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The Effect of Regional Financial Performance on the Human Development Index (HDI) in Indonesia from 2020-2024

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ABSTRACT: This study aims to analyze the effect of Financial Performance as measured by indicators of Regional Independence, Fiscal Decentralization, PAD Effectiveness, PAD Efficiency, and Regional Dependence on HDI (Human Development Index) in Indonesia in 2020-2024. The research approach uses a quantitative approach through panel data regression analysis with the Random Effect Model (REM) model. The test results of the R-Squared (R2) value were obtained at 0.672011 which indicated that the independent variables had an effect of 67.20% on the Human Development Index (HDI). Simultaneously, all independent variables have a significant effect on HDI in Indonesia. This is evidenced by the significance value of the F test <0.05. Fiscal Decentralization and PAD Effectiveness variables have a positive and significant effect on HDI because regions with good fiscal capacity and PAD realization tend to be able to improve public services which have a direct effect on HDI. Regional Dependency has a negative and significant effect because high fiscal dependency indicates that the region has not been able to explore the potential of PAD to the fullest and is still very dependent on transfers from the center. Meanwhile, Regional Independence and PAD Efficiency do not have a significant effect, because the contribution of PAD is still low and its management is not optimal. The results of the analysis are shown in the equation Y_{it} = 79.2090888227 + 1.07163364014$X1_{it}$ + 9.17387358408$X2_{it}$ + 2.611663887$X3_{it}$ + 1.74707262942$X4_{it}$ - 9.49037067833$X5_{it}$ + ε_{it}. Regional independence, fiscal decentralization, effectiveness, and efficiency of PAD have a positive effect on HDI, which means that every 1% increase in these variables will increase HDI, while the variable that has the greatest influence is fiscal decentralization. Regional dependence on the central government has a negative effect, meaning that every 1% increase in regional dependence will reduce HDI achievement.

KEYWORDS: Regional Independence, Fiscal Decentralization, PAD Effectiveness, PAD Efficiency, Regional Dependency, Human Development Index (HDI)

I. INTRODUCTION

Regional autonomy in Indonesia is currently based on Law No. 23 of 2014. Law No. 23 of 2014 is an improvement on Law No. 32 of 2004 and Law No. 22 of 1999 (Trisakti & Djajasinga, 2021). The changes were made because the previous laws were no longer in line with the current conditions. According to Article 1, Paragraph 6 of Law No. 23 of 2014, regional autonomy is the right, authority, and obligation of autonomous regions to manage and administer their own government affairs and the interests of the local community within the system of the unitary state of the Republic of Indonesia. Through regional autonomy, local governments can easily develop their culture, manage their resources, and identify what their regions need (Moonti, 2019).

Autonomous regions must have the authority and capacity to reduce their dependence on the central government. Each level of government has the right to manage its finances to fund its respective duties and authorities, reflecting the ideal balance between the central government and local governments (Saleh, 2020). In the decentralized system implemented in Indonesia, local governments are given the authority to manage their own finances to improve the welfare of the community. Not all regions have the same fiscal capacity, resulting in disparities in Human Development Index (HDI) improvements between regions. Local governments are still expected to take the initiative and find more creative and innovative ways to increase Local Own-Source Revenue (PAD), such as through the development of local potential, improvement of public services, or enhancement of tax and fee collection systems (Wawolangi et al., 2025).

In implementing regional autonomy, evaluation is needed to measure the efficiency and effectiveness of financial management. Financial performance is one of the important things that needs to be evaluated by the government (Permai et al., 2021). This evaluation requires several indicators to measure the performance of regional financial management. Mahmudi

(2010) states that financial performance can be measured using the regional independence ratio, regional dependency ratio, degree of decentralization, PAD effectiveness ratio, and PAD efficiency.

Regional financial performance in Indonesia continues to be a key focus of national fiscal policy. According to the Ministry of Finance (2024), the central government, through the 2024 State Budget, has allocated state expenditure of Rp3,325.1 trillion, of which Rp857.6 trillion has been allocated as transfers to regions, representing an increase of 6.4% compared to the previous year. Meanwhile, the allocation for the Physical Special Allocation Fund (DAK) amounts to Rp36.95 trillion for 2025; however, as of the first quarter, there has been no significant implementation. This situation indicates that there are still serious challenges in budget planning and implementation at the regional level. On the other hand, Regional Original Revenue (PAD), which should be the primary source of funding for local development, has not yet been optimized to its full potential. The reality shows that dependence on transfer funds from the central government remains very high in most regions of Indonesia. Based on the results of a study by the Supreme Audit Agency (2020), only one of 542 regions is classified as highly fiscally independent, while only eight provinces and two cities are classified as independent. The rest are still classified as moving towards independence or not yet independent. Based on an assessment conducted by Next Indonesia (2025) for the 2024 fiscal year, there are seven districts/cities that demonstrate a high level of fiscal autonomy, namely Badung District, Surabaya City, Gianyar District, Semarang City, Tangerang District, Denpasar City, and South Tangerang City, characterized by their ability to finance more than 50% of their regional expenditure needs through Local Revenue (PAD).

Data from the Directorate General of Fiscal Balance (DJPK) shows that in the 2024 APBD structure, the contribution of Local Own-Source Revenue (PAD) is only around 28.7%, while the largest portion still comes from central government transfers at 65.7%. A similar situation occurred in 2023, where transfer funds contributed 64.9% of total local revenue. This fact reflects the continued weakness of fiscal autonomy and the dominant reliance on the central government for fiscal support. This situation directly impacts the limited capacity of local governments to fund critical sectors such as education and health, which contribute to improvements in the Human Development Index (HDI) (Nurjanah, 2025).

Figure 1. Human Development Index (HDI) Trends in Indonesia from 2020-2024

***Source**: Central Statistics Agency (BPS), 2020-2024*

Based on the graph above, the increase in the Human Development Index (HDI) nationally during the period 2020 to 2024 shows a positive trend, starting from 73.37 in 2020 to 74.15 in 2024. However, this achievement is not evenly distributed across all provinces. According to data from the Central Statistics Agency (BPS), there are still significant disparities between regions. For example, provinces such as Jakarta and Yogyakarta consistently rank at the top in the "very high" HDI category, reflecting a high quality of life. On the other hand, provinces such as Papua, West Papua, and other parts of Eastern Indonesia remain in the medium HDI category, with achievements far below the national average. To achieve equitable development and improve the quality of life, it is important for the government to give special attention to provinces with medium HDI, particularly in Eastern Indonesia, through improved access to education, healthcare, and decent living standards.

Based on previous studies, there are still a number of significant gaps in empirical coverage and methodological depth. Most previous studies were limited to specific regions such as Riau Province, Central Java, or East Nusa Tenggara, and therefore were unable to provide a comprehensive picture at the national level. Most previous studies have focused on the impact of fiscal performance on macroeconomic indicators such as poverty or economic growth, rather than on multidimensional social

indicators such as the Human Development Index (HDI), which encompasses education, health, and decent living standards. By placing the HDI as the primary variable, this study contributes to understanding how local fiscal governance directly impacts the quality of life of communities.

Seeing the importance of regional financial performance in supporting the improvement of human development quality. Based on the above description, a more in-depth analysis of various regional financial indicators that contribute to the achievement of the HDI is needed. This study aims to fill this research gap by conducting a study in 34 provinces in Indonesia. Therefore, this study is titled "The Impact of Local Government Financial Performance on the Human Development Index (HDI) in Indonesia from 2020 to 2024", which is expected to provide an empirical foundation for more effective fiscal policy-making that is oriented toward human development.

II. LITERATURE REVIEW

A. Regional Financial Performance

According to Mardiasmo (2018), the public sector performance measurement system is used to assess the achievement of a strategy through financial and non-financial indicators. The results of this measurement must be compiled in the form of a performance report as a form of accountability for the implementation of tasks and the use of the budget. In relation to regional financial performance, this measurement aims to assess how regions manage their finances, both in terms of revenue and expenditure.

1. Regional Independence Ratio

Regional financial independence is the ability of a regional government to independently finance government activities, development, and services to the community. This ability is reflected in the extent to which a region can rely on its own sources of revenue, such as taxes and levies collected from the community, without being overly dependent on assistance from the central government (A. Halim, 2007). This ratio is calculated by comparing Local Original Revenue (PAD) to total revenue derived from loans and transfers from the central government, provinces, or other local governments. A. Halim (2007) formulated the local independence ratio as follows:

$$Independence\ Ratio\ = \frac{Local\ Own - Source\ Revenue}{Central\ Government\ Assistance\ and\ Loans} \times 100\%$$

2. Fiscal Decentralization Ratio

Decentralization is a means of achieving national objectives, particularly in efforts to improve the quality of public services and create a more democratic decision-making process. This is achieved through the transfer of authority from the central government to local governments, including in matters such as tax collection, the establishment of representative bodies such as the People's Representative Council, and other authorities that support local autonomy (Manopo et al., 2015).

Mahmudi (2019) states that fiscal decentralization shows the degree of PAD contribution to total regional revenue. The higher the PAD contribution, the higher the ability of the regional government to implement decentralization. In Jayanti et al., (2023), the fiscal decentralization ratio is formulated as follows:

$$Fiscal\ Decentralization\ Ratio = \frac{Local\ Own - Source\ Revenue}{Total\ revenue} \times 100\%$$

3. Local Own-Source Revenue (PAD) Effectiveness Ratio

The Local Own-Source Revenue (PAD) Effectiveness Ratio is used as a measuring tool to assess the extent to which local governments are able to realize Local Own-Source Revenue (PAD) in accordance with predetermined targets, based on the revenue potential of a particular region (Susanto, 2019). The higher the level of effectiveness of a region, the more positive the impact of the programs implemented will be on the community's economy. In Nurulita et al., (2018), the Local Revenue Effectiveness Ratio is formulated as follows:

$$Effectiveness\ of\ Local\ Own - Source\ Revenue\ = \frac{Realization\ of\ Local\ Own - Source\ Revenue}{Target\ Local\ Own - Source\ Revenue} \times 100\%$$

4. Local Own-Source Revenue (PAD) Efficiency Ratio

The Regional Financial Efficiency Ratio is a comparison that shows how much it costs to generate revenue compared to the amount of revenue that is actually earned. It measures the level of efficiency in regional financial management by comparing inputs (costs) and outputs (actual revenue). An activity is considered efficient if its implementation produces output (results) with the lowest input (costs) (Nurulita et al., 2018). Efficiency is intended to be an indicator of the achievement of an activity (Berliani, 2016). Therefore, the more efficient the Local Original Revenue (PAD) is, the better the achievement of the local government's activities will be. In Nurulita et al., (2018), the Local Revenue Effectiveness Ratio is formulated as follows:

$$Efficiency\ of\ Local\ Own-Source\ Revenue = \frac{Expenditure\ Realization}{Revenue\ Realization} \times 100\%$$

5. Regional Financial Dependency Ratio

The regional financial dependency ratio is an indicator used to assess the extent to which a region is able to finance its own development activities by comparing the amount of transfer income received from the central government to the total regional income (Muslim et al., 2023; Pakaya et al., 2025). The regional dependency ratio is used as an indicator to measure the ratio of transfer income to total income, where a higher dependency ratio indicates greater dependence of the regional government (Digdowiseiso & Satrio, 2022). In Mahmudi (2019), the regional financial dependency ratio is formulated as follows:

$$Ketergantungan\ Keuangan\ Daerah\ = \frac{Transfer\ Income}{Total\ revenue} \times 100\%$$

B. Human Development Index (HDI)

According to BPS (2025), the Human Development Index (HDI) is an indicator used to measure human development achievements in a region, covering three main dimensions: health, education, and decent living standards. The health dimension is measured through life expectancy at birth, which reflects the level of public health. The education dimension is evaluated based on average years of schooling and expected years of schooling, which indicate access to and quality of education. Meanwhile, living standards are measured through adjusted per capita expenditure, which reflects the community's ability to meet basic needs.

III. METHODOLOGY

This study uses a quantitative approach with panel data regression analysis techniques using the Random Effect Model (REM) method. This study uses secondary data from 34 provinces in Indonesia over a 5-year observation period, namely 2020-2024. The data used in this study are the Human Development Index (HDI) data for 34 provinces in Indonesia from 2020 to 2024, obtained from the Central Statistics Agency, while the financial performance ratio data were obtained from the Ministry of Finance's publication in the APBD-Portal SKID data. The independent variables (X) in this study are Regional Autonomy, Fiscal Decentralization, Effectiveness of Local Revenue, Efficiency of Local Revenue, and Regional Dependency. The dependent variable (Y) in this study is the HDI. The research data was then analyzed using panel data regression analysis techniques. The regression equation is as follows:

$Y_{it} = \beta0 + \beta1X1_{it} + \beta2X2_{it} + \beta3X3_{it} + \beta4X4_{it} + \beta5X5_{it} + \varepsilon_{it}$.....(1)

Description:

Y_{it} = Human Development Index (HDI) in region i and period t

$X1_{it}$ = Regional independence in region i and period t

$X2_{it}$ = Fiscal decentralization in region i and period t

$X3_{it}$ = Effectiveness of Regional Own-Source Revenue in region i and period t

$X4_{it}$ = Efficiency of local revenue in region i and period t

$X5_{it}$ = Dependency of the region in region iand period t

$\beta0$ = Constant

$\beta1, \beta2, \beta3, \beta4, \beta5$ = Regression coefficients for each independent variable

ε_{it} = Error term

A. *Panel Data Regression Estimation*

To estimate the panel data regression model, there are three approaches:

1. Common Effect Model (CEM)

   The Common Effect Model is the easiest method, commonly referred to as CEM estimation. The model does not focus on a single dimension or time period, assuming that individual behavior is the same in every time period. This model only combines time series and cross sections in the form of groups. The estimation used is the least squares approach (Sarwono & N.S, 2014).

2. Fixed Effect Model (FEM)

   The Fixed Effects model assumes that there are different effects between individuals. These differences can be resolved by differences in intercepts. Therefore, in the Fixed Effects model, each individual is an unknown parameter, which will be estimated using dummy variable techniques. One way to account for cross-sectional uniqueness in panel regression models

is to allow each cross-sectional unit to have different intercept values, while still assuming a constant slope coefficient (Sarwono & N.S, 2014).

3. Random Effect Model (REM)
   Unlike the Fixed Effect Model (FEM), the specific effects of each individual are considered part of the error component, which is random and independent of the observed explanatory variables. This model is called the Random Effects Model (REM). This model is also often referred to as the Error Component Model (ECM) (Sarwono & N.S, 2014).

B. *Selection of Panel Data Regression Models*

The three models have been estimated, and the most appropriate model will be determined. There are several stages of testing to select a panel data regression model (CEM, FEM, or REM) based on the characteristics of the data, namely:

1. Chow Test
   The Chow test is used to choose between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). This test is used to determine the comparison of the F probability value with significance. If the F-statistic value is less than 0.05, the selected model is the FEM compared to the CEM. Conversely, if the F-statistic value is greater than 0.05, the selected model is the CEM, which is better than the FEM (Sarwono & N.S, 2014).
2. Hausman Test
   The Hausman test is used to select the most appropriate model between the Fixed Effect Model (FEM) and the Random Effect Model (REM). If the probability value is < 0.05, then the selected model is the FEM model compared to the REM model. Conversely, if the probability value is > 0.05, then the REM is selected over the FEM (Sarwono & N.S, 2014).

C. Lagrange Multiplier (LM) Test
   The Lagrange Multiplier (LM) test is conducted to determine which model is most appropriate between the Common Effect Model (CEM) and the Random Effect Model (REM). This test is used if the Common Effect Model (CEM) is selected in the Chow test stage. If LM < chi-square, then the CEM model is used (Sarwono & N.S, 2014).

C. *Classical Assumption Test*

Classical assumption testing aims to evaluate the suitability of the regression model used in a study. In panel data regression analysis, there are three main model approaches that can be used, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The selection of these models is based on data characteristics and analysis objectives. The CEM and FEM models use the Ordinary Least Squares (OLS) estimation technique, while the REM model uses the Generalized Least Squares (GLS) technique. The GLS technique in REM has the advantage of producing estimators that are Best Linear Unbiased Estimators (BLUE) even when there are violations of classical assumptions such as autocorrelation and heteroscedasticity (Montgomery et al., 2021). Therefore, when the REM model is selected for panel data regression analysis, classical assumption tests are not required. This is because the use of the Generalized Least Squares (GLS) estimation technique can address violations of classical assumptions, ensuring that the estimation results remain valid. Several literature sources, such as Montgomery et al. (2021), Basuki (2016), Handarini (2014), Sedyadi (2014), Gujarati (2012), and Verbeek (2000), state that GLS in REM is capable of overcoming violations of classical assumptions, so testing is not mandatory. Furthermore, in cross-sectional panel data, tests for autocorrelation and normality are not absolute requirements. Therefore, in this study, classical assumption tests were not conducted because the REM model used is technically and methodologically capable of accommodating potential violations of classical assumptions.

D. *Hypothesis Testing*

1. Coefficient of Determination (R^2)
   The coefficient of determination (R2) test aims to determine how much the independent variable can explain the movement of the dependent variable in the equation or model to be studied. R2 or adjusted R2 has a value between 0-1. The closer it is to one, the stronger the effect, while the closer it is to 0, the weaker the effect of the independent variable on the dependent variable. If the adjusted R^2 value is negative, it is considered to be zero (Ghozali, 2018).
2. Simultaneous Significance Test (F Test)
   The F-test is used to test the suitability of the regression model for predicting the dependent variable. The hypothesis will be tested using a significance level (α) of 5% or 0.05. If the significant value of the F-test is < 0.05, then the model used in the study is suitable and can be used for further analysis. However, if the significance value of the F-test is greater than 0.05, then the model used in the study is not feasible and cannot be used for further analysis. The F-test is also used to test

whether all independent or free variables included in the regression model have a combined effect on the dependent or bound variable (Ghozali, 2018).

3. Significance Test of Individual Parameters (t)
   The t-test is used to test whether the independent variable has an effect on the dependent variable. The partial testing criteria with a significance level of α = 5% indicate that if the probability is < 0.05, the independent variable has a significant effect on the dependent variable. However, if the probability is > 0.05, the independent variable does not have a significant effect on the dependent variable.

IV. RESULTS AND DISCUSSION

A. *Selection of Panel Data Regression Models*

1. Chow Test
   The Chow test is a test to select the most appropriate model between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). If the probability value of the test is > 0.05, then the hypothesis (H0) is accepted. Conversely, if the probability value is < 0.05, the null hypothesis is rejected, indicating that the fixed effect is significant and therefore the Fixed Effect Model is more appropriate for use. The results of this test serve as the initial basis for selecting the panel model specification before proceeding to further model testing stages such as the Hausman test.
   The following are the results of the Chow test:

Effects Test	**Prob.**
Cross-section F	0.0000

   The above test results show that the probability of cross-section F has a value of 0.0000 < 0.05. This means that the fixed effect is the selected model. Next, a Hausman test can be performed to determine which model is most appropriate to use between the Fixed Effect Model (FEM) and the Random Effect Model (REM).

2. Hausman Test
   The Hausman test is used to select the most appropriate model between the Fixed Effect Model (FEM) and the Random Effect Model (REM). If the probability value exceeds the significance level α = 0.05, then the null hypothesis H0, which states that the Random Effect model is more appropriate, is accepted. Conversely, if the probability value is less than the significance level, then the H1 hypothesis, which states that the Fixed Effect model is more appropriate, is accepted.

Test Summary	**Prob.**
Cross-section random	0.4471

   The above test shows a random cross-section probability value of 0.4471 > 0.05. Therefore, the most appropriate model for this study is the Random Effect Model (REM).

3. Uji Lagrange Multiplier Test
   The Lagrange Multiplier (LM) test is used to determine whether the Random Effect model is more appropriate than the Common Effect (CEM) model. If the LM statistic value is less than the significance level α = 0.05, then the null hypothesis H0 is rejected, and the Random Effect model is declared more appropriate.

Cross-section	
Breusch-Pagan	0.0000

   The results of the Lagrange Multiplier (LM) test show that the probability value of the Both Breusch-Pagan method is 0.0000, which is below the significance level α = 0.05 (0.0000 < 0.05). Based on these results, the null hypothesis H0 is rejected, and the alternative hypothesis H1 is accepted. Therefore, it can be concluded that the most appropriate estimation model to use in this study is the Random Effect Model (REM).

B. *Estimation of Panel Data Regression Models using the Random Effect Model (REM) approach*

This study uses panel regression model estimation with the Random Effect Model (REM) approach. The REM model was selected based on the results of model specification tests conducted previously, namely the Chow test and the Hausman test. The following are the results of the Random Effect Model (REM) test:

Method: Panel EGLS (Cross-section random effects)
Date: 07/16/25 Time: 01:14
Sample: 2020 2024
Periods included: 5
Cross-sections included: 34
Total panel (balanced) observations: 170
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	79.20909	2.614536	30.29566	0.0000
X1	1.071634	0.661932	1.618948	0.1074
X2	9.173874	2.684233	3.417689	0.0008
X3	2.611664	0.578152	4.517258	0.0000
X4	1.747073	1.184835	1.474528	0.1423
X5	-9.490371	2.779336	-3.414618	0.0008

	Effects Specification	
	S.D.	Rho
Cross-section random	2.950413	0.8954
Idiosyncratic random	1.008545	0.1046

	Weighted Statistics		
Root MSE	0.989833	R-squared	0.690590
Mean dependent var	10.89829	Adjusted R-squared	0.672011
S.D. dependent var	1.271710	S.E. of regression	1.007777
Sum squared resid	166.5607	F-statistic	21.02258
Durbin-Watson stat	1.213739	Prob(F-statistic)	0.000000

	Unweighted Statistics		
R-squared	0.669956	Mean dependent var	72.11859
Sum squared resid	1590.778	Durbin-Watson stat	0.127083

The following is the equation model:

Y_{it} = 79.2090888227 + 1.07163364014$X1_{it}$ + 9.17387358408$X2_{it}$ + 2.611663887$X3_{it}$ + 1.74707262942$X4_{it}$ - 9.49037067833$X5_{it}$ + εit

Description:

Y : Human Development Index
X1 : Regional Independence
X2 : Fiscal Decentralization
X3 : PAD Effectiveness
X4 : PAD Efficiency
X5 : Regional Dependence

Based on the panel data regression equation above, it can be concluded that:

1. The value of the constant coefficient (C) in the regression model is 79.2091, which means that if all independent variables in the model, namely Regional Independence (X1), Fiscal Decentralization (X2), Local Government Revenue Effectiveness (X3), Local Government Revenue Efficiency (X4), and Regional Dependency (X5) are held constant, the Human

Development Index (Y) is estimated to be 79.2091 points. This value reflects the baseline level of HDI that can be achieved without the direct influence of the fiscal factors analyzed in the model.

2. A coefficient of 1.0716 indicates that every 1 percent increase in regional autonomy will increase the Human Development Index (HDI) by 1.0716 points. This means that the higher the regional autonomy in financing public spending from Regional Original Revenue (PAD), the greater the potential increase in the Human Development Index (HDI).
3. A coefficient of 9.1739 means that every 1 percent increase in the fiscal decentralization index is estimated to increase the HDI value by 9.1739 points. This shows a strong influence, indicating that regions that receive a larger share of total government spending tend to have better development capacity and are more independent in meeting local needs.
4. A coefficient of 2.6117 means that every 1 percent increase in PAD effectiveness will contribute to a 2.6117-point increase in the HDI. This emphasizes the importance of local governments' accuracy and capability in realizing local revenue in line with targets to drive human development.
5. The coefficient of 1.7471 shows that if PAD efficiency increases by 1 percent, the HDI will increase by 1.7471 points. This reflects that efficient PAD management, which maximizes development benefits from available fiscal resources, contributes positively to human development achievements.
6. Unlike other variables, regional dependency has a negative impact on the HDI. A coefficient of -9.4904 indicates that every 1 percentage point increase in the level of fiscal dependency on the central government will reduce the HDI value by 9.4904 points. This finding reflects that the higher a region's dependence on transfer funds, the more limited the flexibility and effectiveness of regional development policies, which ultimately has a negative impact on improving the quality of life of the community.

C. *Hypothesis Testing*

1. Determination Coefficient Test (R2)

The determination coefficient test (R2) aims to determine how much the independent variable explains the movement of the dependent variable in the equation or model being studied. R2 or adjusted R2 has a value between 0 and 1. The closer the value is to one, the stronger the effect, while the closer it is to 0, the weaker the effect of the independent variable on the dependent variable. If the adjusted R2 value is negative, it is considered to be zero (Ghozali, 2018).

R-squared	0.690590
Adjusted R-squared	0.672011

Based on the results of the Random Effect Model (REM) panel regression estimation, the R-squared value obtained was 0.690590 and the Adjusted R-squared value was 0.672011. These values indicate that the regression model has a fairly strong explanatory power. The Adjusted R-squared value of 0.672011 indicates that the independent variables used in the model, namely regional autonomy, fiscal decentralization, PAD effectiveness, PAD efficiency, and regional dependence, account for 67.20% of the Human Development Index (HDI). The remaining 32.80% is explained by other factors outside the model that were not included in this study, such as social, educational, health, or non-fiscal local policy factors.

2. Simultaneous Significance Test (F-test)

The F test is used to test the validity of the regression model in predicting the dependent variable. The hypothesis will be tested using a significance level (α) of 5% or 0.05.

F-statistic	21.02058
Prob (F-statistic)	0.000000

Based on the table above, the regression results using the Random Effect Model (REM) show that the F-statistic probability value is 0.000000, which is smaller than the significance level of 0.05. This indicates that simultaneously, all independent variables in the model have a significant effect on the Human Development Index (HDI).

3. Individual Parameter Significance Test (T)

The t-test is used to test whether the independent variables have an effect on the dependent variable. The testing criteria are partial with a significance level of $\alpha = 5\%$. If the probability is < 0.05, it means that the independent variables have a significant effect on the dependent variable. If the probability is > 0.05, then the independent variables do not have a significant effect on the dependent variable.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	79.20909	2.614536	30.29566	0.0000
X1	1.071634	0.661932	1.618948	0.1074
X2	9.173874	2.684233	3.417689	0.0008
X3	2.611664	0.578152	4.517258	0.0000
X4	1.747073	1.184835	1.474528	0.1423
X5	-9.490371	2.779336	-3.414618	0.0008

Based on the results of panel data regression estimation using the Random Effect Model (REM), the significance level of each independent variable on the dependent variable, the Human Development Index (HDI), can be determined through the probability value (p-value) in the t-test. This test aims to determine whether each variable individually has a significant influence on the HDI, with a significance level of 5% ($\alpha = 0.05$). The following is the interpretation:

a. For the Regional Autonomy variable, the probability value (p-value) is 0.1074 > 0.05, so it is not significant at the 5% significance level. This means that in this model, regional autonomy has not been proven to have a statistical effect on the HDI.
b. For the Fiscal Decentralization variable, the probability value is 0.0008, which is less than 0.05, so this variable has a significant partial effect on the HDI. The positive coefficient of 9.173874 indicates that an increase in fiscal decentralization tends to significantly increase the HDI.
c. For the PAD Effectiveness variable, the probability value is 0.0000, meaning that this variable is significant at the 5% significance level. This indicates that PAD effectiveness has a positive and significant influence on the HDI. This means that the more effective a region is in realizing its PAD, the higher the HDI achieved.
d. For the PAD Efficiency variable, a probability value of 0.1423 indicates that this variable is not partially significant to the HDI at a significance level of 5%. This means that in this model, PAD efficiency has not been proven to have a statistical effect on the HDI.
e. For the Regional Dependency variable, the probability value is 0.0008, which is significant at the 5% significance level. The negative coefficient of -9.490371 indicates that the higher the level of regional dependency on transfers from the central government, the lower the HDI value achieved. This is a significant and opposite effect.

D. Discussion

1. Based on the regression results, the fiscal autonomy variable is expected to strengthen the capacity of local governments to finance strategic sectors of human development, in line with the principles of Fiscal Federalism (Oates, 1972) and Public Finance Theory (Musgrave & Musgrave, 1989). However, the findings of this study indicate that fiscal autonomy does not have a significant effect on the HDI in Indonesia. This condition can be explained by the limitations of real fiscal capacity due to low local revenue, unproductive spending orientation towards the education and health sectors, and weak governance and institutional capacity at the local level. The implications of these findings emphasize that increasing fiscal autonomy must be accompanied by institutional reform, improved governance, and more productive spending allocation in order to have a significant impact on human development.
2. Fiscal decentralization variables show a strong influence, indicating that regions that receive a larger share of total government spending tend to have better development capacity and are more independent in meeting local needs. The greater the contribution of PAD to regional revenue, the greater the increase in HDI that can be achieved. These results indicate that increasing regional fiscal capacity through fiscal decentralization can improve the quality of life of the community, especially in the education, health, and welfare sectors. The positive and significant results of fiscal decentralization on the HDI reflect the success of some regional governments in managing their fiscal autonomy for the benefit of human development. When regional governments have greater authority to regulate revenue and expenditure, they tend to be more responsive to the needs of the local community. This finding aligns with the Fiscal Federalism Theory proposed by Oates (1972), which states that delegating fiscal authority to local governments enables public services to become more efficient and targeted, as local governments better understand the local needs of their communities. The results of this study are also supported by studies conducted by Winarni et al. (2022) in Jambi Province and Pramartha et al. (2023) in Bali Province, which show that fiscal decentralization has a positive and significant effect on the HDI. These studies

conclude that the ability of regions to manage and optimize local revenue has a real impact on the achievement of human development dimensions.

3. The effectiveness of Local Own-Source Revenue (PAD) has a positive and significant impact on the Human Development Index (HDI) in Indonesia for the period 2020-2024, emphasizing the importance of accuracy and the capability of local governments in realizing PAD in line with targets to drive human development. PAD effectiveness, measured by the ratio of actual revenue to the APBD target, reflects a region's ability to achieve revenue projections. A high ratio indicates strong fiscal capacity, planning, management, and efficient utilization of local potential. Regions with effectiveness above 90% are generally consistent in revenue collection and tax compliance, thereby having stable fiscal space to fund basic public services. This aligns with the public finance theory stated by Musgrave & Musgrave (1989), which asserts that the effectiveness of managing local financial resources determines the success of public services.
4. Based on the results of panel data regression estimates, the efficiency of Local Own-Source Revenue (PAD) has a positive but insignificant effect on the Human Development Index (HDI) in Indonesia for the period 2020-2024. this indicates that while theoretically, the efficiency of PAD management—maximizing the benefits of development from available fiscal resources—should support improvements in living standards, it has not yet been statistically proven as a primary determinant of HDI achievements across provinces. This lack of significance indicates that provinces can offset fiscal inefficiency through effective budget management and targeted public spending allocation, such as in the education, health, and basic infrastructure sectors, or through the strength of key sectors like tourism in Bali and institutional capacity in Yogyakarta and Jakarta. Within the framework of public finance theory, fiscal efficiency is part of the principle of value for money; however, these results emphasize that efficiency alone is insufficient without effective allocation and appropriate policies.
5. Based on the results of panel data regression, regional dependence on the central government has a negative and significant effect on the Human Development Index (HDI) in Indonesia for the period 2020-2024. This indicates that the higher a region's dependence on transfer funds, the more limited its flexibility and effectiveness in development policy. Data from the DJPK in 2024 shows that the average composition of PAD is only 28.7% of total regional revenue, while central transfers reach 65.7%, indicating low fiscal autonomy. High dependence on General Allocation Funds, Special Allocation Funds, and Revenue-Sharing Funds tends to make regions passive in exploring local economic potential, hindering the optimization of spending in the education, health, and decent living standards sectors, and slowing down HDI progress. These findings align with the public finance theory stated by Musgrave & Musgrave (1989) and the fiscal federalism theory by Oates (1972), which emphasize the importance of fiscal autonomy to enhance the efficiency and effectiveness of public services. Research by Winarni et al. (2022) in Jambi and Azwandi et al. (2022) reinforces these results by showing that the dominance of central transfer funds often creates structural dependencies that weaken regional fiscal innovation. Therefore, strengthening PAD and efficient expenditure management are crucial strategies for reducing fiscal dependency and accelerating human development.

V. CONCLUSIONS

Based on the results of an analysis of 34 provinces in Indonesia during the period 2020-2024, using panel data regression analysis with the Random Effect Model (REM), the equation Y_{it} = 79.2090888227 + 1.07163364014$X1_{it}$ + 9. 17387358408$X2_{it}$ + 2.611663887$X3_{it}$ + 1.74707262942$X4_{it}$ - 9.49037067833$X5_{it}$ + ε_{it}. The regression results indicate that the baseline HDI without the influence of other variables is 79.2091. Regional autonomy, fiscal decentralization, effectiveness, and efficiency of PAD have a positive effect on the HDI, with fiscal decentralization having the greatest influence. Conversely, regional dependence on the central government has a negative effect, meaning that the higher the dependence, the lower the HDI achievement.

The R-Squared (R2) value obtained was 0.672011, indicating that the independent variables had a 67.20% effect on the Human Development Index (HDI). Simultaneously, all independent variables have a significant effect on the HDI in Indonesia. This is evidenced by the significance value of the F-test < 0.05. The variables of Fiscal Decentralization and PAD Effectiveness have a positive and significant effect on the HDI because regions with good fiscal capacity and PAD realization tend to be able to improve public services. Regional Dependency has a negative and significant effect because high fiscal dependency indicates that regions have not been able to maximize their PAD potential and remain heavily reliant on transfers from the central government. Meanwhile, Regional Autonomy and PAD Efficiency do not have a significant effect, as PAD contributions remain low and its management is not yet optimal.

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