

Improving the Human Development, Reducing Poverty and Promoting the Economic Growth: A Sustainable Development Strategy

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Citations: Reniati, R., Wahyudin, N., & Akbar, M.F., (2023). Improving the Human Development, Reducing Poverty and Promoting the Economic Growth: A Sustainable Development Strategy. *International Journal of Finance, Economics and Business*, 2(3), 246-257.

Received: 2 June 2023

Revised: 8 Sept 2023

Accepted: 17 Sept 2023

Published: 30 Sept 2023

Abstract: This study analyzes the macro-relationship between three main variables, namely, poverty, the human development index, and economic growth. This study uses the Vector Autoregressive/ Vector Error Correction Model. The variables measured in this study included household income per capita, community education level, poverty, and economic growth. This research was conducted using a quantitative method by capturing information from quantitative data. Meanwhile, the quantitative data were obtained from official publications of government agencies and analyzed using panel data regression. This study used the stationarity test and cointegration test. The study's results concluded that economic growth was affected by the human development index. The human development index affects poverty. Also, the poverty affects economic growth. Thus, a unidirectional causality existed between the human development index, economic growth, and poverty.

Keywords: household income per capita; community education level; poverty; economic growth.



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1. Introduction

Economic growth is one of the leading indicators that is always prioritized in development planning and implementation. It is because economic growth is correlated with per capita income. Economic growth is also vital in reducing poverty and creating more resources essential for human development (Wang et al., 2018). Economic development has taken the form of literature as a process that includes various micro and macro factors such as inflation, income, education, health, and the environment (Doğanalp et al., 2021). Economic growth aims to develop the economy and reduce poverty (Amar et al., 2022). In addition, economic growth indicates economic development in many fields. In his theory, Kuznets (1971) stated that economic growth is a long-term increase in a country's ability to provide more economic goods to its population. This ability grows according to technological advances and the institutional and ideological adjustments it requires (Harahap et al., 2020).

Regional development has a goal to prosper the community. For achieving this goal, a regional development plan is needed. The planning in question is planning that is carried out evenly throughout the region and must be felt by everyone without exception. Development planning can be done through human resources or community development in an area (Mubarak & Nugroho, 2020). Developing countries such as Indonesia hope for stable economic growth, whereby these countries are expected to overcome the problems of poverty, unemployment, health, and education and improve people's welfare. In other words, the economic growth of a country, especially a developing country, will have a multiplier effect on other fields. Therefore, economic growth is the main priority of a country to prosper its population (Haironi & Mariah, 2011). Small, medium enterprises represent the people's economy, which reaches 99% of the total number of business actors in Indonesia. So that when this sector develops well, the people's economy will directly prosper (Reniasi et al., 2019).

Economic growth is an increase in gross domestic product (GDP) or real gross national income (GNI). In theory, economic growth is the development of activities in the economy that cause the goods and services produced in society to increase. For a long time, economists have analyzed the essential factors influencing economic growth. The factors that influence economic growth are the Human Development Index and the poverty rate. The improvement and distribution of the Human Development Index and the reduced number of poor people will accelerate economic growth (Sudirman & Hapsara, 2021).

Economic growth is related to an increase in a country's production or an increase in a country's per capita income. Therefore, economic growth is closely related to gross domestic product (GDP) or gross regional domestic product (GRDP) if it is within the region's scope. Several studies and research results have shown that the HDI, economic growth and poverty are closely related. Dent (2008) stated that dynamic economic growth has dramatically reduced poverty. It may be possible to encourage broader economic growth to reduce poverty by redressing the two barriers if they are connected (Fadul, 2019). The number of people struggling to live on \$1 or less a day has fallen from 900 million in 1990 to 600 million today. It can be interpreted as increased education, better health, longer life, and more significant opportunities. The literature has shown that poverty has a negative impact on investment and GDP growth, especially when financial markets are not well-developed (Strønen et al., 2019).

Poverty is one of the global problems faced by many countries in the world, including Indonesia. In the Sustainable Development Goals (SDGs), poverty alleviation is an issue that receives serious attention (Strønen et al., 2019). Poverty is also a complex problem influenced by various interrelated factors, including community income, unemployment, health, education, access to goods and services, geography, gender, and environmental location (Novriansyah, 2018). Poverty has multiple interrelated effects, so a lack of access to resources can affect health status, life expectancy, security, education, and relationships (Danaan, 2018). The multidimensional and complex nature of poverty guides the selection of the correct worldview for analyzing poverty (Gweshengwe & Hassan, 2020). World Bank (2014) states that poverty is a deprivation of welfare and has many dimensions. These include low incomes and the inability to acquire essential goods and services necessary to survive with dignity (Olopade et al., 2019). Poverty is multidimensional, meaning that because the needs of every human being are diverse, poverty also has many primary elements in the form of poor assets and skills and secondary aspects in the form of being poor in social networks, financial resources, and information and others (Imanto et al., 2020). Sastraningsih et al. (2020) examined the impact of economic growth on reducing the number of poor people. She found that economic growth significantly affected the decline in the number of poor people, although with a relatively small magnitude, such as inflation, population, and shares of the agricultural and industrial sectors. In addition, Sjafi'i & Hidayati (2009) stated that the availability of quality human resources is essential for sustainable economic development.

Kamfose & Agila (2023) also studied the impact of investment in human resources on poverty. Urban and non-agricultural high-income households experienced an increase. In contrast, other households experienced a decrease in the poverty index. Investment in human resources for education can reduce poverty incidence, depth, and severity, except for upper-class non-agricultural households in the village, not the labor force in rural areas. Human development is about realizing human potential, what humans can do, and the freedom to make real-life choices (Ladi et al., 2021). The success of the development process is mainly evidenced by the improvement in the quality of human development in an area as measured by the achievement of the Human Development Index (HDI). The Human Development Index is a measure of the impact of regional development performance, which has vast dimensions because it shows the quality of the population of an area in terms of life expectancy, education, and decent living standards (Sudirman & Hapsara, 2021).

Meanwhile, according to Statistics Indonesia, poverty is seen as an economic inability to meet basic food and non-food needs measured in terms of expenditure; thus, poor people are residents with an average monthly per capita expenditure below the poverty line (Andiny & Mandasari, 2017). The Human Development Index (HDI) is now widely used as an indicator of the state of development of a country and as a means of evaluating human happiness (Ladi et al., 2021). Human development in Indonesia is synonymous with poverty reduction because the main asset of the poor is their manual work. The Human Development Index (HDI), developed by Adedokun (1999), measures living standards and provides a valuable tool for the comparative evaluation of countries in terms of several indicators, including education, literacy, average life expectancy (LE), and quality of life (Gökmenoğlu et al., 2018). The Human Development Index (HDI) is one of the most widely used and referenced indices for assessing sustainable development and ranking different countries (Jin et al., 2020). The HDI is an annual indicator to compare and show changes in living standards (through fundamental indicators of human development characteristics) in different states (Yumashev et al., 2020).

Locally, (strategic) urban sustainability can be described as the facilitation and coordination between formal and functional strategies, such as sustainable land use (density and intensity) and investment in education. Health means more to them than to the rich (Ladi et al., 2021), sustainable transport and integration, in addition to cyclic resource management (Müller-Eie & Bjørnø, 2017). Sustainable development in the social field is related to customs, values, and human and institutional relationships. Economically, sustainable development involves allocating and distributing resources, while in the ecological sector, it involves economic and social contributions and their effects on the environment and its resources (Luckin et al., 2017). Sustainable competitive advantage is a long-term competitive advantage that does not disappear as the environment changes (Kitsios et al., 2020). According to Fazio & Modica (2018) the principles of "sustainability" determine how to find solutions, emphasizing new ethical dimensions, both "horizontal" (equality, social justice, equal opportunity to access resources, independence from external political/economic contexts, etc.) and "vertical" (responsibility to future generations). Thus, decision-makers must choose the right sustainability strategy to align with the business strategy (Kitsios et al., 2020).

In 2018, the HDI values of cities and regencies in the Province of Bangka Belitung Islands were still not evenly distributed. Pangkalpinang City was an area with the highest HDI level of 77.43. It was attributed to the adequate education and health facilities available in the city. Furthermore, West Bangka and Central Bangka Regencies had HDI values of 68.68 and 69.52, respectively. The regency that had the lowest HDI level was South Bangka. The study results revealed that education and health factors were still the main issues in the South Bangka Regency. Certain social conditions, such as early marriages, were the main problems in the area. Early marriages have reasonably broad impacts, including the drop-outs of married couples. The pregnancy conditions accompanying early marriages are still hazardous because early-married couples are still too young, with the babies being faced with health risks from malnutrition because of a lack of commitment from the parents who are not good enough to care for children at this age. To get a clearer picture, consider the following Figure:

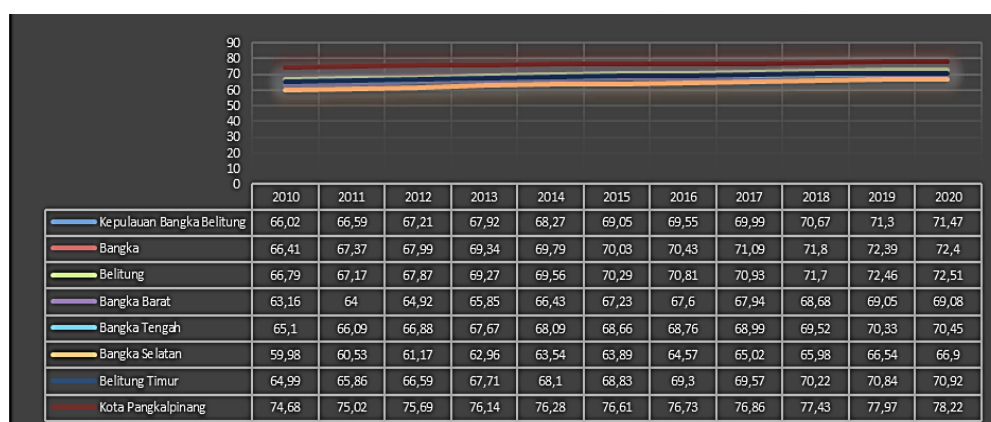


Figure 1. Distribution of HDI Values of the Province of Bangka Belitung Islands

Source: Statistics Indonesia Agency of the Province of Bangka Belitung Islands

Compared with other cities and regencies, the HDI value of Central Bangka Regency showed a slow development. In 2020, Central Bangka Regency occupied 5th out of all 7 regencies/cities, with an HDI value of 70.45. Look at the following Figure:

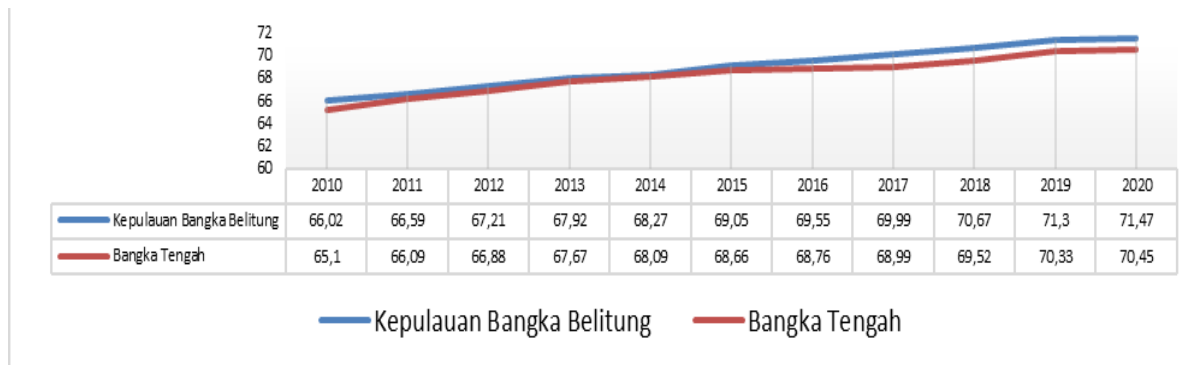


Figure 2. Comparison of the HDI Values of Central Bangka Regency and the Province of Bangka Belitung Islands
Source: Statistics Indonesia Agency of the Province of Bangka Belitung Islands

Figure 2 shows that Central Bangka Regency's HDI score has increased annually in the last 11 years, but it remained below the provincial average. The Human Development Index comprises three indicators, i.e., life expectancy, school expectancy, and average per capita expenditure. In terms of the first of the three, health facilities and human resources in the health sector in Central Bangka Regency have been improving. For this reason, life expectancy is a sufficient indicator to support the HDI of Central Bangka Regency. The data further show that Central Bangka Regency still has the potential to improve in the education sector. In 2020, the average number of years of schooling in Central Bangka Regency was 7.19 years, below the provincial average of 8.06. Meanwhile, in terms of per capita expenditure, the population of Central Bangka Regency had a reasonably good value compared to the average. However, the downward trend in the amount of expenditure experienced by the population in the last three years became quite an issue for the government concerning the level of economic growth. Central Bangka Regency experienced a gradual increase in life expectancy from year to year. Consider the following data.

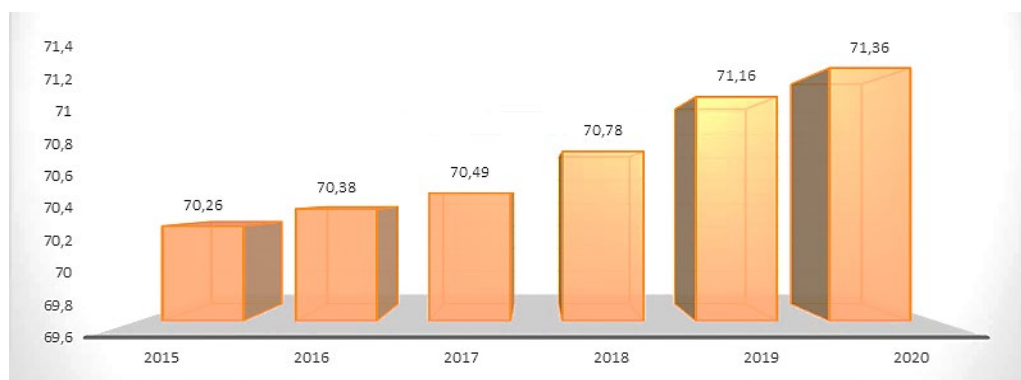


Figure 3. Life Expectancy in Central Bangka Regency
Source: [Abdi Putra & Wijayanto \(2022\)](#)

Figure 3 shows a continuous increase in life expectancy on a gradual basis. In 2020, life expectancy in Central Bangka Regency reached a rate of 71.36. This rate was quite good and higher than the life expectancy rate of the Province of Bangka Belitung Islands, i.e., 70.64. Data from the Health Office show increased medical personnel such as general practitioners, dentists, and specialists. In 2020, there were 75 general practitioners, 38 people at public health centers, 27 at hospitals, and ten partners. The health facilities provided in Central Bangka were generally adequate. In 2020, nine health centers were in the regency ([Abdi Putra & Wijayanto, 2022](#)). The education sector plays a crucial role in shaping a country's ability to absorb modern technology and develop the capacity for sustainable growth and development ([Espíndola et al., 2006](#)).

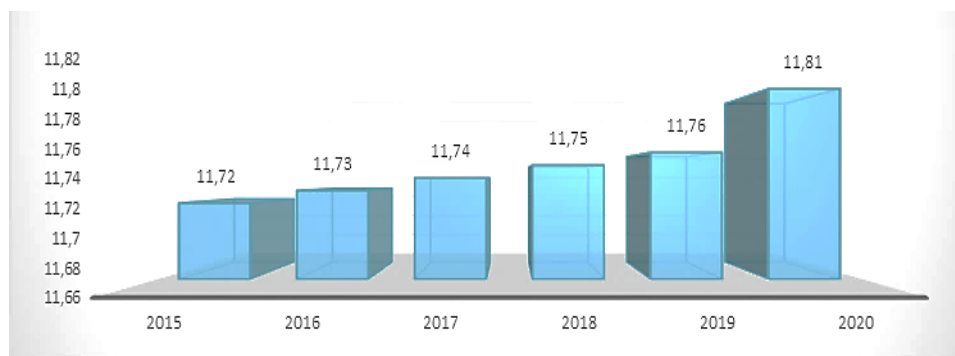


Figure 4. School Expectancy in Central Bangka Regency

Source: [Statistics Indonesia \(2021\)](#)

The school expectancy rate of Central Bangka Regency was classified as good, and it continuously increased gradually from year to year. School opportunities are related to the adequacy of the number of teachers, educational facilities, and infrastructure available in a region. Central Bangka Regency has adequately provided educational facilities and thus successfully driven up the school expectancy rate in almost 12 years of expected schooling (i.e., until high school graduation or the equivalent). Average expenditure per capita is the cost incurred for the consumption of all household members in a month, either for purchases, gifts, or own production, divided by the number of household members. The average monthly expenditure per capita of Central Bangka Regency in 2020 was Rp. 1,362,167.00, detailed as follows: Rp. 730,857.00 went to the food goods group, and Rp. 631,310.00 went to non-food goods group ([Statistics Indonesia, 2013](#)).

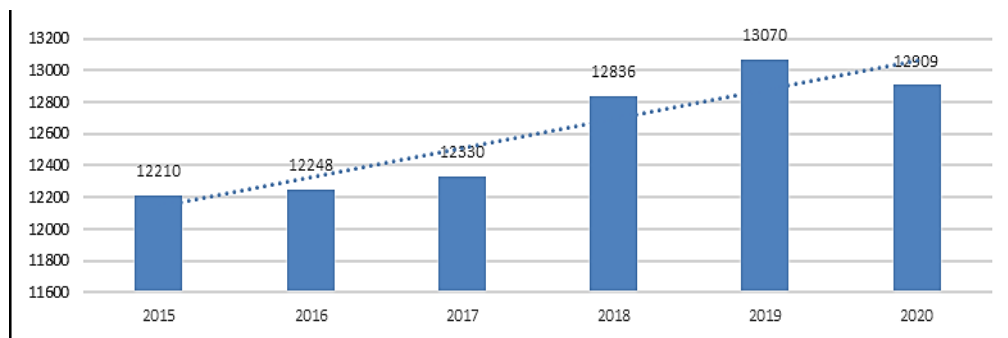


Figure 5. Monthly Average Per capita Expenditure in Central Bangka Regency (Rupiah)

Figure 5 shows per capita expenditure data generally. An increasing trend from year to year. However, in 2020, the per capita expenditure in Central Bangka experienced a slight decline due to reduced community activities and activity restrictions triggered by the COVID-19 protocol policy.

Table 1. Per Capita Expenditure

Expenditure	Goods Category		Total
	Food	Non	
400,000 - 499,999	-	-	-
750,000 - 599,999	400,000.00	230,393.00	631,293.00
600,000 - 749,999	-	-	750,000
- 999,999	360,044.00	882,040.00	100,000
1249,999	654,962.00	458,986.00	1,113,984.00
1,250,000 -	745,365.00	611,272.00	1,499,999
-	1,356,00,631,7	357,003,2700,000	-
	92,000.00		
Total	.	-	-

Expenditure	Goods Category		Total
	Food	Non	
521,995.002019	708,912.00	716,194.00	1,425,106.00
Total 2018	626,724.00	587,034.00	1,213,758.00

The low-income population group mostly spent on food. The higher the income, the lower the proportion of food expenditure from the total income. The data show that the total per capita expenditure of the people of Central Bangka increased in 2019 but decreased in 2020 due to the COVID-19 pandemic. This study conducted a macro analysis of the relationship between three main variables, i.e., poverty, the HDI, and economic growth, using VAR/VECM.

2. Materials and Methods

This research was conducted using a quantitative method. The variables measured in this study included household income per capita, community education level, poverty, and economic growth. Several hypotheses were tested to provide information for researchers to conclude. In the first hypothesis, the researchers intended to provide macro analysis information on factors that could affect poverty, including unemployment, average length of schooling, government expenditure, and life expectancy. Macro data also helped answer the second hypothesis by drawing up regression formulation and VAR/VECM as follows:

$$IPM_{it} = \beta_0 + \beta_1 IPM_{it-1} + \beta_2 PE_{it-1} + \beta_3 KM_{it-1} + e \quad (1)$$

$$PE_{it} = \beta_0 + \beta_1 PE_{it-1} + \beta_2 IPM_{it-1} + \beta_3 KM_{it-1} + e \quad (2)$$

$$KM_{it} = \beta_0 + \beta_1 KM_{it-1} + \beta_2 PE_{it-1} + \beta_3 IPM_{it-1} + e \quad (3)$$

VAR/VECM as follows: KM = Poverty, IPM = Human Development Index, PE = Economic Growth.

The stationarity test was the first step taken to obtain VECM estimation results. This test was carried out on the data of each dependent and independent variable. Static data were needed to influence the results of the VECM estimation test. Regression equations that have non-stationary variables will produce dubious estimates. Therefore, the stationarity test is significant to VECM estimation. The following is an explanation of the stationarity test for each variable.

2.1. Panel Data Estimation

2.1.1. Pooled Least Square (PLS)

This technique is for panel data; we must combine cross-section data with time series data (data pool) before making a regression. Then, this combined data is treated as a single unit of observation used to estimate the model with the OLS method. As a result of combining data, it cannot see the difference between individuals or time. It is certainly not suitable for using panel data. Both intercept and slope do not change between individuals and between times. It means that each individual has a different intercept. For overcoming this problem, two techniques are usually used to create a model from the panel data: the fixed effect method and the random effect method (Gujarati, 2022).

2.1.2. Fixed Effect Model (FEM)

The fixed effect model, which is the rationale, is the existence of variables that are not all included in the equation model, allowing an intercept that is not constant (in other words, this intercept may change for each individual). This method enables changes in α (intercept) at each i and t (region and time). To find out whether α (intercept) is constant on each i and t , or change, can be tested as follows:

$$F \{(RSS_{OLS} - RSS_{MET}) / RSS_{MET}\} \cdot \{(i - 1) / (i + t - 2)\}, \quad (4)$$

This value is compared with table F. If the calculation result is greater than F table, then we can reject the hypothesis, which means that α (intercept) is not constant at each i and t , or in other words, MET (Fixed Effect Method) is better (Gujarati, 2022).

2.1.3 Random Effect Model (REM)

In the Fixed Effect Model, the difference between individuals (regions) and or time is reflected through an intercept so that the intercept changes between individuals and between times. In the Random Effect Model, these differences are accommodated through errors from the model. This technique also considers that errors may correlate throughout the time series and cross-section. Given that two components contribute to the formation of errors, namely individuals and time, random errors in the Random Effect Model must be broken down into errors for individual components, time component errors, and combined errors. Thus, in general, the Random Effect Model (REM) equation is formulated (Gujarati, 2022).

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}; \varepsilon_{it} = u_i + v_t + w_{it}, \quad (5)$$

Where u_i = Component error cross-section, v_t = Time-series error component, w_{it} = Component error combined. The assumptions used for the error component are; $u_i \sim N(0, \sigma_u^2)$; $v_t \sim N(0, \sigma_v^2)$; $w_{it} \sim N(0, \sigma_w^2)$. The above equation shows that the Random Effect Model considers the average effect of cross-section and time series data represented in the intercept. Whereas random effect deviation for time series data is represented in v_t and the deviation for cross-section data is stated in u_i . It is known that: $\varepsilon_{it} = u_i + v_t + w_{it}$. Thus, the variance of the error can be written; $\text{Var}(\varepsilon_{it}) = \sigma_u^2 + \sigma_v^2 + \sigma_w^2$. It is certainly different from the OLS model applied to the data panel (pooled data), as described above, which has an error variant of; $\text{Var}(\varepsilon_{it}) = \sigma_w^2$. Thus, the Random Effect Method can be estimated by OLS if $\sigma_u^2 = \sigma_v^2 = 0$ (Gujarati, 2022).

2.2 Model Concepts and Specifications

The best and most efficient approach to research is to follow the model done by previous research. Researchers used the approach taken by Chi et al. (2010), Chi et al. (2013), Chi et al. (2015), Burke & Nishitaten (2015), Grabowski & Morrissey (2004), Wilson et al. (2009) and Kusdarwati & Hartono (2016). Using the price of real gasoline as the value of actual gasoline prices and the influence of inflation factors. However, the availability of data causes this research to be limited in studies and analysis. Then the model used in this study can be written as follows:

$$KCL_{i,t} = f(HB_{i,t}, Y_{i,t}) + \varepsilon_{i,t}, \quad (6)$$

Where $KCL_{i,t}$ = traffic accident for each region/ time. $HB_{i,t}$ = Real Gasoline Prices for each region/ time. $Y_{i,t}$ = Revenue based on the 2010 constant price of each region/ time. $\varepsilon_{i,t}$ = error term. Next equation (3) is transforms the function in the form of the natural logarithm equation as follows:

$$\ln KCL_{i,t} = \alpha_0 + \alpha_1 \ln HB_{i,t} + \alpha_2 \ln Y_{i,t} + \theta_i + \varepsilon_{i,t}, \quad (7)$$

Equation (4), the elasticity of the explanatory variables measures the strong influence on the variables seen. The sensitivity of the independent variable means that a little change will have a major impact on the dependent variable.

3. Results and Discussion

3.1. Descriptive statistics

Descriptive statistics have an explanation of the description of the observed data. Measurement of this picture is seen from the mean or mean value, maximum value, minimum value, standard deviation, and normal distribution with Jarque-Bera. The variables in this study have been transformed in natural logarithms. The results of descriptive statistics are as follows:

Table 2. Descriptive Statistics Results

	LKCL	LHB	LY
Mean	4.09	8.44	15.18
Max.	6.34	8.91	16.71
Min.	1.60	7.79	13.6
Std. Dev	0.93	0.37	0.77
Jarque-Bera	1.12	9.08	2.95
	[0.571]	[0.016]	[0.228]

Note: [] is the probability value.

3.2. Panel Regression of Traffic Accident

This study uses a panel model to analyze the effect of premium gasoline prices and per capita income on traffic accidents in 21 districts/cities in Aceh Province. The panel model has 3 types of estimation: Common, Fixed, and Random. Fixed and Random Estimates provide an overview for each region there are differences. In contrast to the common estimation, it is done by estimating OLS where all data is done the same (Gujarati, 2022). Selection of the best model estimates is needed to get the best results. These estimates are selected by the Chow / Redundant Test, Hausman Test, and LM Test. The results of the three estimates and the estimation of the corresponding model estimates in Table 3 are as follows.

Table 3. Results of Traffic Accidents in 21 Districts/Cities

Variable		CEM	FEM	REM
Constant	(α_0)	-8.83 (-4.98)**	-14.59 (-1.55)	-9.11 (-2.34)*
LHB	(α_1)	-0.13 (-0.85)	-0.13 (-1.29)	-0.13 (-2.46)*
LY	(α_2)	0.926 (12.2)**	1.30 (2.13)**	0.94 (3.85)**
District	(i)	21	21	21
Time	(t)	5	5	5
Observation		105	105	105
R2		0.595	0.87	0.31
Adj. R2		0.58	0.83	0.30
F-statistics		74.9 [0.000]**	25.27 [0.000]**	23.54 [0.000]**
Jarque-Bera		0.84 [0.654]	2.09 [0.351]	0.88[0.643]
Heteros LR	(i)	37.48 [0.014]**	-	-
	(t)	9.93 [0.979]	-	-
Durbin-Watson		0.46	1.43	1.17
CSD Test	BP LM	392.16 [0.000]**	393.37 [0.000]**	390.82 [0.000]**
Model Selection		Chi-Statistics	Conclusion	
Redundant Test	FE	120.49 [0.000]**	Fixed (H1)	
Hausman Test	RE	0.364 [0.83]	Random (H0)	
LM Test		75.95 [0.000]**	Random (H0)	

Note: () is t-statistics, [] is Probability, **, * is significant at the level 1% and 5%.

Table 3 shows 3 types of model estimates with panel data. The first estimate is common, explaining that HB has a negative and insignificant effect on traffic accidents, while Y has a positive and significant effect on 1 percent. Next, the second estimate is Fixed. The results show HB has a negative but insignificant effect,

and Y has a positive and significant effect of 1 percent on traffic accidents. Then the final estimation result is that Random explained HB has a negative sign and a significant 5 percent of traffic accidents.

Similarly, Y obtained a positive and significant effect of 1 percent on traffic accidents. The theoretical approach of the three models is very appropriate and the same as the results of the correlation test Table 2. But the selection of the model estimation is needed for testing—the redundant test between Common and Fixed. The Hausman test aims to choose between Random and Fixed and LM Test (Lagrange Multiplier) to choose between Common and Random. The Redundant Test with the Chi-Stat approach obtained a value of 120.49 and significant at the level of 1 percent, then concluded rejecting H0 so that the appropriate estimation model is Fixed. The next stage is the Hausman test. The Chi-stat results obtained were 0.364 but insignificant at the 5 percent level. Therefore, H0 is accepted, or the Random model is more appropriate. The third stage test, namely the LM test, shows Random is more suitable than the common because the Chi-stat is 75.95 and is significant 1 percent.

The estimation results using the Random model show that the price of premium gasoline has a negative and significant effect. As complementary goods for vehicles, the effect of rising prices of premium gasoline proves that it can reduce the number of traffic accidents. The results of the aesthetic explained that if there was an increase in the price of premium gasoline by 1 percent, there would be a decrease in the number of traffic accidents by 0.13 percent, assuming *ceteris paribus*. These results are consistent with those studied by Grabowski & Morrissey (2004), Chi et al. (2015) and Zhu et al. (2015). Previous research explains that gasoline is the main ingredient of a vehicle, but price considerations are an important benchmark (Wilson et al., 2015), but there must be an appropriate price measure. Low and cheap gasoline prices will change the view of the public, and will not always consider the consumption of other goods. Reflected in Figure 1 which shows the price of gasoline in 2015 is significantly lower than in other years.

The influence of per capita income on traffic accidents is positive and statistically significant. It explains that the increase in per capita income has a strong impact. If there is an increase of 1 percent, the number of traffic accidents increases by 0.94 percent, assuming *ceteris paribus*. These results also explain the elasticity of the LY variable is close to elastic, so per capita income is a sensitive variable if there is a change or increase. In line with Musso et al. (2013), finding the amount of income will affect a person in vehicle changes. Low gasoline prices encourage higher technology and potentially increasing the number of private vehicles.

4. Conclusions

This study concludes that effect of premium gasoline prices on traffic accidents is negative and significant. The increase in the price of premium gasoline was 1 percent, causing a decrease in traffic accidents by 0.13 percent assuming *ceteris paribus*. The price elasticity of premium gasoline is inelastic. Second, the effect of per capita income is positive and significant on traffic accidents. The increase in per capita income by 1 percent causes an increase in accidents by 0.93 percent assuming *ceteris paribus*. The elasticity of this variable is close to elastic. Based on the results of the previous conclusions and analysis, the suggestion is that, for the government, prevention of traffic accidents is very necessary. From the results of this study the effect of premium gasoline prices and per capita income is an important point. With prices at the current level of Rp. 6450 can reduce the number of traffic accidents and prices. The government needs to limit the number of private vehicles due to the increase in per capita income and the socialization of the transfer of private vehicles to public transportation. Furthermore, it is necessary to socialize the traffic police to the public so that they drive carefully on the road and pay more attention to security. The police continue to urge people to always be pioneers of traffic safety.

Author Contributions: Conceptualization, R.R. and N.W.; methodology, R.R.; software, R.R.; validation, R.R., N.W. and M.F.A.; formal analysis, R.R.; investigation, R.R.; resources, R.R.; data curation, R.R., N.W. and M.F.A.; writing—original draft preparation, R.R. and N.W.; writing—review and editing, R.R., N.W. and M.F.A.; visualization, R.R.; supervision, R.R.; project administration, R.R.; funding acquisition, R.R. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: The authors would like to thank Universitas Bangka Belitung, Indonesia, for supporting this research and publication. We also thank the reviewers for their constructive comments and suggestions.

Conflicts of Interest: The authors declare no conflict of interest.

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