekonomi di Daerah Istimewa Yogyakarta Periode 2009–2015 2017.

[52] Arifin SH. Pengaruh investasi, tenaga kerja, dan tingkat konsumsi terhadap pertumbuhan ekonomi di Kota Makassar tahun 2006-2015. *J Chem Inf Model* 2017.

[53] Swastika IGMY. Pengaruh Tenaga Kerja dan Pertumbuhan Penduduk Terhadap Pertumbuhan Ekonomi di Indonesia Tahun 2017–2022. *Warmadewa Economic Development Journal (WEDJ)* 2024;7:1–9. https://doi.org/10.22225/wedj.7.1.2024.1-9.

[54] Sholihah IM, Syaparuddin S, Nurhayani N. Analisis Investasi Sektor Industri Manufaktur, Pengaruhnya Terhadap Pertumbuhan Ekonomi Dan Penyerapan Tenaga Kerja Di Indonesia. *Jurnal Paradigma Ekonomika* 2017;12:11–24. https://doi.org/10.22437/paradigma.v12i1.3930.

[55] Putri P, Sumanto A, Rahmawati F. Analysis of the Effect of Manufacturing Industry on Indonesia's Economic Growth. *Journal of Business Management and Economic Development* 2023;1:342–54. https://doi.org/10.59653/jbmed.v1i02.151.

[56] Dev SM, Sengupta R. COVID-19: Impact on the Indian Economy. *Indira Gandhi Institute of Development Research, Mumbai April* 2020:1–43.

[57] Fiorentina RF, Ajeng Kartika Galuh. Pengaruh PMDN, PMA, Pengeluaran Pemerintah Dan Tenaga Kerja Terhadap Pertumbuhan Ekonomi. *Journal of Development Economic and Social Studies* 2024;3:362–74. https://doi.org/10.21776/jdess.2024.03.2.3.