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Analysis of Indonesian Exports Demand in the ASEAN Region

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Abstract

The dynamics of a country's exports are determined not only by the supply side but also by the demand side. This research examines the influence of the demand side on Indonesia's exports. Its primary aim is to analyze the effects of per capita income, inflation, and the exchange rates of partner countries on the demand for Indonesia's exports in the ASEAN region. The data used is panel data covering the observation period from 2000 to 2021, encompassing nine ASEAN member countries trading partners with Indonesia. The analytical method employed is a panel regression model using a random effects approach, estimated through the EGLS method. The findings indicate that an increase in per capita income, inflation, and the appreciation of partner countries' currencies against the USD can stimulate the demand for Indonesia's exports in the ASEAN region, albeit to varying degrees.

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INTRODUCTION

The global expansion of trade has significantly bolstered the growth of economies worldwide (Okunade et al., 2022; Salvatore, 2020). The global expansion of trade has resulted in a more extensive product market, leading to a surge in production and fueling economic growth (Virgan, 2022). Therefore, every country seeking to enhance its economic growth must embrace economic openness as an imperative.

Numerous factors play a role in shaping the international trade (imports and exports) of a country. These factors can be categorized into two groups: internal factors (supply side) within the exporting countries and external factors (demand side) in the countries where the exports are being sent. The Heckscher-Ohlin (H-O) theory of trade explains the determinants of exports arising from the supply side. The H-O theory suggests that a country will export goods in which it has a comparative advantage and import those in which it does not (Fisher, 2011; Morrow, 2010). Stated differently, the comparative advantage of a product is a decisive factor in its exportability. A product is said to possess a comparative advantage when manufactured using abundant resources or inputs in the country of production, resulting in lower production costs and competitiveness in the global marketplace (Morrow, 2010).

Several empirical studies have demonstrated that product excellence is crucial for boosting a country's exports. For example, research in China revealed that the margins of Chinese agricultural exports to ASEAN are determined by economic scale, export capacity, economic integration, and the distance between countries (Sun & Li, 2018). A study conducted in India demonstrated that rice, wheat, cotton, and sugar are agricultural products in which India can compete in the global market. The competitiveness of these products is determined by factors such as product specifications, domestic prices, capital productivity, and international trade agreements (Narayan & Bhattacharya, 2019). Numerous additional studies have employed various factors, including the domestic currency exchange rate, domestic inflation, domestic interest rates, and the government policies of the exporting country, as indicators of a country's performance in the global export market (Alstadheim et al., 2021; Chkir et al., 2020; Iwaisako & Nakata, 2017; Szkorupová, 2014; Yunusa, 2020).

In addition to internal factors, a country's exports to the global market are influenced by the conditions in partner countries, which shape export demand from the demand side. In addition to a country's competitiveness, its imports (export demand) are also influenced by the importing capacity of that country. This importing capacity can be measured by the country's prosperity level (Asrafuzzaman M & Islam M, 2021; Gül, 2021). In addition, export prices, actual exchange rates, and devaluation policies determine a country's export demand(Krugman & Obstfeld, 2003).

The value of Indonesia's exports to the global market fluctuates from year to year, as illustrated in Graph 1. It is evident from the graph that the market for Indonesia's export products is still predominantly influenced by Asian countries, including China, Japan, Singapore, Malaysia, and others. Furthermore, the value of Indonesia's exports to the ASEAN region has not exceeded its exports to non-ASEAN Asian countries despite the longstanding promotion of free trade agreements among ASEAN countries.

Numerous studies have been conducted on Indonesia's exports to the ASEAN region, primarily focusing on analyzing the factors that influence Indonesia's exports. These factors primarily originate from internal sources, namely the supply side. The main determinants examined in these studies include commodity prices, the domestic currency exchange rate concerning the destination country's currency, foreign direct investment inflows into Indonesia, inflation, and other macroeconomic variables within the country (Angga Pramuja, 2019; Mahrani et al., 2019; Purusa & Istiqomah, 2018; Septiana & Wahyuningsih, 2020).

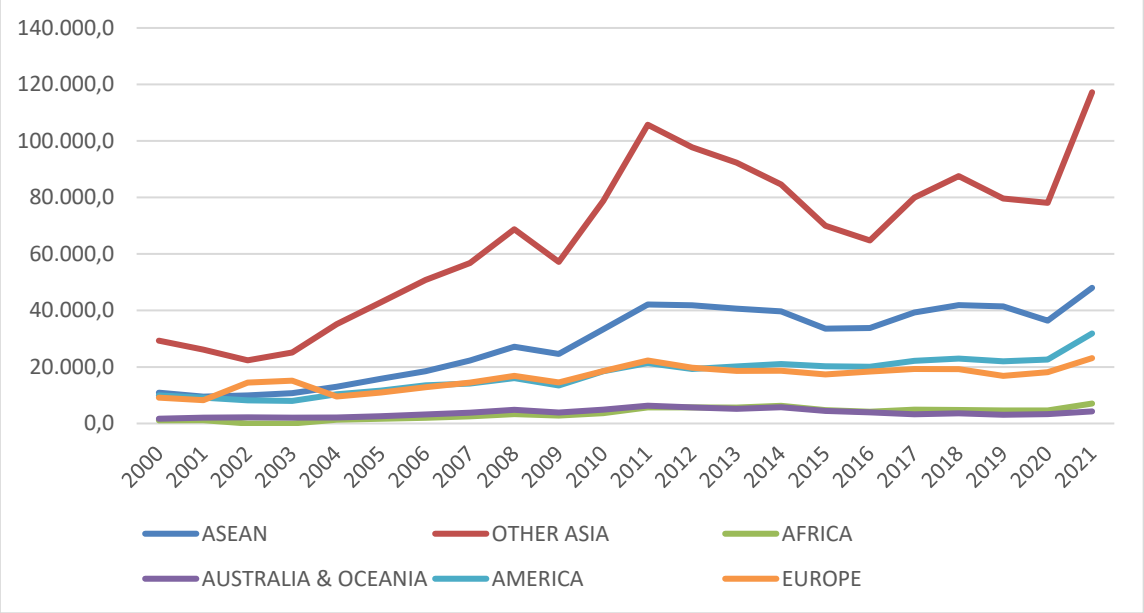

Figure 1. Indonesia's Export Value by Export Destination Area (Million USD)
Source: Central Bureau of Statistics, 2022 (Processed)

In contrast, the assessment of the determinants of Indonesia's export demand remains limited. For instance, research by Fatha (2017) primarily focuses on specific commodities, such as coffee or palm oil products, when examining the determinants of Indonesia's export demand (Nibras & Widyastutik, 2019). To provide comprehensive results and assist policymakers, an extensive study on the determinants of Indonesia's export demand is necessary. Therefore, this research aims to analyze the impact of per capita income, inflation, and the exchange rate of partner countries on Indonesia's export demand in the ASEAN region.

Based on the background and literature review provided earlier, the research hypotheses are as follows: (a) an increase in partner countries' per capita income positively and significantly impacts the demand for Indonesian exports in the ASEAN region; (b) an increase in the inflation rate of partner countries positively and significantly affects the demand for Indonesian exports in the ASEAN region; (c) an appreciation of the exchange rate of partner countries' currency positively and significantly influences the demand for Indonesian exports in the ASEAN region.

RESEARCH METHODS

This research uses panel data that includes nine trading partner countries of Indonesia in the ASEAN region, namely Malaysia, Singapore, Thailand, the Philippines, Brunei Darussalam, Laos, Myanmar, Vietnam, and Cambodia, to ensure adequate observations. The research covers the period from 2000 to 2021, which is expected to capture the dynamics of Indonesia's exports to the ASEAN region. The operational definitions of the variables used in this research are provided in Table 1.

Table 1. Definition of Operational Variables

Variable	Notation	Operating Definition
Export	XPR	Value of Indonesia's exports to ASEAN member countries (FOB value in a million USD)
Income per capita	IPC	Value of income per capita of each ASEAN member country (USD)
Inflation	INF	The inflation value of each ASEAN member country is measured by the Consumer Price Index (CPI), 2010=100.
Exchange rate	KRS	The official exchange rate of each ASEAN member country against the United States Dollar (LCU per US$, period average)

Source: Data Processed, 2022

This research employs a panel regression model to analyze the influence of per capita income, inflation, and the exchange rate of partner countries on Indonesia's export demand in the ASEAN region. Based on the literature review conducted, the research can be modelled as follows:

$$XPR_{it} = \varphi_0 + \varphi_1 IPC_{it} + \varphi_2 INF_{it} + \varphi_3 KRS_{it} + \varepsilon_{it} \quad \text{..... (1)}$$

where XPR_{it} represents the value of Indonesia's exports to each destination country, IPC_{it} represents the per capita income of each export destination country, INF_{it} represents the inflation rate of each export destination country, KRS_{it} represents the exchange rate of each partner country's currency against USD, ε_{it} is the residual of the model, and $\varphi_0, \varphi_1, \varphi_2, \varphi_3$ is the parameter of the model.

The estimation of the model parameters in equation (1) is conducted through three methods: the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) approach (Widarjono, 2018). The CEM model approach assumes that there is no cross-sectional and time-series influence in the model. Thus, the estimation method used is the Ordinary Least Squares (OLS) method. The specific Common Effect Model is as follows:

$$XPR_{it} = \varphi_0 + \varphi_1 IPC_{it} + \varphi_2 INF_{it} + \varphi_3 KRS_{it} + \varepsilon_{it} \quad \text{..... (2)}$$

The Fixed Effects Model (FEM) approach that will be used to estimate the model in this study assumes that the differences in intercepts accommodate the differences between cross-sectional units. The FEM is calculated using the Least Squares Dummy Variable (LSDV) method to account for these intercept differences. The specific fixed effects model is as follows:

$$XPR_{it} = \varphi_0 + \varphi_1 IPC_{it} + \varphi_2 INF_{it} + \sum_{i=1}^{n} D_i + \varphi_3 KRS_{it} + \varepsilon_{it} \quad \text{..... (3)}$$

On the contrary, the Random Effects Model (REM) approach used to estimate the research model assumes that the model's error term accommodates the differences between cross-sectional units. The REM approach is evaluated using the Generalized Least Squares (GLS) method (Alvitiani et al., 2019; Widarjono, 2018). The specific random effects model is as follows:

$$XPR_{it} = \varphi_0 + \varphi_1 IPC_{it} + \varphi_2 INF_{it} + \varphi_3 KRS_{it} + v_i + \varepsilon_{it} \quad \text{.....(4)}$$

The CEM model approach assumes no unit cross-section and time series impact on the model. Hence, the estimation method used is the OLS method. In contrast, the FEM model approach considers that the variations between cross-sectional units are considered by the differences in intercepts, estimated using the least square dummy variable method. The REM model approach, however, assumes that the differences between unit cross-sections are accommodated by the error term model, which is estimated using the Generalized Least Square (GLS) method (Alvitiani et al., 2019; Widarjono, 2018)

This study employs three approaches to estimate the panel regression model and selects the best approach through model specification tests. The first approach is the Chow test, which

determines whether the Common or Fixed Effect Models are better. The null hypothesis for the Chow test states that the common effect model is ideal for the Fixed Effect Model. The second test is the Hausman test, which aids in selecting the Random and Fixed Effect Models. The null hypothesis for the Haussman test is that the random effect model is better than the fixed effect model. The third test is the Breusch-Pagan test, which determines whether the common or random effect models are better. The null hypothesis for the Breusch-Pagan test is that the common effect model is superior to the random effect model (Alvitiani et al., 2019; Widarjono, 2018).

The ordinary least squares (OLS) estimation method used in CEM or FEM models is based on several assumptions. The first assumption is that the residual model follows a normal distribution. The statistical test used to examine the distribution of the residual model is the Jarque-Bera test, with the following formula (Widarjono, 2018):

$$JB = n\left[\frac{S^2}{6} + \frac{(K-3)^2}{24}\right] \quad \text{..... (5)}$$

S is the skewness value, *K* is the kurtosis value, and *n* is the number of observations. The null hypothesis is that the residual model does not follow a normal distribution. Suppose the p-value of the Jarque-Bera statistic is greater than a certain alpha level. In that case, it indicates that the residuals are normally distributed (Alvitiani et al., 2019).

The second assumption is that the variance of the residual model is constant or homogenous. The test tool used to detect the homogeneity of the residual model is the Breausch-Pagan LM test, with the following formula (Widarjono, 2018):

$$\phi = \frac{1}{2}(ESS) \quad \text{..... (6)}$$

Where ESS is the estimator of the sum of the squared supplementary model, the null hypothesis of the Breausch-Pagan LM test is that the residuals are homogenous. Suppose the p-value of the Breausch-Pagan LM statistic is higher than a certain alpha level. In that case, the residual model is homogenous (Widarjono, 2018).

The third assumption is that the residual model does not have serial correlation or autocorrelation. The test tool used to detect serial correlation in the residual model is the Durbin-Watson test (Silalahi et al., 2014), and its formula is as follows (Widarjono, 2018):

$$dw = \frac{\sum_{t=2}^{n}(e_t - e_{t-1})^2}{\sum_{t=1}^{n} e_t^2} \quad \text{.....(7)}$$

Where e_t is the residual of the model at period t.

Once the selected research model met the assumptions, it was subjected to statistical tests to determine the significance level of the estimated parameters. The first statistical test employed was the partial statistical test (t-test). This test is used to assess the significance level of the impact of the independent variables on the dependent variable, assuming that the other independent variables are constant. Suppose the t-statistic value of the independent variable is greater than the value of the t-table at a certain level of significance. In that case, the null hypothesis is rejected, indicating that the independent variable significantly affects the dependent variable (Widarjono, 2018).

The second statistical test employed is the simultaneous test, also known as the F test. This test examines the combined impact of all the independent variables on the dependent variable. When the F-statistic value is higher than the F-table value at a particular significance level, the null hypothesis is rejected, indicating that the independent variables are significantly the dependent variables together (Widarjono, 2018).

The third test conducted is the coefficient of determination or goodness of fit test. This test is used to assess the extent to which the independent variables used in the model contribute to explaining the dependent variable. A higher coefficient of determination indicates a better fit of the model (Widarjono, 2018)

RESULTS AND DISCUSSION

The data used in this study is secondary data in the form of panel data. It consists of 9 units for cross-sectional data and 21 units for time-series data. The variables analyzed in this study include exports, per capita income, inflation, and exchange rates. Descriptive data for each variable is presented in Table 2.

Table 2. Descriptive Research Data

Test Statistics	Variables			
	XPR	**IPC**	**INF**	**KRS**
Mean	3204,33	11505,66	99,68	3627,63
Median	1057,80	2938,66	100,00	42,23
Maximum	18443,90	66176,39	171,88	23208,37
Minimum	0,50	318,01	14,99	1,25
Standard Deviation	4156,17	16664,66	27,62	6255,20
Number of Observations	198	198	198	198

Source: Data processed, 2022

From 2000 to 2021, Indonesia's exports to partner countries in the ASEAN Region have continuously increased, with an average value of USD 3.2 billion. Among these countries, Singapore is a dominant market for Indonesian exports, with an average value of USD 11.23 billion from 2000 to 2021. In 2021, Singapore is projected to absorb 29.27 % of Indonesia's total exports to the ASEAN Region, followed by Malaysia, the Philippines, and Thailand. Together, these four ASEAN countries are expected to absorb 81.75 % of Indonesia's exports to the ASEAN Region in 2021.

During study period, the macroprudential of Indonesia's partner countries in the ASEAN region was relatively stable, except for 2020, which was affected by the COVID-19 pandemic. Singapore had the highest per capita income in the region, averaging USD 48,218 during the study period, followed by Brunei Darussalam with an average of USD 33,056. On the other hand, Myanmar had the lowest per capita income, averaging only USD 904. The average per capita income of Indonesia's partner countries in the ASEAN region during the study period was USD 11,458.

Indonesia's partner countries in the ASEAN region have experienced stable inflation, with Brunei Darussalam, Singapore, Thailand, and Malaysia having relatively low inflation rates and even experiencing deflation during some periods. On the other hand, Vietnam and Myanmar have had different conditions in terms of currency exchange rates against the USD, as their currencies experienced some significant depreciation from 2000 to 2021. For instance, the Burmese Kyat exchange rate was K 6.52/USD in 2000 but decreased to K 510.35/USD in 2021. In contrast, other ASEAN member countries have had relatively stable exchange rates against the USD.

Table 3 presents the estimation outcomes for three methods used in this study to estimate the panel data regression model to address the research questions, including the common effect model approach, the fixed effect model and the random effect model.

Table 3. Estimation Results of Panel Data Regression Model

Variable	Model Estimation Approach		
	Common Effect	**Fixed Effect**	**Random Effect**
C	-3,3155	-9,0016***	-8,2991***
Log(IPC)	-0,1422	1,4039***	1,2568***
Log(INF)	2,7307***	0,8908***	1,0066***
Log(KRS)	-0,3357***	-0,0824**	-0,0796**
R-squared	0,2663	0,9784	0,7456
F-statistic	23,2385***	757,3044***	187,6229***

Note: *) significant at 10%, **) significant at 5%, ***) significant at 1%
Source: Data processed, 2022

The three models' estimation outcomes are further scrutinized to identify the optimal model conducting model specification tests, such as the Chow test, Haussman test, and Breusch-Pagan test(Wau, 2022). Table 4 displays the outcomes of the model specification test conducted in this research.

Table 4. Model Specification Test

Test Criteria	Chow Test	Hausman Test	Breusch-Pagan Test
Statistics Value	757,7874	2,6303	1903,962
P-value	0,0000	0,4522	0,0000

Source: Data processed, 2022

The study found conflicting results after conducting the Chow and Haussman tests to determine the best model. Therefore, the Breusch-Pagan test was conducted next, which indicated a significant statistical test value at the one per cent alpha level. This finding implies that the study's random effect model was the best. Thus, the residual model in the random effect model accommodates the variations in country characteristics. Table 5 presents the estimation results of the random effect model.

Table 5. Results of Panel Data Analysis and Partial Test

Variable	Coefficient	Stand. Error	t-statistic	p-value
Constanta	-8,2991	1,5668	-5,2965	0.0000
Log(IPC)	1,2568	0,2614	4,8073	0.0000
Log(INF)	1,0066	0,2362	4,2611	0.0006
Log(KRS)	-0,0796	0,0376	-2.1190	0.0354
R-squared	0,7456			
F-Statistic	187,6229			
P-value	0.0000			

Note: Estimation Method: Panel EGLS (Cross-section random effects)
Source: Data processed, 2022

The estimated results of the random effects model, as presented in Table 5 above, were calculated using the Panel EGLS method. Therefore, this study does not require the assumption test of the OLS method. Consequently, we can proceed with testing the significance of the parameters.

Simultaneously, this research model is a goodness-of-fit model. This is indicated by the significant F-statistic value at a 1 % alpha level (see Table 5). This finding is also supported by a high coefficient of determination of 74.56 %.

Furthermore, partial testing also shows the same results. The coefficient of the per capita income variable and the coefficient of the

inflation variable indicate significant values at a 1% alpha level. Meanwhile, the coefficient of the exchange rate variable is significant at a 5% alpha level. Based on the statistical test results for the three independent variables used in the research model, it can be concluded that all three variables significantly impact Indonesia's export demand in the ASEAN region.

Considering that all the independent variables used in the model have a significant impact, further analysis can be conducted on the regression coefficient values found in the model.

From Table 5, it can be seen that the regression coefficient value for the inflation variable is 1.25. This finding illustrates that the increase in Indonesia's export demand to partner countries in the ASEAN region depends on the prosperity level of the export destination countries. Specifically, a one per cent increase in the per capita income of the export destination country can drive a 1.48% increase in demand for Indonesian export products. This means that the economic growth of ASEAN countries has a positive impact (trade creation) on Indonesia's trade in the ASEAN region. This finding is consistent with previous research (Asrafuzzaman M & Islam M, 2021).

Furthermore, the coefficient value for the inflation variable is found to be 1.00. This coefficient value indicates that an increase in inflation in partner countries stimulates their demand for Indonesian export products in the same proportion, meaning that a 1% increase in inflation in partner countries leads to a 1% increase in Indonesia's export demand. Therefore, the price dynamics in partner countries play a crucial role in determining Indonesia's trade value in the ASEAN region. This finding supports previous research on this topic (Angga Pramuja, 2019; Febrianti & Setiawan, 2022).

This study identifies the fluctuation of currency exchange rates in trading partner countries as a critical factor influencing the value of Indonesia's exports to the ASEAN region. The estimation results of the model reveal a significant coefficient value of -0.079 for the exchange rate variable at a 5% significance level. This suggests that when the currencies of Indonesia's trading partners depreciate against the USD, it can increase the value of Indonesia's exports to the ASEAN region. Specifically, a 10% reduction in the partner country's currency value can result in a 0.79% increase Indonesia's exports. While this effect may be small, the potential impact of currency depreciation on Indonesian exports should not be ignored. Notably, this finding aligns with Setianto's (2014) research, which also found a negative relationship between exchange rates and Indonesia's exports.

However, the findings of Goestjahjanti et al. (2023) suggest different implications. According to this study, the relationship between exchange rates and export products is unidirectional, meaning that any depreciation of the Rupiah against the USD increases Indonesia's export products. These results call for further analysis to follow up on the findings of these two studies.

CONCLUSION

This research investigates how certain macroprudential conditions, such as income per capita, inflation, and the volatility of partner countries' exchange rates relative to the USD, affect nine partner countries of Indonesia within the ASEAN Region. The aim is to determine the external factors that impact Indonesia's exports to these partner countries. The results reveal that the growth in partner countries' welfare, increased prices, and an appreciation of the partner country's currency value compared to the USD are vital factors driving Indonesia's exports in the ASEAN Region. Therefore, the stability of partner countries' macroeconomic conditions plays a significant role in determining trade in the ASEAN Region.

It can be inferred from this discovery that Indonesia's role in upholding the macroeconomic stability in the ASEAN Region is crucial. This is because Indonesia accounts for over 35% of the ASEAN's economy. Any instability in the macroeconomic conditions of the ASEAN Region has a detrimental effect on Indonesia's exports to the region.

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