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Southern Coastal East Java GRDP Under Fiscal and Macroeconomic Factors

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Abstract

General Background Gross Regional Domestic Product (GRDP) serves as a fundamental metric in regional economic analysis for assessing community welfare and regional productivity. **Specific Background** The southern coastal region of East Java exhibits significant economic potential but lags behind the northern industrial regions, necessitating development initiatives such as the Southern Cross Road infrastructure project. **Knowledge Gap** Although previous studies have examined fiscal decentralization and investment, there is a lack of empirical research integrating General Allocation Funds (GAF), Investment, Inflation, and Labor Force Participation Rate (LFPR) to understand production stability in this recently opened coastal corridor. **Aims** This study examines the economic determinants of GRDP in eight southern coastal districts of East Java from 2015 to 2024. **Results** Utilizing a Fixed Effects Model (FEM), the analysis reveals that GAF and Inflation have a significant negative impact on GRDP, while Investment and LFPR demonstrate a significant positive impact. The model explains 99.28% of GRDP variation. **Novelty** This research reconstructs the regional production function by incorporating updated time-series data that captures the full implementation phase of the Southern Cross Road infrastructure. **Implications** These findings necessitate policies focused on controlling local inflation and shifting GAF allocation from routine expenditures toward sustainable infrastructure and local economic development to reduce fiscal dependence on the central government.

Highlights:

- ♦ General allocation funds and investments function as primary catalysts for increasing regional real economic value.
- ♦ Infrastructure development through the Southern Cross Road acts as a catalyst for investment and operational efficiency.
- ♦ Policymakers must prioritize inflation control and economic independence to foster sustainable regional growth.

Keywords: GRDP, General Allocation Fund, Investment, Inflation, Labor Force Participation Rate

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Introduction

Gross Regional Domestic Product has become an important indicator in explaining the economic welfare of a region. It serves as a fundamental metric in regional economic analysis, as it represents the cumulative added value by all economic sectors in a region over a specific period[1]. The growth of GRDP depends on the management of productivity, labor, and capital accumulation in accordance with economic activities. When all indicators operate simultaneously and optimally, they will certainly produce outputs that can enhance the growth of community welfare [2].

East Java Province has coastal areas that consist of two parts, namely the southern coast and the northern coast. These two regions have interesting characteristic differences, each with economic potential to support the improvement of the region's real economy [3]. The Southern Coast has become one of the regions dominated by the primary sector, with a GRDP growth characteristic that is slower compared to the northern region, which is industrial.

Areas with a high level of industry tend to contribute more to GRDP compared to regions that rely on the primary sector. Therefore, the southern coast has become one of the focuses of development in East Java in accordance with Presidential Regulation No. 80 of 2019[3]. This indicates the need for the development of the southern coastal economic structure to support the GRDP [Figure 1].

If we look at figure 1, there is a sharp disparity in GRDP between the southern and northern coasts. The northern coast has a value that is far superior compared to the southern coast. It shows a stronger economic potential in the northern coastal area, reaching 865.271 billion compared to the southern coastal area, which only averages 339.910 billion.

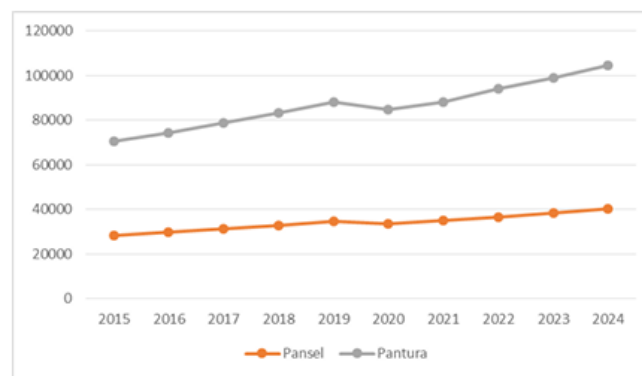


Figure 1. Gross regional domestic product of the East Java coastal area (2015-2024) billion

Moreover, the northern coast is dominated by key economic sectors that do not solely rely on the fisheries and tourism sectors. The district with the highest average GRDP growth over the past 10 years is Malang Regency, as it has become the industrial center in the southern coastal region.

That significant difference underscores the importance of special attention in the development of the regional economic structure. Moreover, before the development of infrastructure, the accessibility of capital, goods, and services was still hindered. After the construction of the Southern Cross Road, it is expected to boost the economy of the southern coast. Based on the 8 districts in the southern coastal region, each certainly has different regional economic conditions. This requires the government's role in providing capital through central transfer funds. The government's fiscal instrument, explained through the General Allocation Fund variable, is expected to help districts that still have needs adjusted to the population size, area, and regional income levels in driving GRDP to reduce inequality[4].

In addition to fiscal fulfillment from the central government, investment is also needed as an accumulation of capital that can drive the development of GRDP through increased production capacity. In this study, investment stands as an additional capital that can encourage the production capacity of goods and services, expand job opportunities, thereby increasing the economic output in global production. Although it briefly entered the Covid-19 period, which became a weak point for investors due to global economic uncertainty and adjustments in domestic policies. However, the development of Southern crossroad was able to attract investors, driving the development of capital access, production, and local economic growth[5].

The specific characteristics of this region, which continue to develop positively despite facing national economic pressures, necessitate an empirical study to examine the impact of variables on regional production stability. Price fluctuations will be vulnerable when there are exogenous factors that pose a major challenge in achieving sustainable development goals. Unpredictable inflation rates can drastically reduce the purchasing power of the population. The stability of local inflation becomes a key variable because even a substantial GRDP will be eroded if the cost of living increases significantly[6].

The dynamics of inflation reflect fluctuations in market prices that directly affect employment in the real sector. This can expand production to meet market demand, which in turn can automatically increase the workforce. Based on the human capital perspective, the increase in the Labor Force Participation Rate (LFPR) is crucial for enhancing productivity at work and supporting growth. However, the increase in LFPR requires a relatively long time and consistent policy support to align with the increase in Gross Regional Domestic Product (GRDP)[7].

Solow-Swan states that economic growth is formed from the accumulation of capital, labor, and technological development. In fiscal stimulus, the General Allocation Fund becomes an important instrument in stimulating the economy, due to the government's expenditure needs to encourage the development of supporting economic infrastructure. The flow of investment to the regions through the optimization of local labor participation aims to build a sustainable regional economy. Then, a high LFPR will increase inflation due to the rise in economic activity of the local community. Although there is no strong correlation between financial capital and human capital, economic growth remains a theoretical success without a real impact on the community's economy.

This research differs from several other studies because no research has yet been found that combines these four variables. Similar research has been found, but it does not discuss the labor force participation rate. This is a novelty, based on research conducted by Utomo and Tambunan regarding the influence of fiscal decentralization, investment, and LFPR in Central Java province [8]. Using multiple linear regression analysis without Log transformation. Previous research focused on strategically important metropolitan areas with stable economies. In this study, it differs from the previous one due to the pattern of relationships between variables, especially because the region has recently experienced economic opening due to regional infrastructure improvements.

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Based on the existing research gaps, this study has several novelties. First, analyzing real economic growth in coastal areas economically through the fiscal role of the government as explained by the variables of General Allocation Funds, Investment, Inflation, and Labor Force Participation Rate. Second, using updated time series data where this period is very important because it includes the full implementation and integration phase of the national strategic project, the Southern Cross Road. Previous studies published a few years ago did not consider these developments, as secondary data were still unavailable due to the global pandemic and the suboptimal road construction phase. Third, the difference lies in the reconstruction of the regional production function model specification. Using a panel data econometric approach with a fixed effects model, this context is interesting for observing strong, new, and highly representative regional economic developments related to the future development of the southern corridor in East Java.

Method

This study uses quantitative methods to analyze the extent of the causal relationship between macroeconomic variables. The object of this research is 8 Southern Coastal Districts in East Java, with an annual time series for a ten-year period from 2015-2024, resulting in a sample of 80 observations. This period is representative for capturing the dynamics of regional economic independence based on the economic dynamics generated by the accelerated development of coastal area infrastructure. Using secondary data through the observation of publication reports from the Central Statistics Agency, DJPK budget realization reports, and BKPM regarding investment realization data.

The subject of this research analysis uses the dependent variable, namely GRDP at constant prices measured in millions of rupiah, to observe the real economy. Independent variables include the General Allocation Fund (GAF), which is a fiscal transfer fund from the central government to the regions used for infrastructure development costs (billions). Investment is measured by the total amount of foreign and domestic investment that enters the eight southern coastal areas from 2015-2024 (billions). Inflation is the rate of price increase that continues over a long period (percent). The labor force participation rate based on a minimum age of 15 years explains the quality of the workforce in supporting economic growth in a region (percent).

$$\text{LNY} = a + \beta_1 \text{LNX}_1 + \beta_2 \text{LNX}_2 + \beta_3 \text{LNX}_3 + \beta_4 \text{LNX}_4 + \mu \quad (1)$$

Information:

Y = GRDP
X1 = General allocation fund
X2 = Investment
X3 = Inflation
X4 = LFPR

α = constant coefficient
 $\beta_1, \beta_2, \beta_3$ = Regression Estimation Parameters
 μ = Error

This model is used to observe the relationship between independent variables and dependent variables. This study uses the best model selection test. The testing concluded that the Fixed Effect Model was chosen because it can observe the intercepts of each district. Then, classical assumption tests were conducted to see if the data used were suitable for further testing, such as normality test, heteroscedasticity test, multicollinearity test, and autocorrelation test.

Result and Discussion

A. Statistics Descriptive Analysis

Data summaries that provide a description of the data, averages, and percentage changes in variables in each region. Based on this research, descriptive statistics explain information on the GAF, Investment, Inflation, and LFPR variables during the 2015-2024 period.

	GRDP	GAF	INVESTMENT	INFLATION	LFPR
Mean	33991046	1189327.	826350.9	3.018819	72.14413
Median	25925060	1110635.	215338.8	2.807445	71.77000
Maximum	79500890	1832794.	5044377.	6.395984	86.62000
Minimum	9019540.	714847.2	0.000000	0.586644	61.89000
Std. Dev.	20320306	330073.6	1176570.	1.476552	4.929580
Prob	0.021340	0.035211	0.000000	0.146253	0.054546

explaining the research objects based on sample and population data which is presented in figure 2.

Figure 2. Statistic Descriptive

The statistical description from 80 observations shows that the GRDP variable has an average of 33,991,046, a minimum of 9,019,540, a maximum value of 79,500,890, and a standard deviation of 20,320,306. This indicates the presence of GRDP variation in 8 districts in the southern coastal region. The general allocation fund with an average of 1,189,327 means that fiscal dependence is still relatively high. Investment reaching an average of 826,350.9 indicates that the influx of capital is expected to develop better after the infrastructure development in the region. Meanwhile, the average amount of inflation is 3.018819, indicating that the rise in goods and services is still considered safe, and the LFPR with an average of 72.14413 shows that labor force participation in the region is developing very well. Thus, the results of this analysis show significant differences in fiscal flows, capital flows, price increases of goods and services, and labor that affect the GRDP in the region.

B. Selection of The Best Model

This analysis, testing is necessary to select the estimation model to observe structural changes over a period of time.

1. Chow Test

Based on the Chow test result prob value of 0.0000 indicates it is less than the significance level of 0.05. The Fixed Effect Model is used because the approach yields more valid results, but further testing is still needed.

2. Hausman Test

Test result the prob value of 0.0000 indicates that it is < 0.05. Based on the Hausman test, the model suitable for use is the Fixed Effect Model.

3. Lagrange Multiplier Test

The Breusch-Pagan statistic has a p-value of 0.0000. The parameter comparison is well below 0.05, meaning this test empirically indicates that the panel data regression model has a significant random effect with the Random Effect Model.

According to the three tests, this study establishes the Fixed Effect Model as the final and most objective estimation method based on the Chow and Hausman test results for calculating GRDP growth in the Southern Coast of East Java.

C. Classical Assumption Test

Showing the equation of the hypothesis through normality, multicollinearity, autocorrelation, and heteroscedasticity tests[10].

1. Normality test

This test aims to determine whether the regression model's variables are normally distributed or not. The analysis tool for this test uses the Jarque-Bera histogram. The results show a Jarque-Bera value of the statistic 2.688581 with a prob value of 0.260725. The prob value is > 0.05, thus the hypothesis is approved that the variable's normal distribution. Therefore, this research can proceed because the data is suitable for further testing.

2. Heteroskedasticity test

This examination is carried out to see if the regression model has a variance that is not uniformly distributed and whether the residuals between individual variables differ from one another. In this study, the Glesjer method is used by transforming the main model's residual values into absolute residual values (abs resid), which are positioned as a new dependent variable to regress all independent variables.

The GAF variable is significant at 0.2368, the investment variable has a significance value of 0.6193, the inflation variable has a significance value of 0.0823, and the LFPR variable has a significance of 0.1284. The overall prob values for all variables are higher than 0.05. This means that the research model passed the heteroscedasticity test, allowing the next test to be conducted.

3. Multikolinearitas test

The test was conducted to see if there is a linear connection between the independent variables in the regression model with the criterion of coefficient values > 0.80 to indicate that the model does not experience multicollinearity. It shows no signs of multicollinearity because all variables have coefficient values far below 0.80, allowing the research to proceed.

4. Autokorelasi test

Testing is to verify there is a correlation between the variables over a period and variables in

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.92528	0.822570	14.49758	0.0000
LNGAF	-0.380430	0.095058	-4.002090	0.0002
LNINVESTMENT	0.019693	0.005487	3.589329	0.0006
INFLATION	-0.022785	0.005306	-4.293960	0.0001
LFPR	0.013121	0.003351	3.915446	0.0002
R-squared	0.992985	F-statistic		875.0289
Adjusted R-squared	0.991850	Prob(F-statistic)		0.000000

conducted whether correlation error term specific other the model.

According and Porter decision-

this test is based on the Durbin Watson result. The test result values show that $Dl\ 1.5337 < Du\ 1.7430 < Dw\ 1.8790 < 4-du\ 2.257$, and $4-dl\ 2.4663$. This indicates that the model is free from autocorrelation issues.

to Gujarati (2009), the making for

D. Hypothesis test

Several testing stages have been completed, resulting in the use of a fixed effects model in the regression model, as shown in the table 1 below.

Table 1. Fixed Effect Model

1. T-test

- a. The GAF variable with a t-statistic value of $-4.002 > 1.992$, and a partial test significance value of $0.0002 < 0.05$. The GAF variable has a negative and significant effect on the at Constant Prices GRDP value. This means hypothesis 1 is approve.
- b. The Investment variable with a t-statistic value of $3.589 > 1.992$, and a partial test significance value of $0.0006 > 0.05$. This indicates that the investment variable has a positive and significant effect on the Constant Prices GRDP value. Thus hypothesis 2 is approved..
- c. The Inflation variable with a t-statistic value of $-4.239 < 1.992$, and a partial test significance value of $0.0001 > 0.05$. This indicates that the inflation variable has a negative and significant effect on the Constant Prices GRDP value. This means hypothesis 3 is accepted.
- d. The LFPR variable with a t-statistic value of $3.915 > 1.992$, and a partial test significance value of $0.0002 > 0.05$. This indicates that the LFPR variable has a positive and significant effect on the Constant Prices GRDP value. This means hypothesis 4 is accepted.

2. F-test

Based on the FEM estimation results, the F-test prob has a value of 0.000000, which is smaller than the 5 percent significance level. Therefore, collectively, all independent variables, namely the GAF variable, investment, and inflation, significantly affect the GRDP at Constant Prices in the Southern Coastal Region of East Java.

3. Coefficient of Determination Test

Based on the Fixed Effect Model estimation results, an R-Squared (R^2) value of 0.99285 was obtained. This indicates that the variables GAF, Investment, Inflation, and LFPR can explain 99.28% of the variation in the At Constant Prices GRDP variable. The remaining 0.72% can be explained by other factors or variables not examined in this study.

E. Discussion

1. The Influence of General Allocation Funds on GRDP

Based on the research results, GAF has a negative impact on GRDP from 2015 to 2024. This means that if GAF increases, GRDP will decrease. This means that the southern coastal areas have a relatively high fiscal dependency on the central government due to low regional income and their inability to manage key sectors. In addition, a large portion of the GAF is also used for routine employe expenses, which does not provide a multiplier effect for the regional economy. Thus, GAF needs to be used more optimally and for local economic development to increase regional income. In line with a study on 20 Indonesian provinces that found the GAF variable does not affect GDRP [11]. This happens because the use of funds is only focused on routine expenditures, so it does not function optimally in supporting regional economic equity.

2. The influence of investment on GRDP

The findings of the study indicate that investing has a favorable effect on GRDP in the Southern Coastal Region of East Java during the period 2015-2024. Whereas when investment increases, it will impact the value of GRDP. The economic potential in the southern coastal region is capable of attracting both local and foreign investment. According to the idea of Harrod-Domar, which explains that capital accumulation is one of the keys to accelerating regional economic growth. Moreover, the development of Southern crossroad infrastructure can enhance accessibility, supporting other economic sectors as transportation costs for goods and services become more efficient. In line with the research that investment can influence expansion of the economy [8]. Strengthened which shows a significant influence of investment in driving economic growth in Central Java [12].

3. The impact of inflation on GRDP

The research findings indicate that the inflation variable has a negative impact on GRDP in the Southern Coastal Region of East Java for the period 2015-2024, thus hypothesis four is rejected. This is in line with the depiction of the inflation theory on the supply side (cost-push inflation). Where inflation in the region is decreasing, but overall purchasing power is declining and production input costs remain the same or are increasing. Therefore, household consumption is slow, which also hampers GRDP growth. The results are in line with the previous research that inflation has a substantial and

detrimental impact on GRDP[13]. Reflecting the vulnerability of the local economy in the Southern Coastal region to price shocks. The findings of this research emphasize that GRDP growth through infrastructure development is crucial for controlling inflation and maintaining the price stability of essential goods for the community [14].

4. The influence of the labor force participation rate on GRDP

The research results show a positive influence of the LFPR variable on the GRDP during the period 2015-2024. The high participation of the community as workers in the tourism, fisheries, and agriculture sectors indicates that human capital is able to function optimally in managing the regional economic sectors. According to the previous research where LFPR has a positive and significant impact on GRDP in North Sumatra Province [7]. Then it is also supported that LFPR influences growth in Lampung [15]. When job opportunities increase each year, the input of labor also rises, thereby driving the growth of GRDP. In line with Gary S. Becker's theory that the decision of residents to work is influenced by infrastructure and economic potential, when wages increase in the economy, the supply of labor also rises.

Conclusion

Based on the discussed research findings, several conclusions were drawn, including: General allocation funds have a negative impact on GRDP. This happens because fiscal management in the southern coastal region is not yet optimal, so the benefits are not directly felt in the economic wheel. Investment and LFPR with GRDP have a positive impact in the southern coastal region. This happens because high investment can expand economic activities, thereby increasing GRDP growth. The increase in investment will enhance the production capacity of goods and services, which in turn will raise the value of regional GRDP. A high labor force participation rate (LFPR) reflects that human capital, both in terms of quality and quantity in a region, can significantly enhance economic activity, thereby also increasing GRDP. Inflation has a negative impact on GRDP in the southern coastal region. The government needs to pay attention to the flow of logistics by better utilizing access to the southern intersection to reduce production costs and make it more efficient. High inflation will slow down economic growth. This study has limitations as it uses a 10-year period and 8 classified districts. Macroeconomic data shows differences in equity across each region. Therefore, it is recommended that future researchers add additional variables such as government spending, infrastructure, or COVID-19, which can affect the growth of GRDP in the Southern Coastal region of East Java.

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