



Analysis of the Influence of Economic Factors on Crime Rates in East Java Regencies/Cities in 2017–2021

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Abstract. The purpose of this study is to analyze the effect of GRDP per capita, open unemployment rate, poverty, and human development index (HDI) on crime rates in East Java Regency/City in 2017–2021. The analysis method used is panel data regression analysis. The data used is secondary data from the publication of the Central Statistics Agency (BPS) of East Java in 2017–2021. The results showed that the best model chosen was the Fixed Effect Model (FEM). The results of the t-test show that the variables of GRDP per capita and the open unemployment rate have a negative and significant influence on the crime rate, the human development index (HDI) has a positive and significant influence, while the poverty variable does not affect the crime rate in East Java in 2017–2021. The R² value of 0.816094 means that 81.61% of the variation in the crime rate variable can be explained by the variables of GRDP per capita, open unemployment rate, poverty, and human development index (HDI). The remaining 18.39% is explained by other free variables that were not included in the research model.

Keywords: Crime · GRDP Per capita · Open Unemployment Rate · Poverty · Human Development Index

1 Introduction

In the era of globalization competition which is quite sharp, it results in a fairly high gap in economic growth. This gap can occur between countries as well as within a country itself. Unequal distribution of income results in the emergence of criminal acts in society.

Criminality is one of the inevitable problems in various regions in Indonesia. According to Emilia Susanti and Eko Raharjo, criminality harms all parties, including the perpetrators themselves. Such losses refer to material (economic) losses and psychological losses (the state of the psyche of society polluted by criminal morality) [1].

According to the Central Statistics Agency [2], the crime rate in 2021 was the highest in North Sumatra at 36,635 cases, followed by the DKI Jakarta and surrounding areas at 20,370 cases, and East Java at the third position at 19,816 cases. Meanwhile, the lowest crime rate occurred in West Sulawesi with 1,704 cases, followed by North Kalimantan with 859 cases, and North Maluku with 600 cases.

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Septaria and Zulfaridatulyaqin [5] explain that the rise of criminality in the current era of globalization and modernization is motivated by: (1) Patterns of the behavior of individuals, groups, or organizations that cause material, physical, or psychological harm to society. (2) Patterns of the behavior of individuals, groups, or organizations that are contrary to the moral sentiments of society.

According to Simadjuntak, many factors can cause a person to commit criminality. These factors are demographic, ecological, geographical, economic, and social factors. Economic factors are one of the influential factors in the increasing crime rate, such as economic growth, unemployment, poverty, and population density [6]. The lower a person's economy, the greater the probability of committing a criminal act [7].

Becker was the first researcher to include economic factors in the crime model. It is explained that punishing attitudes alone are not enough to reduce criminality, because crime is related to economic activity, which in criminal acts takes into account the costs and income earned. Criminalities that are strongly influenced by economic factors are property crimes such as fraud, theft, and robbery [8].

The purpose of this study is to analyze the effect of GRDP per capita, open unemployment rate, poverty, and human development index (HDI) on crime rates in East Java Regencies/Cities in 2017–2021.

2 Literature Review

2.1 Definition, Causes, and Countermeasures of Criminality

Criminality comes from the word “crime” which means crime. It is called criminality because it indicates an act or behavior of a crime. Criminality as a social phenomenon affects various aspects of social life, such as political, economic, and socio-cultural, as well as issues of defense and security of the state. Criminality is defined as an act that is considered very detrimental to society, both material losses and losses or risks to human life and health [9].

According to criminologists, criminality is human behavior that violates norms or criminal laws that are detrimental, irritating, and inflicting victims so that they cannot be allowed. A characteristic of criminality is an act that endangers the physique and property of others. The criminality of physical harm in the form of murder, violence, abuse, slavery, narcotics, and illegal drugs. The criminality that threatens other people's property in the form of deprivation of property rights, fraud, embezzlement, and corruption [10].

To date, there has not been a single theory that can accurately explain the causes of criminality committed by individuals. However, in the criminology literature, several factors are very often associated with criminality [11]. According to Abdulsyani [1], the factors causing criminality include: (1) Internal factors that include special traits and general properties. Special traits, that is, the psychological state of a person, include madness, emotional strength, mental weakness, and confusion. While the general traits can be grouped into several categories, namely age, gender, the position of the individual in society, education of the individual, entertainment of the individual or recreational issues. (2) External factors, namely factors related to the environment outside of oneself

(external), especially factors related to the emergence of crime, including: economic factors (price changes, unemployment, urbanization), religious factors, educational factors and film factors (including television).

Socialist theory posits that crime arises due to the presence of unbalanced economic pressures in society. This theory illustrates that to fight crime there must be an improvement in the economic sphere. In other words, increased prosperity, balance, and social justice will reduce the occurrence of crime [12].

According to Hoefnagels, efforts to combat criminality can be pursued through [13]: (1) Preventive without punishment or punishment, for example by applying the maximum punishment to the perpetrator of the crime, to indirectly provide prevention (prophylaxis). (2) Influencing views of society on crime and punishment or influencing people's views on criminality through the mass media. For example, through the socialization of laws that provide knowledge about crimes and the threat of punishment. (3) Criminal application or application of criminal law. For example, the application of article 35 of the Criminal Code with the threat of a maximum sentence of 8 years for both prosecution and conviction.

2.2 Factors Affecting Criminality

Several factors influence the increase in the crime rate, namely:

(1) GRDP per capita

The relationship between per capita income and criminality in the concept of benefits and costs proposed by Omotor [14] suggests that an increase in per capita income brings a negative relationship with criminal acts. Lifestyle expectations of people with per capita income growth will increase so that crime commitments will decrease.

(2) Open unemployment rate

Unemployment is a condition where a person does not have a job or source of income so he cannot meet his basic needs in decent living conditions. This will cause criminal problems that lead to crime. Therefore, there is a close relationship between the problem of crime and the problem of unemployment, that is, the higher the unemployment, the higher the crime cases [15]. High unemployment also triggers crime. The more unemployed, the more likely the crime to occur [9].

(3) Poverty

Poverty is a factor that influences the occurrence of crime because to meet the needs of their lives, people will tend to do whatever it is even if they commit a crime [9]. Todaro dan Smith [16] argues that the poorer a person is, the farther away they are from the facilities that can make them prosperous. This increases the likelihood of people getting involved in crimes to save their lives.

(4) Human development index (HDI)

The human development index is an important effort that can be done to reduce the crime rate. Better quality of human resources can increase a person's chances of getting a job with a higher income, thus affecting the well-being of life and reducing crime [17].

2.3 Previous Research

Febriani [17] conducted a study entitled “The Influence of Human Resource Aspects on the Number of Crimes in South Sumatra in 2019”. The research method used is multiple linear regression analysis. The results showed that the number of poor people, open unemployment rate, population density, and GRDP had a positive and significant effect on crime at $\alpha = 0.05$, while the HDI variable had a negative influence on crime at $\alpha = 0.05$.

Kosmaryati et al. [18] conducted a study entitled “Factors Affecting Criminality in Indonesia in 2011–2016”. This study used panel data regression analysis with a selected model, namely the Random Effect Model (REM). The results stated that the variables of the number of unemployed, domestic violence cases, narcotics cases, embezzlement cases, and fraud cases had a positive and significant effect on the number of crimes at $\alpha = 0.05$.

Fajri and Rizki [19] conducted a study entitled “The Effect of Economic Growth, Population Density, and Unemployment on Aceh’s Urban Crime”. The data analysis method in this study is panel data with a Generalized Least Square (GLS) approach. The results showed that the variables of unemployment and population density had a positive and significant effect, while the variable GRDP per capita had a negative and significant influence on crime $\alpha = 0.05$.

Omotor [14] conducted a study entitled “Demographic and Socio-Economic Determinants of Crimes in Nigeria (A Panel Data Analysis)”. Results show that the highest crime rates, per capita income, and population density correlate positively and significantly with all forms of crime.

2.4 Research Hypothesis

According to Syahrudin and Salim [20], a hypothesis is a conjecture or temporary answer to the formulation of a research problem. This study hypothesizes that it is suspected that the GRDP per capita, open unemployment rate, poverty, and human development index have a significant effect on the crime rate in East Java Regency/City in 2017–2021.

3 Research Methods

3.1 Data Types and Sources

The data used in this study is secondary data in the form of panel data. Gujarati dan Porter [21] defines panel data as a combination of time series data and cross-section data. The data used in this study came from the publication of the Central Statistics Agency (BPS) of East Java which consisted of data on crime rates, GRDP per capita, open unemployment rate, poverty, and human development index (HDI) in each regency/city in East Java in 2017–2021 [22].

3.2 Data Analysis Model

To estimate the effect of GRDP per capita, open unemployment rate, poverty, and human development index (HDI) on crime rates in East Java Regencies/Cities in 2017–2021, panel data regression analysis with econometric models (estimators) is used as follows [21]:

$$CRIME_{it} = \beta_0 + \beta_1 GRDP_{it} + \beta_2 UE_{it} + \beta_3 POV_{it} + \beta_4 HDI_{it} + \varepsilon_{it} \quad (1)$$

Information:

CRIME : Crime Rate (case)

GRDP : GRDP per capita (rupiah)

UE : Open Unemployment Rate (%)

POV : Poverty (rupiah)

HDI : Human Development Index (%)

β_0 : Constant

$\beta_1 \dots \beta_4$: Independent variable regression coefficient

ε : Error term

i : Cross section (38 Regencies/Cities)

t : Time Series (2017-2021)

There are four steps in estimating the econometric model in Eq. (1), namely:

(1) Estimating panel data model parameters

a. Pooled Least Square (PLS)

This technique is a collection of cross-sectional and time-series data as a single unit, without taking into account the difference in time and units (individuals).

b. Fixed Effect Model (FEM)

This technique uses dummy variables to identify differences between individuals.

c. Random Effect Model (REM)

This technique is a calculation that errors may correlate along cross-sections and time series.

(2) Choosing the best estimator

a. Chow test

The Chow test is used to select an estimated Pooled Least Square (PLS) or Fixed Effect Model (FEM) model. H_0 Chow test: the estimated model is Pooled Least Square (PLS), and its H_A : the estimated model is the Fixed Effect Model (FEM). is accepted if the value of probability or statistical empirical significance is $F > \alpha$; H_0 is rejected when the probability value or statistical empirical significance of $F \leq \alpha$.

b. Hausman test

The Hausman test is used to select a Fixed Effects Model (FEM) or Random Effects Model (REM) estimated model. Hausman test H_0 : the estimated model is the Random Effects Model (REM) and its H_A : the estimated model is the Fixed Effects Model (FEM). H_0 is accepted if the value of probability or statistical empirical significance $\chi^2 > \alpha$; H_0 is rejected when the value of probability or statistical empirical significance $\chi^2 \leq \alpha$.

(3) Test the validity of influence in the selected estimator

The influence validity test (t-test) is used to test the significance of the influence of each independent variable on the dependent variable individually. Test t states $\beta_i = 0$: the variable independent of i has no significant effect; H_A states $\beta_i \neq 0$: the independent variable to i has a significant influence. H_0 is accepted when the statistical t probability value is $> \alpha$; H_0 is rejected when the statistical t probability value is $\leq \alpha$.

(4) Test the goodness of the model with the selected estimator

a. Test the existence of the model (Test F)

The model existence test or F Test is performed to determine whether all independent variables have a joint effect on the dependent variables. This study uses four independent variables so that the formulation of the test hypothesis is $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$, ,, which means that the entire regression coefficient is zero so that together the GRDP per capita, open unemployment rate, poverty, and human development index (HDI) do not affect the crime rate. Meanwhile, $H_A: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$, ,, which means that there is at least one regression coefficient that is not zero, so together, the GRDP per capita, the open unemployment rate, poverty, and the human development index (HDI) affect the crime rate. H_0 is accepted when the probability of $F > \alpha$; and H_0 is rejected if the probability of $F \leq \alpha$.

b. Coefficient of Determination (R^2)

The coefficient of determination R^2 is an important indicator in regression because it can be used to find out whether the estimated regression model is good or not. The value of the coefficient of determination ranges from 0 to 1. If the value of the coefficient of determination is 0 it means that the variation of the dependent variable cannot be explained by the independent variable in the model. Conversely, if the value of the coefficient of determination is equal to 1 means that the variation of the dependent variable as a whole can be explained by the independent variable in the model.

4 Results and Discussion

4.1 Data Analysis Results

Data processing with panel data analysis using the Chow test and Hausman test to choose the best model between Pooled Least Squares (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM).

Chow Test. Based on the results of the chow test, the probability value or statistical empirical significance of F is 0,0000 ($< 0,01$), so H_0 is rejected. In conclusion, the estimated model is a Fixed Effect Model (FEM).

Hausman Test. Based on the results of the Hausman test, the probability value or statistical empirical significance of χ^2 is 0,0000 ($< 0,10$), so H_0 is rejected. In conclusion, the estimated model is the Fixed Effect Model (FEM).

From the Chow test and the Hausman test, the Fixed Effect Model (FEM) was selected as the best-estimated model. The results of the complete estimation of the Fixed Effect Model (FEM) are presented in Table 1.

Table 1. Complete estimation results of the Fixed Effect Model (FEM)

$$\begin{aligned}
 \overline{CRIME}_{it} = & -7519.010 - 0.0000361GRDP_{it} - 172.3132UE_{it} \\
 & - 0.001431POV_{it} \\
 & + 154.7836HDI_{it} \\
 & \quad (0.0085)^* \quad (0.0000)^* \quad (0.5831) \\
 & \quad (0.0915)^{***}
 \end{aligned}$$

R² = 0.816094; DW = 1.422600; F = 16.01849; Prob. F = 0,0000

Source: Processed secondary data.

Information:

- * Significant at $\alpha = 0,01$
- ** Significant at $\alpha = 0,05$
- *** Significant at $\alpha = 0,10$

Table 2. Effect Validity Test Results

| Variable | t | Sig. t | Conclusion |
|----------|--------|--------|------------------------------------|
| GRDP | -2.668 | 0.009 | Negatively affects $\alpha = 0,01$ |
| UE | -5.412 | 0.000 | Negatively affects $\alpha = 0,01$ |
| POV | -0.550 | 0.583 | No effect on $\alpha = 0,10$ |
| HDI | 1.699 | 0.092 | Positive effect on $\alpha = 0,10$ |

Source: Processed secondary data.

4.2 Effect Validity Test (t-test)

The results of the influence validity test can be seen in Table 2.

4.3 Model Goodness Test

Model Existence Test (Test F). Based on Test F Results, the statistical F probability in the estimated model is 0.0000 which means $< 0,01$; then H_0 is rejected. This means that per capita GRDP, open unemployment rate, poverty, and human development index (HDI) together affect the crime rate in East Java districts/cities in 2017–2021.

Coefficient of Determination (R²). Based on the results of the estimates in Table 1, it is known that the coefficient of determination (R²) is 0.816094; this means that 81.61% of the variation in the variable crime rate in East Java in 2017–2021 can be explained by the variables of GRDP per capita, open unemployment rate, poverty, and human development index (HDI). While the remaining 18.39% is explained by other free variables that are not included in the model.

4.4 Economic Interpretation

The crime rate in the 2017–2021 period is influenced by the variables of GRDP per capita (GRDP), open unemployment rate (EU), and human development index (HDI). Meanwhile, the poverty variable (POV) does not affect the crime rate (CRIME).

Based on Table 1, GRDP per capita negatively affects crime in East Java Regency/City. Increasing GRDP per capita can reduce crime. An increase in GRDP per capita means an increase in a person's welfare or productivity. Increasing one's welfare or productivity can reduce the crime rate [23]. This is to Anata's research [15], where an increase in GRDP per capita tends to reduce the crime rate in Java from 2007 to 2012. Thus, the hypothesis that states the variable GRDP per capita has an effect and is significant on the supported crime rate.

Based on the results of estimates (Table 1), it appears that the open unemployment rate has a negative and significant effect on the crime rate in East Java Regency/City in 2017–2021. The fewer unemployed, the higher the crime rate. This is due to several factors including the implementation of community activity restrictions (PPKM) due to the Covid-19 virus and new university graduates tend to be selective in choosing jobs. That is why these graduates are unemployed and do not work at all. This condition is different from that of low-educated people. Generally, they accept any job that is important to meet the needs of daily life. They don't think about their qualifications and only think about how to make money. This research is in line with the research of Rahmalia et al., [24] that rising unemployment will reduce the crime rate in Indonesia. Unemployment has a significant negative impact on crime. Thus, the hypothesis of this study states the variable open unemployment rate has an effect and is significant on the supported crime rate.

Based on the results of estimates (Table 1), the human development index (HDI) has a positive and significant influence on the crime rate. This is in line with research by Nadilla and Farlian [25] which explains that education has a positive and significant effect on criminality. Becker's research [8] states that a high human development index (HDI) should teach individuals to be better. Criminality occurs because a person with higher education can take certain opportunities so that there is a loophole for a person to become a criminal, such as being a hacker. Thus, the hypothesis that states the human development index (HDI) variable has a positive and significant effect on the number of supported crimes.

Based on the results of the estimates in Table 1, shows that the poverty rate does not affect the crime rate. This is because poverty is not the cause of the crime problem. After all, high case resolution rates and security can minimize the occurrence of crime in the area. The rising poverty rate forces people to work harder to make ends meet and reduce crime. This research is in line with research conducted by Winda and Sentosa [26] that the poverty rate does not affect crime in Indonesia. A poor person can still make ends meet with help from the government or his job even though wages are low so the poverty factor alone without being followed by other factors is not able to cause someone to commit a crime.

5 Conclusion

Based on the results of the regression analysis of panel data (fixed effect model) regarding the factors that affect the crime rate in the Regency/City of East Java Province during the period 2017–2021, the following conclusions can be drawn: (1) The results of the selection of the cross-section panel data regression model prove that the fixed effect model (FEM) is the best. (2) The results of the influence validity test prove that the GRDP per capita (GRDP), and the Open Unemployment Rate (EU) affect crime at the level of $\alpha = 0.01$, and the human development index (HDI) affects crime at the level of $\alpha = 0,05$. Meanwhile, poverty has no effect on crime with $\alpha = 0,10$. (3) The results of the existence test (test F) prove that the model used exists or together the variables of GRDP per capita, open unemployment rate, poverty, and human development index (HDI) affect the crime rate in the Regency/City of East Java Province in 2017–2021 at the level of $\alpha = 0,01$. (4) Coefficient of determination (R²) of 0.816094. This means that 81.61% of the variation in the Crime Rate variable can be explained by the variables of GRDP per capita, open unemployment rate, poverty, and the Human Development Index (HDI). While the remaining 18.39% is explained by other free variables that are not included in the model.

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