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Economic Growth in Indonesia: The Influence of Fiscal Decentralization, Investment, Labor, and Human Development Index

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Abstract

Economic growth is the main indicator of the success of a region's development. This study aims to analyze the effect of fiscal decentralization, investment, labor, and the Human Development Index (HDI) on economic growth in Indonesia. Fiscal decentralization is measured through the General Allocation Fund (DAU), Revenue Sharing Fund (DBH), and Special Allocation Fund (DAK), while investment is represented by Domestic Direct Investment (PMDN) and Foreign Direct Investment (PMA). The labor factor is measured based on the number of workers employed, while the HDI is used as an indicator of human resource quality. This study uses a quantitative approach, employing panel data regression with the Ordinary Least Squares method. Data were collected from 34 provinces in Indonesia from 2014 to 2023. The results of the study show that DAU, DBH, and DAK have a positive and significant effect on economic growth, indicating that fiscal transfers from the central government to the regions can encourage economic activity at the regional level. In addition, PMDN and PMA also have a significant positive impact on economic growth. However, labor does not show a significant effect on economic growth, indicating that the increase in the number of workers has not been accompanied by an increase in skills and work productivity. Meanwhile, the HDI has a positive and significant effect, confirming that improving the quality of education and health plays an important role in increasing labor productivity and economic growth. These findings emphasize the importance of optimizing fiscal policy, increasing the effectiveness of regional fund allocation, and workforce development and human development strategies to support sustainable economic growth in Indonesia.

Introduction

Economic growth is one of the main parameters in the development of economic life, which reflects the increasing capacity of an economy to produce goods and services sustainably [1]. According to Schumpeter & Swedberg [2], economic growth occurs due to an increase in national income output driven by natural population growth and savings rates. Cevik [3] adds that economic growth is a quantitative measure that describes the development of an economy over a certain period compared to a previous one.

Economic growth has a close relationship with increasing public income, investment, and employment opportunities. Research by Bakari & Tiba [4] shows that in the United States, investment and labor have a positive and significant effect on economic growth. Meanwhile, government spending shows varying effects depending on effectiveness. Another study by Nasir et al. [5] on 10 countries in the Asia Pacific over the period 2000-2021 shows that FDI, exports, and education have a positive and significant effect on economic growth. In contrast, labor shows a negative effect, which may be due to low productivity or skill mismatch. Government spending does not show a significant effect on economic growth. Appiah et al. [6] research in BRICS and G7 countries found that the Human Development Index (HDI) has a

positive influence on economic growth, suggesting that improvements in quality of life go hand in hand with increased economic activity.

A number of studies have been conducted to analyze the effect of fiscal decentralization, investment, labor, and the Human Development Index (HDI) on economic growth in Indonesia. Research by Fadilla et al. [7] used panel data from 11 provinces in Eastern Indonesia for the period 2010-2019 with the Fixed Effect Model (FEM) method. The results show that fiscal decentralization has a significant positive effect on economic growth, while foreign investment has no significant effect, and domestic investment has a significant positive effect.

A study by Sulaeman & Silvia [8] showed that in districts and cities in Indonesia, Regional Original Revenue (PAD), the General Allocation Fund (DAU), the Revenue Sharing Fund (DBH), and capital expenditure had a positive and significant effect on economic growth. However, the Special Allocation Fund (DAK) did not show a significant effect. Research by Abrar et al. [9] in Aceh Province also showed that regional economic growth, measured by Gross Regional Domestic Product (GRDP), was influenced by the allocation of government funds. Before the introduction of the Special Autonomy Fund, DAK, DAU, and DBH had a positive and significant effect on GRDP through capital expenditure. After the Special Autonomy Fund was introduced, only DAK continued to have a positive and significant effect, while DAU and DBH no longer showed a significant influence. These studies suggest that the effects of fiscal decentralization, such as government transfers and spending, on economic growth in Indonesia can be different depending on the region and the time period being studied.

National economic growth has an influence on the regional economic structure because the region is an internal part of a country. Indonesia is a unitary state, which has the characteristic that development is carried out through planning, which includes national and regional plans. Economic growth, which can be measured by the development of Gross Domestic Product (GDP) every year, is one of the benchmarks for assessing the socio-economic conditions of a country and for the regions seen in the form of Gross Regional Domestic Product (PRDB), namely in seeing the success of development carried out by a regional government [10].

Based on the ADHB GDP and ADHK GDP values, the Indonesian economy shows a positive growth trend during 2014-2023. In 2023, GDP at current prices reached Rp20,892.4 trillion, with GDP per capita of Rp75.0 million or US$4,919.7. Economic growth that year was 5.05 percent, slightly down from 5.31 percent in 2022. Despite a contraction due to the COVID-19 pandemic in 2020, Indonesia managed to recover with stable growth, reflecting the resilience and adaptability of the national economy. In the fourth quarter of 2023, Indonesia's economy grew by 5.04 percent (year-on-year), supported by the transportation, warehousing, and non-profit consumption expenditure sectors.

This sustained economic recovery reflects Indonesia's success in overcoming the impact of the COVID-19 pandemic and maintaining growth stability. Despite facing various global challenges, such as tightening monetary policy by the world's central banks as well as geopolitical instability in Europe and the Middle East, Indonesia has been able to maintain solid economic performance. This resilience demonstrates the effectiveness of the policy strategies implemented in maintaining the resilience of the national economy amid the evolving global dynamics [11].

In 2023, as shown in Figure 1, the Gross Regional Domestic Product (GRDP) at constant 2010 prices by province in Indonesia exhibited significant regional disparities, according to data from Statistics Indonesia (BPS). Based on the 2023 ADHK GRDP data, DKI Jakarta recorded the highest GRDP at 2,050 trillion rupiah, followed by East Java (1,844 trillion), West Java (1,669 trillion), and Central Java (1,103 trillion), highlighting the dominance of the Java Island economy. Outside Java, North Sumatra (602 trillion), Riau (551 trillion), and East Kalimantan (537 trillion) had the highest GRDPs, primarily driven by industrial activity and natural resource exploitation.

Most provinces remain below the national average of 361.27 trillion rupiah, with regions such as Maluku (35 trillion) and West Papua (40 trillion) reporting significantly lower figures. This imbalance underscores the need for an economic equalization strategy through increased investment, improved infrastructure, and the development of key sectors in underdeveloped regions.
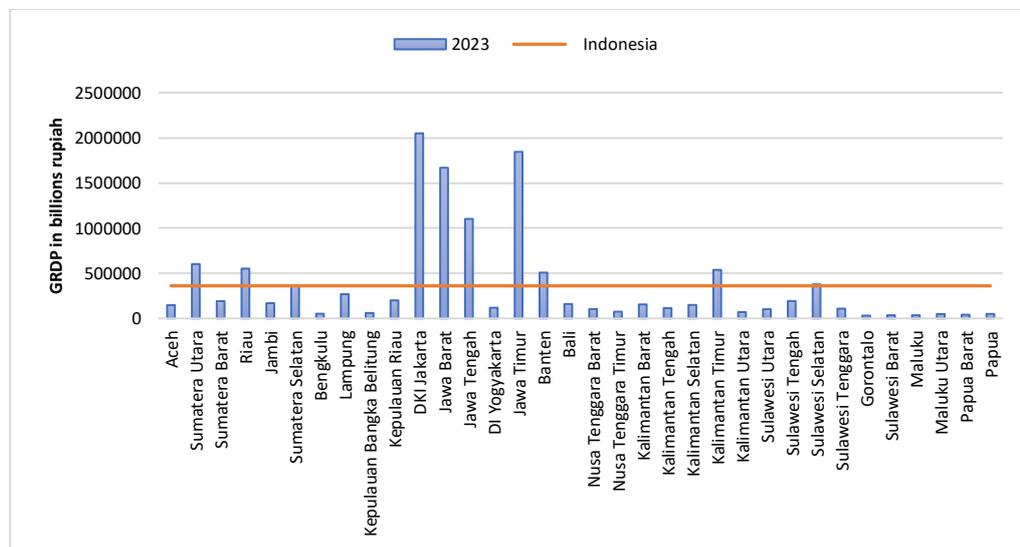

Figure 1. GRDP at 2010 Constant Rupiah by Province in Indonesia, 2023 (Source: BPS [12])

Many countries have implemented fiscal decentralization to promote economic growth and equitable development. In African countries such as Ghana, Kenya, and Ethiopia, as well as OECD countries such as Japan and Germany, decentralization is proven to increase GDP per capita. Countries such as Pakistan and Egypt show that institutional quality plays an important role in the effectiveness of decentralization. Meanwhile, federal countries such as India and Brazil benefit more from fiscal flexibility. In developing countries such as the Philippines and Vietnam, decentralization also has a positive impact, especially if supported by a fair fiscal transfer mechanism [13].

Indonesia began implementing fiscal decentralization in 2001. The implementation of fiscal decentralization policy in Indonesia has been carried out extensively since 2004, as stipulated in Law No. 32 of 2004. It was later revised through Law No. 23 of 2014 on Regional Autonomy. This law applies to all local governments in Indonesia. Abrar et al. [14], to prove the impact of the implementation of fiscal decentralization, many economists have examined the effect of fiscal decentralization on the economy. The indicator used is economic growth, which reflects the level of public welfare.

Decentralization is often considered an important strategy to improve efficiency, accountability, and equity in government. However, in practice, decentralization can face various challenges that affect economic growth; some of the main problems facing decentralization today are how these problems can affect economic growth. Local governments often face funding and budget constraints, especially in less developed regions. Lack of funds can hinder the implementation of important projects and the financing of public services, which can slow down economic growth [15].

Regions that heavily rely on fiscal transfers from the central government may face challenges in independently planning and implementing policies. This dependency can reduce the incentives for local governments to maximize local revenue and improve the efficiency of budget management. This is because not all regions have the same resources. Wealthier or more developed regions tend to have better access to capital, technology, and infrastructure

compared to less developed regions. This disparity can exacerbate economic inequality, where rich regions become increasingly advanced while poorer regions remain left behind. This can hinder inclusive economic growth. A lack of capacity can result in inefficient use of resources and reduce the effectiveness of local policies, which may harm economic growth [16].

Special allocation funds are allocated to finance the implementation of special regional autonomy in the form of devolution from the central government to regions with special autonomy status. The main objective of implementing the transfer from the central government to local governments is to reduce fiscal disparities that occur both vertically and horizontally. In addition, the purpose of special autonomy funds is to encourage regions with special autonomy status to catch up with development compared to other regions [9].

Unemployment and low-quality jobs can reduce income and access to essential services, which in turn affects the Human Development Index (HDI) score [17,18]. Unstable and low-paying jobs also affect the overall quality of life. Adequate economic growth can increase per capita income, which directly contributes to the income component of HDI. Increased income can improve living standards, enable better access to health and education services, and enhance quality of life. A high labor force participation rate reflects the active involvement of the working-age population in the economy, which can drive income and welfare improvements. Meanwhile, the HDI, which includes education, health, and a decent standard of living, is a key factor in improving workforce quality. With a high HDI, people are more educated and healthier, thus increasing labor productivity, which in turn contributes to economic growth and overall social welfare.

The endogenous economic growth theory, developed by economists Paul Romer and Robert Lucas, posits that economic growth can be explained by internal factors within the economic system itself, such as the level of education, accumulation of knowledge, and innovation that originates from within [19]. According to this theory, public policies that support education and research can directly influence economic growth. The government can create conditions that enable innovation and the accumulation of knowledge through investments in human capital [20–22].

One of the objectives of regional autonomy is to ensure that regional development is more directly carried out by local governments, thereby achieving better results in advancing their respective regions as they better understand the local issues, challenges, threats, potentials, and needs. In this way, underdeveloped regions, particularly outside Java or in Eastern Indonesia, can become more advanced and developed, thereby improving the welfare of their communities and reducing disparities. However, despite more than two decades since the enactment of the regional autonomy law, some regions have shown improvements, although disparities in regional welfare, as measured by Gross Regional Domestic Product (GRDP), still persist [23].

This study aims to analyze the impact of fiscal decentralization, investment, labor, and the Human Development Index (HDI) on economic growth in Indonesia. By understanding the relationships between these factors, this research can provide deeper insights into the effectiveness of implemented economic policies and offer recommendations for both local and central governments in designing more inclusive and sustainable economic growth strategies. Unlike previous studies that often focus on only one or two factors, this research integrates four key variables (fiscal decentralization, investment, labor, and HDI) to examine their simultaneous impact on economic growth. By examining national-level data and comparing it with several regional studies, this research reveals patterns and differences in policy impacts across regions. The study not only evaluates the statistical relationships among these variables but also provides insights into the effectiveness of fiscal decentralization policies in boosting economic growth and public welfare. By including HDI as a main variable, this research also contributes

to the understanding of how human development factors influence economic growth and whether existing policies have delivered equitable benefits across society.

Materials and Methods

Data and Variables

The data used in this study is secondary panel data, combining time series data from the period 2014 to 2023 with cross-sectional data from 34 provinces in Indonesia. The study employs a total of eight variables, consisting of seven independent variables and one dependent variable. The independent variables include the General Allocation Fund (DAU), Revenue Sharing Fund (DBH), Special Allocation Fund (DAK), Domestic Investment (PMDN), Foreign Investment (PMA), Labor (LAB), and the Human Development Index (HDI). The dependent variable is economic growth, proxied by Gross Regional Domestic Product (GRDP) at constant prices. All data were obtained from Statistics Indonesia (BPS) [12]. A detailed description of each variable used in this study is presented in Table 1.

Table 1. Variable description.

Status	Variable (Symbol)	Unit	Data Source
Dependent	Gross Regional Domestic Product (PDRB)	Trillion Rupiah	BPS
Independent	General Allocation Fund (DAU)	Trillion Rupiah	Ministry of Finance
	Special Allocation Fund (DAK)	Trillion Rupiah	Ministry of Finance
	Revenue Sharing Fund (DBH)	Trillion Rupiah	Ministry of Finance
	Domestic Investment (PMDN)	Billion Rupiah	BPS
	Foreign Investment (PMA)	Million US$	BPS
	Labor Force (LAB)	People	BPS
	Human Development Index (HDI)	Percent (%)	BPS

Methodology

The analytical technique employed in this study is panel data regression, used to assess the influence of each independent variable on economic growth. To ensure the validity and reliability of the results, classical assumption tests such as multicollinearity and heteroskedasticity tests are conducted. The collected data is processed using statistical software to generate accurate findings and better explain the determinants of economic growth in Indonesia. Panel data regression is selected because it can address provincial heterogeneity and control for unobserved factors that may influence economic growth. The analysis involves both the Fixed Effects Model (FEM) and the Random Effects Model (REM), with the optimal model determined using the Hausman test [24,25].

According to Gujarati [26], panel data, also known as pooled or longitudinal data, combines cross-sectional and time-series dimensions. Cross-sectional data refers to information collected from multiple entities at a single point in time, while time-series data involves observations of a single entity over several time periods. The panel data approach allows for a more dynamic and comprehensive empirical analysis [27–29]. This method enhances the model's explanatory power by capturing both temporal and spatial variations. The general form of the panel data regression model used in this study is adapted to our framework and presented in Equation 1 [30].

$$lnPDRB_{it} = \beta_0 + \beta_1 lnDAU_{it} + \beta_2 lnDBH_{it} + \beta_3 lnPAD_{it} + \beta_4 lnDAK_{it} + \beta_5 lnPMDN_{it} + \beta_6 lnPMA_{it} + \beta_7 lnLAB_{it} + \beta_8 IPM_{it} + \varepsilon_{it} \tag{1}$$

Here, all variables are in natural logarithm form: regional GDP ($lnPDRB_{it}$), General Allocation Fund ($lnDAU_{it}$), Revenue Sharing Fund ($lnDBH_{it}$), and Regional Original Revenue ($lnPAD_{it}$), reflecting fiscal decentralization efforts. The model also incorporates the Special Allocation Fund ($lnDAK_{it}$), Domestic Investment ($\beta_5 lnPMDN_{it}$), and Foreign Direct Investment ($lnPMA_{it}$) to

assess the role of capital inflows in regional economic performance. Labor ($lnLAB_{it}$) and the Human Development Index (IPM_{it}) are included to capture the effects of workforce size and human resource quality. Each coefficient (β_1 through β_8) represents the elasticity of $lnPDRB$ with respect to the corresponding variable, indicating the percentage change in regional GDP resulting from a 1% change in that variable, holding others constant. The error term (ε_{it}) accounts for unobserved factors that may also influence economic growth.

Results and Discussion

Descriptive Statistics

Based on Table 2 Descriptive Statistics, the study data includes 340 observations for each variable, covering 34 provinces in Indonesia over the period 2014–2023. Gross Regional Domestic Product (PDRB) has an average value of IDR 308.62 trillion, with a maximum of IDR 2,050.47 trillion (Jakarta, 2023) and a minimum of IDR 19.21 trillion (North Maluku, 2014). The General Allocation Fund (DAU) has an average of IDR 11.22 trillion, with a maximum of IDR 41.71 trillion (East Java, 2023) and a minimum of IDR 0 trillion. The Revenue Sharing Fund (DBH) averages IDR 3.31 trillion, with a maximum of IDR 42.50 trillion (East Kalimantan, 2023) and a minimum of IDR 0.07 trillion (West Sulawesi, 2016). The Special Allocation Fund (DAK) has an average of IDR 4.22 trillion, with a maximum of IDR 21.59 trillion (West Java, 2023) and a minimum of IDR 0 trillion (Jakarta, 2015). Domestic Investment (PMDN) has an average of IDR 10.63 trillion, with a maximum of IDR 95.20 trillion (Jakarta, 2023) and a minimum of IDR 0 trillion (Maluku, 2014). Foreign Investment (PMA) averages USD 973.56 million, with a maximum of USD 8,283.7 million (West Java, 2023) and a minimum of USD 2 million (West Sulawesi, 2014). The average labor force is 3.72 million people, with a maximum of 23.50 million people (West Java, 2023) and a minimum of 0.27 million people (North Kalimantan, 2014). The Human Development Index (HDI) averages 70.74 percent, with a maximum of 83.55 percent (Jakarta, 2023) and a minimum of 56.75 percent (Papua, 2014).

The standard deviation indicates the degree of data dispersion from the mean value. GRDP, with a standard deviation of IDR 439.23 trillion, reflects significant economic disparities across provinces. Likewise, DAU (IDR 9.07 trillion), DBH (IDR 4.90 trillion), and DAK (IDR 4.36 trillion) suggest an unequal distribution of budget allocations. PMDN has the highest standard deviation at IDR 15.81 trillion, indicating substantial disparity in domestic investment across provinces. Meanwhile, PMA has a standard deviation of USD 1,430.36 million, showing considerable variation in foreign investment. On the other hand, HDI, with a standard deviation of 4.27 percent, and Labor, with 5.27 million people, show that human development and labor distribution tend to be more evenly spread across provinces.

Table 2. Descriptive statistics.

Stat.	PDRB	DAU	DBH	DAK	PMDN	PMA	LAB	IPM
Mean	308.62	11.22	3.31	4.22	10.63	973.56	3.72	70.74
Median	131.22	8.22	1.43	2.93	4.44	400.15	2.07	70.59
Max.	2,050.47	41.71	42.5	21.59	95.2	8,283.70	23.5	83.55
Min.	19.21	0	0.07	0	0	2	0.27	56.75
Std. Dev.	439.23	9.07	4.9	4.36	15.81	1,430.36	5.27	4.27
Obs.	340	340	340	340	340	340	340	340

Best Model Selection: Chow, Hausman, and LM Test

The model selection in this study is determined by considering the results of the Chow test, Hausman test, and Lagrange Multiplier (LM) test. The Chow test is conducted to determine the best choice between the Common Effect Model and the Fixed Effect Model. The Hausman test is used to compare the best choice between the Random Effect Model and the Fixed Effect Model, while the LM test is conducted to select the best model between the Common Effect

Model and the Random Effect Model. The results of the Chow test, Hausman test, and LM test are presented in Table 3 [31].

Table 3. Chow, Hausman, and LM test results.

Test	Effects Test	Stat.	d.f	Prob.	Best Model
Chow	Cross-section F	155.2418	(33.288)	0.0000	Fixed
	Cross-section Chi-square	965.0310	33	0.0000	
Hausman	Cross-section random	134.8062	7	0.0000	Fixed
Lagrange Multiplier	Cross-section Breusch-Pagan	838.9971	-	0.0000	Common

Multicollinearity Test

The presence or absence of multicollinearity symptoms can be detected through the magnitude of the correlation coefficient between each variable. If the partial correlation coefficient of a variable is greater than 0.80, then multicollinearity is present, and vice versa [26]. The purpose of the multicollinearity test is to determine whether or not there is a correlation among the independent variables in the regression model. If significant correlations are present, the independent and dependent variables may be disrupted [32]. Meanwhile, a well-specified regression model will not experience multicollinearity [33]. The test results show no serious multicollinearity issues, as all correlation values are below 0.80 and remain within acceptable tolerance levels. The detailed results of the multicollinearity test are shown in Table 4.

Table 4. Multicollinearity test results.

Variable	LNDAU	LNDBH	LNDAK	LNPMDN	LNPMA	LNLAB	IPM
LNDAU	1.0000	0.2313	0.6864	0.3054	0.3471	0.6901	-0.1738
LNDBH	0.2313	1.0000	0.2969	0.5355	0.6296	0.4172	0.1970
LNDAK	0.6864	0.2969	1.0000	0.5360	0.3976	0.6805	0.1226
LNPMDN	0.3054	0.5355	0.5360	1.0000	0.5040	0.6473	0.4899
LNPMA	0.3471	0.6296	0.3976	0.5040	1.0000	0.5447	0.1631
LNLAB	0.6901	0.4172	0.6805	0.6473	0.5447	1.0000	0.2271
IPM	-0.1738	0.1970	0.1226	0.4899	0.1631	0.2271	1.0000

Heteroscedasticity Test

Based on the results of the heteroskedasticity test shown in Table 5, there are no heteroskedasticity issues in the model, as all variables have probability values above the 0.05 significance level. This indicates that the residual variance is constant and does not follow a specific pattern in its distribution. Variance instability, known as heteroskedasticity, can affect the accuracy of coefficient estimation and the validity of statistical testing. This test is commonly conducted using methods such as the Breusch-Pagan Test, the Glejser Test, or the White Test. If the probability value (p-value) is below the specified significance level (typically 0.05), heteroskedasticity is detected, and corrective steps, such as applying a robust model or transforming variables, are required to address the issue.

Table 5. Heteroscedasticity test results.

Variable	Coeff.	Std. Err.	t-Stat.	Prob.
C	-0.1595	0.3189	-0.5001	0.6173
LNDAU	0.0026	0.0075	0.3519	0.7251
LNDBH	0.0023	0.0028	0.8336	0.4051
LNDAK	0.0003	0.0025	0.1256	0.9001
LNPMDN	-0.0001	0.0012	-0.1094	0.9129
LNPMA	-0.0004	0.0014	-0.3113	0.7558
LNLAB	0.0111	0.0243	0.4582	0.6471
IPM	-0.0002	0.0008	-0.3304	0.7413

The Estimation of Panel Data Regression

Based on Table 6, the results of the partial test in this study can be interpreted using a 5 percent significance level. The General Allocation Fund (DAU) variable has a coefficient of 0.1781, meaning that a 1 percent increase in DAU will raise economic growth by 0.1781 percent. The t-statistic of 6.0334 exceeds the t-table value of 1.974 at a 95 percent confidence level, with a probability of 0.0000 (<0.05), indicating that DAU has a significant effect on economic growth. The Revenue Sharing Fund (DBH) has a coefficient of 0.1141, suggesting that a 1 percent increase in DBH will boost economic growth by 0.1141 percent. With a t-statistic of 10.1645 exceeding the t-table value and a probability of 0.0000 (<0.05), this result indicates a significant effect of DBH on economic growth. The Special Allocation Fund (DAK) has a coefficient of 0.0606, meaning that a 1 percent increase in DAK will lead to a 0.0606 percent increase in economic growth. With a t-statistic of 6.0811 and a probability of 0.0000 (<0.05), DAK is shown to have a significant impact on economic growth. The Domestic Investment (PMDN) variable has a coefficient of 0.0142, indicating that a 1 percent increase in PMDN will enhance economic growth by 0.0142 percent. With a t-statistic of 2.9057, which is greater than the t-table value, and a probability of 0.0039 (<0.05), this variable is significantly associated with economic growth at the 95 percent confidence level.

Furthermore, the coefficient for Foreign Direct Investment (PMA) is 0.0470, indicating that a 1 percent increase in PMA will raise economic growth by approximately 0.0470 percent. With a t-statistic of 8.0385 and a probability of 0.0000 (< 0.05), this variable is statistically significant. The labor force (LAB) variable has a coefficient of -0.0096, meaning that a 1 percent increase in the labor force may actually reduce economic growth by 0.0096 percent. However, the t-statistic of -0.1007 and the probability of 0.9199 (> 0.05) indicate that this variable does not have a significant effect on economic growth. Meanwhile, the Human Development Index (IPM) has a coefficient of 0.0182, showing that a 1 percent increase in HDI will increase economic growth by 0.0182 percent. With a t-statistic of 5.2015 and a probability of 0.0000 (< 0.05), this variable is statistically significant.

Table 6. Results of panel data regression.

Variable	Coeff.	Std. Err.	t-Stat.	Prob.
C	7.4195*	1.2483	5.9433	0.0000
LNDAU	0.1781*	0.0295	6.0334	0.0000
LNDBH	0.1141*	0.0112	10.1645	0.0000
LNDAK	0.0606*	0.0099	6.0811	0.0000
LNPMDN	0.0142*	0.0048	2.9057	0.0039
LNPMA	0.0470*	0.0058	8.0385	0.0000
LNLAB	-0.0096	0.0954	-0.1007	0.9199
IPM	0.0182*	0.0035	5.2015	0.0000
R-squared	0.9962			
Adjusted R-squared	0.9957			
F-statistic	1912.349			
Prob. (F-statistic)	0.0000			

Note: * indicates significance at the 1% level.

Discussion

The General Allocation Fund (DAU) has a positive and significant effect on economic growth. DAU is provided by the central government to regions as the main funding source for local governance and development. With increased fiscal capacity, local governments have more resources to finance infrastructure projects, public services, and economic programs that can stimulate regional economic growth. DAU allows local governments to improve basic infrastructure such as roads, electricity, and telecommunications, which in turn enhances the region's attractiveness to investors. Higher investment from both public and private sectors increases economic productivity and accelerates growth. This is in line with studies by Sima et

al. [11], Yakita [15], Fadilla et al. [7], Abrar et al. [14], and Chadiza & Syahnur [34], which state that DAU has a positive and significant impact on economic growth. This shows that increasing DAU can drive economic growth, especially if the funds are effectively allocated to productive activities such as infrastructure development and human capital improvement.

Revenue Sharing Funds (DBH) also show a positive and significant effect on economic growth. DBH helps regions reduce dependence on central government funding and increase fiscal independence. As regional financial capacity strengthens, local governments can more flexibly determine development priorities based on their local potential and needs. A portion of DBH is used to finance social and economic development programs, such as business assistance, agricultural subsidies, and education. The increase in household income from these programs boosts purchasing power and consumption, which are key factors in driving economic growth. DBH provides additional revenue that regions can use to increase spending in productive sectors that support economic growth. This aligns with research by Yushkov [35], Sohail et al. [13], Mokorowu et al. [36], and Sulaeman & Silvia [8], who found a positive and significant relationship between DBH and economic growth. The findings show that increasing DBH boosts regional economic growth by strengthening local governments' fiscal capacity. Revenue from taxes and natural resources through DBH serves as a key instrument in supporting regional development.

Special Allocation Funds (DAK) also have a positive and significant effect on economic growth. As DAK is earmarked for specific sectors, its use is more targeted and aligned with the region's strategic needs. This ensures that the budget is used effectively to promote growth, as opposed to being spent on consumptive expenditures. DAK is often allocated to priority sectors such as agriculture, tourism, and the creative industry. This support helps regions develop their leading sectors, which have strong potential to drive faster and more sustainable growth. When DAK is used to finance development projects, a multiplier effect occurs. For example, building hospitals or schools not only improves public services but also creates jobs, increases community income, and stimulates surrounding economic activity. These results are supported by Emmanuelle & Anaïs [37], Widianto et al. [38], Arbila et al. [39], and Chadiza & Syahnur [34], who found that DAK significantly impacts regional economic growth. DAK is designed to fund national priority programs that can spur local development.

Domestic Investment (PMDN) has a positive and significant impact on economic growth. Domestic investment often leads to business expansion, new industrial developments, and infrastructure projects requiring substantial labor, which helps absorb the workforce, increase income, and stimulate domestic consumption. When domestic companies invest, they often adopt new technologies to improve efficiency and competitiveness. PMDN can also drive local innovation that boosts overall productivity and economic efficiency. These findings are consistent with studies by Tafese et al. [40], Shabbir et al. [41], Omri & Kahouli [42], Elmariska & Syahnur [43], Kambono & Marpaung [44], and Fadilla et al. [7], which confirm the positive impact of domestic investment on economic growth. Domestic investment plays a crucial role in stimulating economic activity, particularly in high-growth-potential sectors such as industry and services.

Foreign Direct Investment (FDI or PMA) also has a positive and significant effect on economic growth. Foreign companies investing in a country typically open factories, offices, or other facilities that employ local workers. This creates more jobs, reduces unemployment, increases household income, and ultimately boosts purchasing power and domestic consumption. These findings are supported by Siripi et al. [45], Hornstein [46], Elmariska & Syahnur [43], Fadilla et al. [7], and Bimantoro [47], who found that FDI positively and significantly affects economic growth in Indonesia. FDI contributes substantially to economic improvement, particularly in industrial and manufacturing sectors that generate wide-ranging employment and added economic value.

Labor (LAB) has a negative and insignificant impact on economic growth. In many developing countries, including Indonesia, a significant portion of the labor force works in the informal sector, which typically has lower productivity than the formal sector. The informal sector often lacks access to capital, technology, and infrastructure necessary to contribute significantly to economic growth. In some regions, labor supply exceeds available job opportunities. If the labor force is not effectively absorbed into productive sectors, it can become an economic burden through high levels of unemployment or underemployment. Moreover, if the available labor lacks the skills required by key industries, they cannot contribute optimally to economic growth. This mismatch often results from an education and training system not aligned with market needs. According to economic theory, increasing labor without proportional capital and technological advancement may lead to diminishing returns—meaning economic productivity does not grow in line with labor increases. These findings are consistent with studies by Immurana et al. [48], Appiah et al. [6], Rahman et al. [49], and Safira et al. [50], which found that labor has no significant effect on Indonesia's economic growth. Although labor numbers are rising, their contribution to growth remains suboptimal, partly due to skill mismatches with industry demands.

The Human Development Index (HDI or IPM) has a positive and significant impact on economic growth. HDI includes three main aspects: education, health, and standard of living. Better education produces more skilled and innovative workers, improving productivity. Healthy workers can also perform optimally and contribute to growth. Countries with high HDI tend to have a higher-quality workforce capable of facing global competition. Skilled and well-educated workers can adopt and develop new technologies that enhance production efficiency and national competitiveness. These results are in line with studies by Sama et al. [51], Maulana et al. [52], and Sari & Setyowati [53], who found that HDI positively and significantly impacts Indonesia's economic growth. Improvements in HDI—which encompass education, health, and living standards—enhance human capital quality. Skilled human capital is a key factor in driving growth, as healthy, capable workers boost productivity and innovation. However, to maximize HDI's impact, policies supporting job creation and investment in productive sectors are necessary. Continued efforts to expand access to quality education and healthcare will help HDI contribute more significantly to economic growth.

Conclusions

This study reveals that fiscal decentralization, investment, labor, and human resource quality play an important role in Indonesia's economic growth. The analysis results show that the General Allocation Fund (DAU), Revenue Sharing Fund (DBH), and Special Allocation Fund (DAK) contribute positively and significantly to economic growth, reflecting the importance of effective regional fiscal management in economic development. Meanwhile, foreign direct investment (FDI) has a positive and significant impact on economic growth, while domestic investment (DI) has a more limited influence. This indicates that foreign investment plays a greater role in driving economic growth compared to domestic investment.

In addition, this study found that labor has no effect on economic growth, which indicates that the increase in the number of workers has not been accompanied by an increase in productivity and skills that are in line with industry needs. The Human Development Index (HDI) has a positive and significant effect on economic growth, confirming that improvements in the quality of education and health are able to support increased labor productivity. Overall, the results of this study emphasize that more effective fiscal policies, investment strategies oriented towards productive sectors, and improving the quality and suitability of labor skills are the main factors in supporting sustainable economic growth.

Based on the findings of this study, several policy recommendations can be proposed to support optimal economic growth. First, the government should enhance the effectiveness of the

allocation of the General Allocation Fund, Revenue Sharing Fund, and Special Allocation Fund by ensuring that these resources are directed toward improving infrastructure and public services that contribute to regional economic productivity. Strengthening periodic evaluations and promoting transparency in fund utilization are essential to minimize inefficiencies and prevent budget misuse. Second, given that Domestic Investment and Foreign Direct Investment have shown a positive and significant impact on economic growth, the government must improve the investment climate by streamlining regulations, offering fiscal incentives for investors who generate employment, and reinforcing legal and political stability to attract greater investment. Priority should be given to investments in sectors with high multiplier effects, such as manufacturing and technology.

Third, the finding that labor has a negative and insignificant effect on economic growth highlights the need to improve labor quality through better education and vocational training aligned with industry demands. Strengthening skills-based training programs, fostering partnerships between education institutions and industries, and adopting more flexible labor policies are necessary to enhance productivity. Fourth, since the Human Development Index positively and significantly influences economic growth, greater investment in education and healthcare is critical. The government should expand access to quality education, reinforce scholarship programs, upgrade primary healthcare services, and ensure a more equitable distribution of medical and teaching personnel nationwide. By implementing these policies consistently, Indonesia can achieve more sustainable, inclusive, and regionally balanced economic growth.

In this study, there are several limitations that need to be considered and can be the basis for future research to produce a more in-depth and accurate analysis. First, this study uses panel data over a certain time range, so although it can capture interprovincial dynamics, there is still a possibility that the time period used is not long enough to observe the long-term effects of the variables analyzed. Therefore, future research can extend the observation period to obtain more stable and robust results. Second, this study focuses on macroeconomic variables such as DAU, DBH, DAK, DI, PMA, labor, and HDI but has not included other factors that can also affect economic growth, such as the inflation rate, interest rate, trade policy, or institutional quality. Third, this study uses a panel data regression method, which, in general, can identify the relationship between variables but has not yet explored the possibility of a stronger causal relationship. To increase the validity of causality, future research can use methods such as Difference-in-Differences (DiD), Generalized Method of Moments (GMM), or dynamic panel analysis, which are better able to overcome potential endogeneity bias in the model.

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