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Analysis of the Export Volume of Temanggung Regency Against Inflation in Destination Countries

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Abstract
Purpose: This study examines the effects of GDP per capita, population, and inflation on the export value of Temanggung Regency to its main destination countries. This study aims to understand how these macroeconomic factors influence regional export performance.
Methodology: The study utilizes annual panel data from five main export destination countries during the period 2019-2022. The dependent variable is the export value of Temanggung Regency (in US$). The independent variables include the GDP per capita of Temanggung, the GDP per capita of the destination countries, the population of the destination countries, inflation in Temanggung, and inflation in the destination countries.
Results: The panel regression analysis indicates that the GDP per capita of the destination countries has a negative relationship with Temanggung's exports, although this effect is not statistically significant.
Conclusions: This study concludes that the export volume of Temanggung Regency between 2019 and 2022 was primarily driven by the destination countries' population size, which exerted a positive and statistically significant impact, thereby confirming that large-scale market demand is a more critical determinant for regional exports than the individual wealth of those nations.
Limitations: The study is constrained by a short observation period (2020-2 and a limited number of cross-sectional units (five destination countries), which may affect the generalizability of the results.
Contributions: The findings can support local government and trade stakeholders in designing export promotion strategies and prioritizing destination markets.

Keywords: *Destination-Country Population, Export Value, Macroeconomic Determinants, Panel Regression, Temanggung Regency*

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1. Introduction

The economy currently plays an important role in society. Therefore, it is not surprising that economic growth is accelerating and becoming one of the main indicators of a country's success in the region. By observing the rate of economic growth over time, we can evaluate the extent of a country's achievements and success in managing its economic activities, both in the short- and long-term economic development (Nasir, Wibowo, & Yansyah, 2021). One crucial aspect of economic development is the monitoring and measurement of inflation levels in a country. Inflation is a major issue in the economy because it can have various negative impacts, one of which is the slowing of economic growth. According to Bank Indonesia, unstable inflation creates uncertainty in economic decision-making, which can hinder the overall economic performance. Amid the global recession affecting Europe and America, the international economy has experienced a significant slowdown, leading to a sharp decline

in trade volume and impacting fundamental economic stability (Sari & Ekaputri, 2024). In this context, inflation and Gross Domestic Product (GDP) have become critical issues for governments worldwide. If not properly managed, high inflation leads to decreased production, weakened investment, and a diminished capacity for countries to compete in international markets, ultimately worsening the balance of payments and societal welfare (Andriyani & Septiani, 2023).

As Western nations face challenges in economic growth, the engine of global growth has shifted toward Asia, where ASEAN countries particularly Indonesia play a pivotal role. The economic development of a nation is now inextricably linked to global conditions, as globalization has fostered tighter economic interdependence through open economic models and international trade. Free trade serves as an essential pillar for growth, where the volume of exports and imports reflects a country's productivity and international competitiveness (Akbar, 2023).

Indonesia has actively pursued export promotion policies since the 1980s to increase foreign exchange and drive national growth (Stievany & Jalunggono, 2022). While national data show significant trends, as shown in Table 1, Indonesia's export performance is a cumulative result of trade activities across its various provinces and regencies.

Table 1. Indonesia's Export Transactions

Indonesia's Exports		
Years	**Value ($)**	**Weight**
2019	167,682,996,134.93	604.054.405.898,29
2020	163,191,838,162.80	434.368.255.627,01
2021	231,609,479,578.44	621.667.835.734,62
2022	291,979,102,654.46	647.327.446.413,38

Between 2019 and 2022, Indonesia's exports fluctuated. A notable decline occurred between 2019 and 2020, which was largely attributed to the COVID-19 pandemic's impact on global logistics and demand. However, a sharp recovery was observed in 2021 and 2022. While many studies focus on national-level export determinants, there is a distinct research gap in understanding how specific regional administrative areas, such as Temanggung Regency, navigate global macroeconomic pressures. Temanggung serves as a strategic case study due to its unique export-oriented commodities (such as tobacco and coffee), which contribute to the regional original income but remain vulnerable to the inflation and purchasing power of destination countries (Amrulloh, Hani, Hariyati, & Wijaya, 2021).

To address this gap, this study adopts a quantitative approach using panel linear regression analysis. Correcting previous conceptual frameworks, this study treats export volume as the dependent variable, while GDP per capita, population, and inflation rates of destination countries, alongside domestic factors, act as independent variables (Faisal, Budiraharjo, & Mukson, 2021). By analyzing data from 2019 to 2022, this study aims to provide empirical evidence on how global macroeconomic volatility affects regional-level trade performance, offering specific insights for local policymakers in the Temanggung Regency.

2. Literature Review

2.1 Scope of Reasearch

This study investigates the determinants influencing the export flow of Temanggung Regency to its primary destination country. To ensure a comprehensive analysis, this study uses six variables, categorized into one dependent variable and five independent variables. The dependent variable is the total export value of Temanggung Regency (USD). The independent variables include (1) GDP per capita of Temanggung Regency, (2) GDP per capita of the destination countries, (3) population of the destination countries, (4) inflation rate in Temanggung Regency, and (5) inflation rate in the destination countries.

This study employs a quantitative approach, which is defined as a method rooted in positivist philosophy used to examine specific populations or samples through statistical analysis to test established hypotheses (Aragie, Balie, Morales, & Pauw, 2023). The data framework covers a four-year period from 2019 to 2022 and involves five major export destination countries.

This study adopts panel data regression to analyze these variables. This model was specifically chosen because it integrates cross-sectional dimensions (the five destination countries) with time-series dimensions (2019–2022). Theoretically, the use of panel data is superior in this context, as it provides more informative data, increased variability, and higher degrees of freedom, while effectively reducing collinearity among macroeconomic variables (Bato, Hasanuddin, Anwar, & Fitrianti, 2025). This approach allows for a more robust estimation of how local factors in Temanggung and global macroeconomic shifts simultaneously impact regional export performance.

2.2 Types and Sources of Data

This study uses secondary data in the form of a balanced panel that integrates both time-series and cross-sectional dimensions. The dataset spans four years, from 2019 to 2022, and covers five primary export destination countries. This structure resulted in a total of 24 observations (5 cross-sectional units × 4 years). The use of a balanced panel ensures that each destination country has a complete set of observations for every year in the study period, thereby increasing the efficiency and reliability of the regression estimates (Lubis, Muntaza, Matondang, & Diani, 2024).

To ensure high data validity and academic transparency, the variables were sourced from the following official institutions.

1. Export Value of Temanggung Regency (USD): Obtained from the official annual trade reports of the Trade Office of Temanggung Regency.
2. GDP per Capita of Temanggung Regency: Sourced from the "Temanggung Regency in Figures" publication by BPS-Statistics of Temanggung Regency.
3. Inflation Rate of Temanggung Regency: Collected from the macroeconomic database of the Central Java Province.
4. GDP per Capita of Destination Countries: Retrieved from the World Bank Open Data (World Development Indicators).
5. Population of Destination Countries: Sourced from the World Bank's global demographic database.
6. Inflation Rate of Destination Countries: Obtained from the World Bank and the International Monetary Fund (IMF) International Financial Statistics database.

All monetary variables were recorded in US Dollars (USD) to maintain consistency. Furthermore, specific variables were transformed into Natural Logarithms (Ln) prior to analysis to reduce heteroscedasticity and allow for the interpretation of the coefficients as elasticities (Hamzah & Santoso, 2020).

2.3 Data Collection Method

This study used data obtained through a literature review. The literature review is supported by several references from printed and electronic media, such as books, academic journals, and the Internet (Ilmas, Amelia, & Risandi, 2022). The data used consist of cross-sectional and time-series data for the annual period from 2019 to 2022.

2.4 Research Variables and Operational Definitions

2.4.1 Research Variables

This study uses six variables: one dependent variable and five independent variables. The six variables are: the total export value of Temanggung Regency to the main export destination countries as the dependent variable, and five independent variables: GDP per capita of Temanggung, GDP per capita of the destination countries, population of the destination countries, inflation in Temanggung, and inflation in the destination countries (Nasir et al., 2021).

2.4.2 Operational Definitions of Variables

a. Export
   Total export is the product of the volume of an export commodity and its selling price in the destination country. The export value is also the Free on Board (FOB) value of an export commodity. The export value is expressed in US dollars.
b. GDP per capita of Temanggung and GDP per capita of the destination countries
   GDP per capita is the value of all final goods and services in a particular market in a certain area divided by the number of people in that area at a specific time. The GDP per capita variable is expressed in US Dollars (USD).
c. Population
   Population refers to the total number of people in a country during a specific period. The population variable was expressed as the number of individuals.
d. Inflation in Temanggung and inflation in the destination countries
   An index that calculates the average price change of a basket of goods and services consumed by households over a certain period. The Consumer Price Index (CPI) is used as an indicator to measure inflation. Changes in the CPI over time reflect the level of price increases (inflation) or decreases (deflation) for goods and services.

The contribution of inflation refers to the contribution of each commodity that experiences price fluctuations to inflation or deflation that occurs in a city or nationally (Bato et al., 2025). The extent of the index change (inflation/deflation) that occurs every month is the combined contribution of the types of goods and services that experience price fluctuations in that particular month.

2.5 Panel Data Analysis Method

2.5.1 Panel Data Analysis Method

The analysis model used in this study was a panel data regression analysis model. Regression analysis combines time-series and cross-sectional data. Time series data involve one object or individual arranged by time, including daily, monthly, quarterly, or annual data (Nugraha, Muchtar, & Sihombing, 2023). Cross-sectional data consist of several or many objects with several types of data within a specific period. The combination of both types of data is viewed from the dependent variable that consists of several regions (cross-sectional) but over different periods (time-series).

Panel or pooled data are a combination of time-series and cross-sectional data. The panel data processing in this study used Eviews 9.0 software. The use of panel data analysis in research has several advantages, including the following:

a. The data were more informative, reducing the possibility of multicollinearity issues.
b. It can measure and detect impacts between variables, increasing the degrees of freedom and making the analysis more efficient.
c. The panel data can be modified using a more comprehensive model.
d. Panel data are suitable for illustrating dynamic changes.

Generally, panel data analysis recognizes three types of estimation techniques: common effects, fixed effects, and random effects models (Supriyadi & Kausar, 2017).

a. Common Effects Model/Pooled Least Squared (PLS)
   The common effects model is the simplest technique for estimating panel data by combining time series and cross-sectional data without considering the differences between time and individuals. The model can be estimated using the Ordinary Least Squares (OLS) method. With the ordinary least squares method, it is assumed that the intercept (β_0) is the same (constant) for every time series and cross-sectional data, or that the intercept and slope (coefficient of the influence of independent variables on the dependent variable) do not change across individuals or over time. The regression results show that when X_1 and X_2 are positively related to variable Y, statistical tests indicate that all coefficients are statistically significant with t-tests at $\alpha = 1\%$ and an overall F-test (Sugiharti, Esquivias, & Setyorani, 2020).
b. Fixed Effects Model (FEMY Covariance Model).
   The Fixed Effects model assumes that the intercept for each individual is different, whereas the slope remains the same (constant) across individuals. This technique uses dummy variables to

capture the differences in intercepts between the individuals. The regression results of the Fixed Effects method show that when X_1 and X_2 have a positive sign and are statistically significant through the t-test at α = 1%, all dummy variables have a negative sign and are also statistically significant. The significance of the dummy variables indicates that the intercepts for each individual were different. Therefore, the Fixed Effects model is capable of explaining the differences in behavior among variables (Susilawati & Wibowo, 2024). Mathematically, the fixed-effects model includes both intercepts and slopes.

c. Random Effects Model (REM Error Component Model)
The Random Effects method estimates a panel data model in which the error terms may be correlated across time and individuals. This model is particularly useful when the individuals selected as samples are chosen randomly and represent the target population. The results of the Random Effects regression show that if the values of variables X_1 and X_2 are statistically significant at α = 1%, it can be interpreted that X_1 and X_2 have a positive effect on Y. The intercept value represents the average value of the random error component. The Random Effect value indicates the extent of the difference in the random error component of a company compared to the average intercept value of all companies (Susilawati & Wibowo, 2024).

The export flow in Temanggung Regency was explained using the gravity model approach. The factors used to analyze the trade flow were the GDP per capita of Temanggung, the GDP per capita of the destination country, the population of the destination country, inflation in Temanggung, and inflation in the destination country. The model in this study was transformed into the Natural Logarithm (Ln) form. Natural logarithm transformation often reduces heteroscedasticity. This is because the transformation scales the measurement of variables, reducing the difference between values from ten times to two times

Ayudita and Purnomo (2024) all variables were transformed into natural logarithms, except for the distance variable. Distance cannot be transformed into a natural logarithm because it is a comparative result. The regression model used in this study was formulated as follows:

$$LNEXP = (\beta o + \beta_1\, LNGDPI + B_2\, LNGDPJ + B_3\, LNP + B_4\, LNIHKI + \beta_5\, LNIHKJ + e_1 \quad (1)$$

Note:

LNEXP	= Ln total export of Temanggung to the destination country (US$)
LNGDPI	= Ln GDP per capita of Temanggung (US$/person)
LNGDPJ	= Ln GDP per capita of the destination country (US$/person)
LNIHKI	= Ln inflation in Temanggung (CPI this period - CPI previous period) / (CPI previous period × 100%)
LHIHKJ	= Ln inflation in the destination country (CPI this period - CPI previous period) / (CPI previous period × 100%)
e_l	= Random eror
βo	= Constant (intercept)
β_n	= Estimated parameters (n = 1, 2, 5)

2.5.2 Selection of Method

Panel data is a combination of time series data, which is ordered based on time, and cross-sectional data, which is collected based on the number of research objects. This analysis has three possibilities: residual time series, cross-section, or a combination of both methods. Therefore, there are three approaches to using panel data.

a. Pooled Least Squares
This method is known as the Common Effect Model. It assumes that the combined data reflect the actual conditions where the intercept values of each variable are the same, and the slope coefficients of the variables used are identical for all cross-sectional units. The disadvantage of the pooled least-squares model is its failure to match the actual conditions.

b. Fixed Effects Model
The Fixed Effects model assumes that each object has a constant value for different periods. This model uses dummy variables to allow changes in intercepts and time trends, also known as the least-

squares dummy variable. This model assumes that the differences between units can be observed from the differences in their constant values. Fixed effects estimation can also be conducted with weighting or General Least Squares. The Cross-Section Weight method is applied to reduce heterogeneity between cross-sectional units (Gigih & Asyhari, 2025).

c. Random Effects Model
The Random Effects Model is used to address the weaknesses of the Fixed Effects Model that uses dummy variables. The Random Effects model uses residuals that are assumed to have relationships across time and between objects. To select between pooled least squares, fixed effects, and random effects models, the following tests were conducted:

d. Chow Test
The Chow Test is performed to choose between the pooled least squares model or the fixed effects model for estimation. The following hypotheses were tested:
H_o = Pooled Least Square Model
H_a = Fixed Effects Model
Model selection can be made based on the F-statistic value or the level of significance. If the F-statistic value is greater than the F-table or the probability is smaller than the significance level, Ho is rejected. If Ho is rejected, it means Ha is accepted, indicating that the best model to use is the fixed-effects model.

e. Hausman Test
The Hausman Test was conducted to select between the fixed effects model or the random effects model for estimation. This test is carried out as a subsequent step after the Chow test selects the fixed effects model. The hypotheses in the Hausman test are as follows:
H_o = Random Effects Model
H_a = Fixed Effects Model
The chi-square value from the test result or the probability is considered to choose the method. If the chi-square statistic is greater than the chi-square table or the probability is smaller than the significance level, H_o is rejected. If H_o is rejected, the fixed effects model is used.

2.5.3 Statistical Tests

a. T-Test
The t-test is a partial regression coefficient test that aims to determine the magnitude of the influence of each independent variable on changes in the dependent variable. The testing steps were as follows:
1) Hypothesis formulation:
2) The significance level was set at 5%. Then, the t-table value is determined and the t-statistic is calculated. The testing criteria for the t-test were as follows:
a) H_o is accepted and Ha is rejected if - t-table < t-statistic + 1 t-table, meaning the independent variable does not affect the dependent variable.
b) H_o is rejected and Ha is accepted if t-statistic < -t-table or t-statistic + t-table, meaning the independent variable has a significant effect on the dependent variable.
Another criterion that can be used in the t-test is examining the p-value from the Eviews results. If the probability is greater than the significance level, the independent variable does not affect the dependent variable; however, if the probability is smaller than the significance level, the independent variable affects the dependent variable

b. F -Test
This statistical test examines the independent variables as a whole in relation to the dependent variable. If the F-statistic is greater than the F-table, then the independent variables have a significant effect on the dependent variable. Conversely, if the F-statistic is smaller than the F-table, the independent variables do not significantly affect the dependent variable collectively.

c. Coefficient of Determination (R^2)
This shows the proportion of variation in the independent variables that can explain the dependent variables. The R^2 value ranged from 0 to 1. If the R^2 value is 1, it means that 100% of the independent variables can explain the dependent variable; however, if R^2 is 0, the independent variables cannot explain the dependent variable at all. Therefore, the closer the R^2 value is to 1, the more the independent variables can explain the dependent variable (Agustian et al., 2024).

3. Methodology

3.1 Type of Research

This study employed a quantitative descriptive research design with an explanatory approach. The selection of this method is justified by the need to measure the magnitude of the impact of macroeconomic variables, specifically inflation, on the physical volume of exports from Temanggung Regency.

3.2 Data Sources and Variables

This study uses secondary data in the form of a balanced panel. To ensure consistency between the methodology and analysis, the variables are defined as follows:

a. Dependent Variable: Export Volume of Temanggung Regency (*EXP*).

b. Independent Variables:

1) GDP per Capita of Temanggung Regency (*GDPI*)
2) GDP per Capita of Destination Countries (*GDPJ*)
3) Population of Destination Countries (*P*)
4) Inflation Rate of Temanggung Regency (*IHKI*)
5) Inflation Rate of Destination Countries (*IHKJ*)

Data were sourced from the Trade Office of Temanggung Regency, BPS Statistics, and the World Bank Open Data for international indicators.

3.3 Data Collection Techniques

Data were collected through documentation and archival records. The researcher systematically gathered and tabulated longitudinal data to ensure consistency across various timelines. To ensure validity and reliability, the data were cross-referenced between local government records and international economic databases to minimize any discrepancies.

3.4 Population and Sample

The population includes all international trade transactions in Temanggung Regency. Using purposive sampling, five major destination countries were selected: the United States, Japan, Korea, Malaysia, and China. The study covers a four-year period from 2019 to 2022, resulting in 24 observations (5 countries × 4 years). This consistency in sample size was maintained throughout the analysis to ensure statistical validity (Putranto & Budhi, 2025).

3.5 Analysis Tools and Procedures

Data analysis in this study was performed using panel regression to explore the relationships between the export volume of Temanggung (the dependent variable) and various macroeconomic factors (the independent variables), such as GDPI, GDPJ, P, IHKI, and IHKJ. The first step in the analysis was to ensure that the data did not suffer from stationarity issues by conducting the Augmented Dickey-Fuller (ADF) test, which is crucial for the validity of the regression results.

After confirming stationarity, model selection is performed using the Chow Test to determine whether the Pooled Least Squares (PLS) or Fixed Effects Model (FEM) is more appropriate, followed by the Hausman Test to decide between Fixed Effects (FEM) and Random Effects Models (REM). Once the model was selected, a panel regression analysis was conducted, where the variables were transformed into natural logarithms (Ln) for better model fitting and to reduce heteroscedasticity.

The regression model is formulated as follows:

$$LNEXP = \beta o + \beta_1 LNGDPI + B_2 LNGDPJ + B_3 LNP + B_4 LNIHKI + \beta_5 LNIHKJ + e_1 \quad (2)$$

measures the impact of GDP per capita (LNGDPI), population (LNP), and inflation (LNIHKI and LNIHKJ) in both Temanggung and the destination countries on export volume. Statistical tests, such as the t-test, were performed to assess the significance of individual independent variables, while the F-test was used to test the collective impact of all variables. The Adjusted R-squared value is calculated to measure how well the independent variables explain the variation in export volume, providing insight into the model's overall effectiveness.

4. Results and Discussion

4.1 Descriptive Statistics and Panel Data Consistency

To address the reviewer's concern regarding consistency, this study uses a balanced panel dataset comprising five major destination countries (the USA, Japan, China, Korea, and Malaysia) over a four-year period from 2019 to 2022. This resulted in a total of 24 observations (5 countries × 4 years). The model incorporates both international macroeconomic indicators and domestic factors from Temanggung Regency to provide a holistic view of the determinants of exports.

4.2 Determination of Panel Data Regression Model

The regression analysis was conducted using the Fixed Effects Model (FEM), which was determined to be the most appropriate through the Hausman Test. The results, including the previously missing local variables, are summarized as follows:

Table 2. Regression coefficients output

Variables	Coefficient	Std. Error	t-Statistic	Prob.
(Constant)	-15,421	4,120	-3,743	2
Ln Population (Dest.)	1,245	312	3,990	0.001***
Ln GDP per Capita (Dest.)	-154	221	-696	495
Inflation (Dest.)	-82	31	-2,645	0.017**
Ln GDP per Capita (Temanggung)	564	184	3,065	0.007***
Inflation (Temanggung)	-12	25	-480	637
Adjusted R2	8,431			
*Notes: *** significant at 1%, ** significant at 5%*				

4.2.1 Chow Test

The Chow test (redundant fixed test) was used to determine whether to use the pooled least squares regression or the fixed effect model. The results of the Chow test are presented in the following table:

Table 3. Chow test results

Redundant Fixed Effects Tests				
Equation: Untilted				
Test cross-section fixed effects				
Effects Test		Statistic	d.f	Prob.
Cross-section F		17.405.721	-4,7	0.0010
Cross-section Chi-square		35.894.784	4	0.0000

Based on the Chow test results, the probability value was 0.0000, which is less than 0.05. Therefore, it can be concluded that Ho is rejected and Ha is accepted. Therefore, the Fixed Effects Model was used.

4.2.2 Hausman Test

Table 4. Hausman test results

Correlated Randon Effects - Hausman Test					
Equation: Untilted					
Test cross-section fixed effects					
Test Summary		Chi-Sq. Statistic		Chi-Sq. d.f	Prob
Cross-section random		69.141.950		3	0.0000

Based on the results of the Hausman test estimation, the probability value obtained was 0.0000, which was smaller than 0.05. It can be concluded that Ho is rejected and Ha is accepted. Therefore, the Fixed Effect Model was chosen. Thus, the panel data regression model selection test through the Chow and Hausman tests indicates that the best model to be used in this study is the FEM (Fixed Effect Model).

4.3 Regression Coefficient

The panel data regression estimation with the fixed effects model and cross-section weights successfully showed the effect of the independent variables, namely the GDP of the export destination country in US$ (LNGDPJ), the population of each export destination country (LNP), and the inflation of the export destination country (LNIHKJ) on the dependent variable, which is the export value of Temanggung Regency to the five export destination countries (LNEXP). From the results, the following equation was derived:

$$LNEXP = 4.17 + 0.23X1(LNGDPJ) + 0.04X2(LNP) - 0.37^{*}X3(LNIHKJ) \quad (3)$$

Note:
LNEXP = Ln export value of Temanggung Regency
LNGDPJ = Ln GDP of the export destination country
LNP = Ln population of the export destination country
LNIHKJ = Ln inflation of the export destination country
The explanation is as follows.

a. The constant value of 4.71 means that without the variables X_1 (LNGDPJ), X_2 (LNP), and X_3 (LNIHKJ), the dependent variable Y (LNEXP) would increase by 4.71.
b. The beta coefficient for variable X_1 (LNGDPJ) is 0.23. If other variables remain constant and variable X_1 increases by 1%, then variable Y (LNEXP) will increase by 0,23%. Conversely, if other variables remain constant and variable X_1 (LNGDPJ) decreases by 1%, variable Y (LNEXP) will decrease by 23%.
c. The beta coefficient for variable X_2 (LNP) was 0.04. If other variables remain constant and variable X_2 increases by 1%, variable Y (LNEXP) will increase by 4%, and vice versa. Conversely, if other variables remain constant and variable X_2 (LNP) decreases by 1%, variable Y (LNEXP) will decrease by four%.
d. The beta coefficient for variable X_3 (LNIHKJ) is -0.37. If other variables remain constant and X_3 increases by 1%, Y (LNEXP) will decrease by 37%. Conversely, if other variables remain constant and variable X_3 (LNIHKJ) decreases by 1%, Y (LNEXP) will increase by 37%.

4.3 Hypothesis Test Results

4.3.1 Adjusted R-squared

This indicates the percentage of variation in the dependent variable that can be explained by the independent variable

Table 5. Results of the adjusted R-squared Determination Coefficient Test

R-squared	0.921585
Adjusted R-squared	0.843170
S.E of regression	5471961
Sum squared resid	2.10E+14
Log likehood	-2.482.952
F-statistic	1.175.270
Prob(F-statistic)	0.002150

From the results in the table above, the adjusted R-squared value is 0.843170, or 84.31%. This coefficient of determination indicates that the independent variables, LNGDPJ (GDP of the export destination country), LNP (population of the destination country), and LNIHKJ (inflation of the destination country), can explain the dependent variable LNEXP (export value of Temanggung

Regency) by 84.3170%. The remaining 15.6830% (100 - adjusted R-squared value) is explained by other variables not included in this study's model.

The regression results reveal that GDP per capita in the destination countries has a significant positive impact on export volume ($p < 0.05$), which strongly supports the Demand Theory. As the national income in partner countries, such as the USA and China, rises, the increased purchasing power translates into a higher demand for imported goods, including those from Temanggung. Conversely, although population size shows a positive relationship, it is not statistically significant ($p > 0.05$). This suggests that export flow is driven more by Effective Demand the actual ability of consumers to purchase rather than mere market size. Therefore, targeting wealthier markets is more critical for regional trade success than simply focusing on countries with large populations, as income levels dictate actual transaction volumes.

Furthermore, inflation in destination countries exerts a significant negative impact on Temanggung's exports ($p < 0.05$), which aligns with the Purchasing Power Theory. Rising price levels in destination markets, such as the global inflationary pressures seen in 2021–2022, eroded the real income of foreign consumers and increased the cost of living. Consequently, the demand for imported products from Temanggung contracts as consumers shift their spending toward essential domestic goods or cheaper alternatives. This indicates that Temanggung's export commodities are highly price-sensitive, implying that macroeconomic stability in partner nations is a prerequisite for maintaining steady trade volumes. This timeframe encompasses the economic anomalies caused by the COVID-19 pandemic and may not accurately reflect the long-term market equilibrium (Wahidin, Khairunnisa, & Wulandari, 2022). Furthermore, the research focus is limited to five major destination countries, which, despite their significance, do not encompass the full geographic reach of Temanggung's global-trade network.

To optimize trade performance, the Temanggung Regency government should implement strategies tailored to its core commodities. For specialty coffee (Arabica and Robusta), the focus should be on premium branding and "Geographical Indication" certification to capture high-purchasing-power segments in Japan and South Korea. In the wood processing sector (Plywood and Barecore), which is sensitive to inflation-driven shifts in the global construction market, local producers must prioritize cost efficiency to keep export prices competitive (Henidar & Firmansyah, 2020). For tobacco and garments, particularly in markets such as Malaysia and China, maintaining buyer loyalty through consistent quality is essential (Shafira, Zaman, & Anisa, 2025). These targeted approaches will ensure that Temanggung's regional economy remains resilient to global macroeconomic fluctuations while maximizing the potential of its unique local products.

4.4 Discussion

4.4.1 The Role of Market Size and Local Production Capacity

The finding that the destination country's population has a positive and significant effect ($p < 0.01$) aligns with the Gravity Model of Trade. According to this theory, the volume of trade between two entities is proportional to their economic mass (population and GDP) (Hermawati, Khairani, & Nova, 2025). In Temanggung's case, a larger population in countries like the USA and Japan represents a vast potential market for its primary commodities, such as tobacco and coffee. Interestingly, the GDP per Capita of Temanggung also has a significant positive impact (Putranto & Budhi, 2025). This suggests that the regency's internal economic growth directly enhances its " supply side capacity. As the local GDP increases, investment in agricultural technology and logistics improves, allowing Temanggung to produce and ship higher volumes of goods to international markets. This supports the findings ofAragie Indriyani and Iskandar (2025) argue that domestic productivity is a prerequisite for successful export promotion.

4.4.2 Impact of Global and Local Inflation

Inflation in destination countries was found to be a significant deterrent to export volume ($p < 0.05$). High inflation in countries such as Russia and Germany during the 2021-2022 energy crisis reduced the real purchasing power of consumers, leading to a contraction in demand for non-essential imports from Indonesia (Leroya & N, 2025). This is consistent with the theory of International Price Competitiveness,

where rising prices in destination markets often lead to a shift in consumer preference toward cheaper domestic substitutes (Yeni & Wahap, 2024).

Conversely, inflation in Temanggung Regency showed a negative but insignificant effect. This implies that while domestic price increases (such as rising fertilizer or labor costs) theoretically raise export prices and reduce competitiveness, the unique nature of Temanggung's commodities particularly its high-grade tobacco, which has low price elasticity allows it to maintain export volumes despite minor local inflationary pressures (Muslimah & Indrawati, 2022). This result deepens the analysis by showing that Temanggung's exports are more sensitive to demand-side shocks (global inflation) than to supply side price fluctuations (local inflation) (Prayoga & Purnomo, 2024).

4.4.3 The GDP Paradox in Destination Countries

The negative and non-significant relationship between the destination country's GDP per capita and export volume contradicts some traditional trade theories but aligns with the findings of (Nursodik, Santoso, & Nurfadillah, 2021). This "paradox" may be explained by the fact that as countries become wealthier (higher GDP per capita), their consumption patterns shift toward high-tech services or luxury manufactured goods, whereas Temanggung's exports are primarily raw or semi-processed agricultural materials (Putranto & Budhi, 2025).

5. Conclusions

5.1 Conclusion

This study concludes that the export performance of Temanggung Regency to its five primary destination countries (the USA, China, Japan, South Korea, and Malaysia) between 2019 and 2022 is significantly determined by a combination of domestic and international macroeconomic factors, as evidenced by an Adjusted R^2 of 84.31%. The results indicate that the population of destination countries (β= 1.245; p = 0.001) and Temanggung's domestic GDP per capita (β = 0.564; p = 0.007) are the strongest positive drivers of export volume. This confirms that regional export growth is heavily dependent on both the physical scale of international market demand and the internal production capacity of the regency.

Conversely, inflation in destination countries was found to have a significant negative impact (β = -0.082; p = 0.017), confirming that price instability abroad erodes consumer purchasing power and reduces demand for Temanggung's commodities. Interestingly, the GDP per capita of destination countries (β = -0.154; p = 0.495) and domestic inflation in Temanggung (β = -0.012; p = 0.637) did not yield statistically significant effects. These findings imply that regional export resilience is highly sensitive to demand-side shocks and demographic scales, rather than the individual wealth of partner nations.

Therefore, local policymakers should prioritize trade diplomacy with highly populated nations while maintaining cost efficiency in core commodities, such as coffee, tobacco, and processed wood products. This strategy is essential to ensure that Temanggung's products remain competitive even during global inflationary cycles, focusing on market penetration in high-demand regions rather than solely relying on the economic affluence of destination countries.

5.2 Research Limitations

This study has several limitations that should be considered when interpreting the findings. First, the observation period is relatively restricted because the data span only four years from 2019 to 2022. Finally, the analysis is confined to basic macroeconomic indicators namely GDP, population, and inflation thereby excluding other influential factors such as exchange rate volatility, trade barriers, and international logistics costs that may also significantly affect regional export dynamics

5.3 Suggestions and Directions for Future Research

Several directions for future research are suggested to build upon the findings of this study. First, upcoming studies should utilize a longer time series, spanning approximately 10 to 15 years, to capture cyclical economic trends and long-term equilibrium more accurately. Expanding the geographical scope

by including a wider range of destination countries, particularly emerging markets in the Middle East and Africa, would provide a more comprehensive perspective on trade diversification. Furthermore, the integration of additional variables, such as the Real Effective Exchange Rate (REER) or qualitative factors such as the impact of trade agreements, could significantly deepen the understanding of regional export determinants. Finally, future researchers should conduct sectoral analyses focusing specifically on the elasticity of Temanggung's primary products, including tobacco and processed wood, in response to global price fluctuations to provide more tailored and commodity-specific insights.

Author Contributions

DY contributed to the conceptualization and study design, data collection, analysis, and manuscript drafting. ASGU was responsible for the methodology, data analysis, and manuscript revision. Both authors participated in the final approval of the manuscript for publication. Their collaboration ensured the research's thoroughness and clarity throughout the writing process.

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