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The Effect of Gross Regional Domestic Product of the Manufacturing Industry Sector, Manufacturing Industry Labor, and Population on Local Own-Source Revenue (PAD) in Tuban Regency

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Abstract

The industrial sector plays a strategic role in driving economic growth and increasing regional revenue through Local Own-Source Revenue (PAD). Tuban Regency, as one of the industrial areas in East Java, records a significant contribution from the manufacturing industry sector to the regional economy, yet the increase in industrial activity has not been fully proportional to PAD growth. This study examines the influence of manufacturing industry GRDP, manufacturing industry labor, and population on PAD in Tuban Regency using secondary data in the form of annual time series from 2006 to 2025 obtained from the Central Bureau of Statistics (BPS) of Tuban Regency. The analytical method used is multiple linear regression with the Ordinary Least Square (OLS) approach and supported by classical assumption tests including normality, multicollinearity, heteroscedasticity, and autocorrelation tests. The results show that simultaneously, the three independent variables have a significant effect on PAD in Tuban Regency. Partially, manufacturing industry GRDP has a positive and significant effect, manufacturing industry labor has a positive but insignificant effect, while population has a negative and significant effect on PAD.

Keywords: PAD, Manufacturing Industry GRDP, Labor, Population.

INTRODUCTION

Local Own-Source Revenue (PAD) is one of the primary indicators reflecting the level of a region's fiscal independence in implementing regional autonomy. An increase in Local Own-Source Revenue (PAD) bolsters a local government's fiscal capacity, allowing it to fund regional development and public services while reducing its

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dependency on central government transfers. Consequently, local authorities must fully leverage their economic potential to boost PAD (Nalle et al., 2021). Optimizing PAD is also considered an important strategy to strengthen regional fiscal capacity and support sustainable economic development (Sapira & Tiara, 2022).

The manufacturing sector is a strategically vital industry, contributing significantly to economic growth by generating value, enhancing productivity, and broadening employment opportunities (Solow, 1956). Tuban Regency has considerable manufacturing industry potential, supported by the presence of several large-scale industries that contribute substantially to the regional economy. The Gross Regional Domestic Product (GRDP) of the manufacturing industry sector in Tuban Regency has shown an increasing trend after experiencing a slowdown during the COVID-19 pandemic, indicating its potential to enhance Local Own-Source Revenue. Furthermore, the expansion of manufacturing activities generates a multiplier effect that stimulates broader economic activities within the region (Keynes, 1936).

Beyond the manufacturing industry's GRDP, both the sector's workforce and the overall population are also regarded as determinants of Local Own-Source Revenue. Labor is an essential factor of production that contributes to higher industrial productivity and household income (Budiani et al., 2022). Furthermore, population growth can drive up demand for goods and services, which in turn stimulates regional economic activity and enhances the potential for local revenue generation (Nashiruddin & Witono, 2024). Nevertheless, prior research has yielded mixed results concerning the impact of GRDP, labor, and population on Local Own-Source Revenue. These inconsistencies indicate that the relationships among these variables require further investigation, particularly in regions with strong industrial characteristics such as Tuban Regency.

Accordingly, this study examines the influence of Manufacturing Sector GRDP, Manufacturing Industry Employment, and Population on Tuban Regency's Local Own-Source Revenue. It relies on annual time-series data for 2006–2025 and uses multiple linear regression. The anticipated results are expected to clarify the factors affecting Local Own-Source Revenue and to support regional authorities in their pursuit of greater fiscal autonomy through manufacturing expansion.

METHOD

This research adopted a quantitative methodology and utilized an explanatory research design. The study was conducted in Tuban Regency using secondary time-series data. The observation period covered 2006–2025, consisting of 20 years of data. The data utilized in this research were sourced from the Central Bureau of Statistics (BPS) of Tuban Regency, along with other pertinent official institutional sources.

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The dependent variable in this study was Regional Original Revenue (PAD) of Tuban Regency. The independent variables consisted of Gross Regional Domestic Product (GRDP) of the manufacturing sector (X_1), manufacturing-sector labor (X_2), and population (X_3). The relationships among these variables were analyzed to determine their effects on Regional Original Revenue. All data were organized according to the observation period before statistical analysis was conducted.

The collected data were subjected to multiple linear regression analysis utilizing the Ordinary Least Squares (OLS) estimation technique. This method was used to examine the effects of GRDP in the manufacturing sector, manufacturing-sector labor, and population on Regional Original Revenue in Tuban Regency. Data processing and statistical analysis were conducted using EViews 13. The regression model was formulated as follows:

$$PAD = \beta_0 + \beta_1 GRDP + \beta_2 LAB + \beta_3 POP + e$$

Before hypothesis testing, the model was checked for normality, multicollinearity, heteroscedasticity, and autocorrelation. Hypotheses were then tested using F-test and t-test at 5% significance. Adjusted R^2 was also applied to measure how well the independent variables explain variations in Local Own-Source Revenue.

RESULTS AND DISCUSSIONS

Table 1. Normality Test

Jarque-Bera	0.160989
Probability	0.922660

To check for normality in the residuals, the Jarque-Bera test was applied. The resulting p-value was 0.922660, which is greater than 0.05. This indicates that the residuals are normally distributed, meaning the regression model fulfills the normality requirement.

Table 2. Multicollinearity Test

Variable	Centered VIF
C	NA
PDRB	5.714919
TK	3.412894
JP	2.916819

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Multicollinearity was assessed using the Variance Inflation Factor (VIF). The computed VIF values were 5.714919 for Manufacturing Sector GRDP, 3.412894 for Employment, and 2.916819 for Population. Since all VIF figures fell considerably below the conventional threshold of 10, it is evident that multicollinearity does not pose a concern among the independent variables. Consequently, the regression model fulfills the multicollinearity assumption.

Table 3. Heteroscedasticity Test

Obs*R-squared	Prob. Chi-Square(9)	0.0763

The heteroscedasticity test was administered to assess whether the residual variance exhibited inequality within the regression model. The results yielded a Prob. Obs*R-squared value of 0.0763. As this figure exceeds the 0.05 significance threshold, the model is free from heteroscedasticity, thereby confirming that the homoscedasticity assumption is fulfilled.

Table 4. Autocorrelation Test

Obs*R-squared	Prob. Chi-Square(2)	0.4780

The autocorrelation test produced a Prob. Chi-Square statistic of 0.4780, which exceeds the 0.05 significance level. This outcome confirms the absence of correlation among the residuals across the observation periods, indicating that the regression model is free from autocorrelation.

Multiple Linear Regression Analysis

Multiple linear regression was performed to determine the effects of manufacturing GRDP, manufacturing labor, and population on PAD in Tuban Regency.

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Table 5. Multiple Linear Regression Analysis Results

Variable	Coefficient	t-Statistic	Prob.
Constant	1308292.	1.983041	0.0648
Manufacturing Sector GRDP	43.02618	4.747832	0.0002
Manufacturing-Sector Labor	0.873295	1.006652	0.3291
Population	-1.193459	-2.146396	0.0475
R-squared	0.883173		
Adjusted R-squared	0.861268		
F-statistic	40.31816		
Prob(F-statistic)	0.000000		

From the multiple linear regression analysis, the resulting regression equation is as follows:

PAD = 1308292. + 43.02618 GRDP + 0.873295 LAB − 1.193459 POP + e

The constant of 1308292. represents the value of PAD when all independent variables are assumed to be constant. Manufacturing sector GRDP had a positive coefficient of 43.02618, while manufacturing-sector labor also had a positive coefficient of 0.873295. In contrast, population had a negative coefficient of −1.193459. These results indicate different directions of influence of the independent variables on Regional Original Revenue in Tuban Regency.

The regression model achieved an Adjusted R^2 of 0.861268, indicating that Manufacturing Sector GRDP, Manufacturing Employment, and Population account for 86.13% of the variance in Regional Original Revenue, with the remaining 13.87% explained by variables not included in the model. This suggests a relatively strong explanatory power.

The F-test produced a statistic of 40.31816 (p = 0.000000), well below the 0.05 significance level, confirming that the independent variables jointly have a significant effect on PAD and that the overall model is statistically significant.

Partially, the t-test showed that Manufacturing GRDP is statistically significant (t = 4.747832, p = 0.0002 < 0.05), indicating a positive effect on Regional Original Revenue. However, Manufacturing Employment was not significant (p = 0.3291 > 0.05), suggesting that its positive coefficient does not represent a statistically meaningful contribution to PAD.

Population had a t-statistic of −2.146396 and a probability value of 0.0475. Since the probability value was below 0.05, population had a negative and significant effect on Regional Original Revenue in Tuban Regency. This indicates that an increase in population during the observation period tended to be associated with a decrease in PAD,

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assuming other variables remained constant. These findings suggest that population growth did not necessarily contribute positively to the fiscal capacity of the region.

DISCUSSION

1. **The Effect of Gross Regional Domestic Product of the Manufacturing Industry Sector on Local Own-Source Revenue (PAD) in Tuban Regency**

The findings indicate that Manufacturing Sector GRDP exerts a positive and statistically significant influence on Regional Original Revenue in Tuban Regency. This suggests that growth in manufacturing output and value-added activities stimulates broader economic activity, thereby enhancing the government's revenue potential through local taxes and service charges. Consequently, an expansion in manufacturing-sector economic activity is associated with a corresponding increase in its contribution to PAD.

2. **The Effect of Manufacturing Industry Labor on Local Own-Source Revenue (PAD) in Tuban Regency**

Manufacturing Employment shows a positive but insignificant effect on PAD. This implies that adding more workers does not directly boost regional revenue, since employment growth is not always matched by higher productivity or value added. The result is also consistent with Tuban's manufacturing sector being capital-intensive, where production depends more on technology and machinery than on additional labor.

3. **The Effect of Population on Local Own-Source Revenue (PAD) in Tuban Regency**

Population is found to have a significant negative effect on PAD. This implies that population growth has not been accompanied by sufficient improvements in workforce quality, job creation, or productivity. Moreover, while a larger population increases the demand for public services, PAD is more strongly driven by high-value economic activities, especially large-scale industry and production-related earnings.

CONCLUSION

Based on the empirical findings, Manufacturing Sector GRDP exerts a positive and statistically significant influence on PAD in Tuban Regency, whereas Manufacturing Employment demonstrates a positive yet non-significant effect. In contrast, Population exhibits a negative and significant relationship with PAD. These results collectively suggest that PAD in Tuban Regency is driven more substantially by the level of economic activity and value added generated within the manufacturing sector than by workforce size or population figures.

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