JURNAL AKUNTANSI, MANAJEMEN DAN EKONOMI
Vol.23, No. 1, pp. 18 - 28
Published online in http://jos.unsoed.ac.id/index.php/jame
ISSN: 1410-9336 / E-ISSN: 2620-8482

The Export Determinants of Indonesian Automobile in the Selected Middle-East Countries

Abi Revyansah Perwira[1]

[1]*Badan Pusat Statistik kabupaten Tabalong, Indonesia*

Abstract

Since the automobile is one of Indonesia's high value-added commodities which has high export potency, this paper attempts to analyze and find the export determinants of Indonesian automobile in the selected Middle-east countries during the period 2006 – 2019. Those countries are chosen since they are the largest oil exporters in the world and have large GDP from it. This paper applies the gravity model and the Ordinary Least Square (OLS) regression method. Since the Fixed Effect Model (FEM) suffers from positive autocorrelation heteroscedasticity, the analysis employs Seemingly Unrelated Regression (SUR) weights on the FEM model. Based on the analysis result, the export determinants of Indonesian automobile in the selected Middle-east countries are Indonesia's Gross Domestic Product (GDP) per capita, the importer country's GDP per capita, economic distance between Indonesia and the importer country, exchange rate, and oil price crisis.

Keywords Gravity Model; Indonesian Automobile Export; The Middle-east Countries

INTRODUCTION

Since Indonesia adopts an open economic system, international trade activities have an essential role in Indonesia's economy. Export can boost GDP through foreign exchange revenue while import consumes foreign exchange reserves for purchasing goods and services from abroad. Therefore, export must be endeavored by developing Indonesia's potential commodities.

Unfortunately, raw and intermediate commodities from the agriculture and mining sectors are the majority of Indonesia's export commodities which have a low contribution to employment and involve limited network enterprises. Therefore, Indonesia should export high value-added commodities more by developing national industries. Realizing the importance of exporting industrial commodities, the Ministry of Industry Republic of Indonesia launched the "Making Indonesia 4.0" program in 2018 where the automobile industry is one of the development targets. One of the program goals is to make Indonesia the leader of automobile export in the ASEAN.

The automobile industry was chosen because first, the Indonesian automobile is a high value-added commodity and the 4th rank as non-oil & gas export commodity based on the Ministry of Trade Republic of Indonesia. Second, *Gabungan Industri Kendaraan Bermotor Indonesia* (Gaikindo) reports that Indonesian automobile export increased tremendously from 5,000s units to 250,000s units within 15 years resulting in labors absorption in the automobile industry from 50,000s to 200,000s (BPS-Statistics Indonesia, 2021). Third, previous papers mostly study agriculture export commodities where high value-added commodity such as the automobile is not studied yet. Only Abedini & Péridy (2009) and Peridy & Abedini (2008) study Indonesian automobile export together with other automobile exporter countries. However, their results are too broad and do not discuss specifically Indonesian automobile or address particular importer countries.

Export generally is influenced by internal factors and external factors (Lubis, 2013). On the automobile export case. the internal factors are a large domestic market, low capital investment, and limited commodity variations. While the external factors are the automobile price, exchange rate, limited access to the export market, and protective regulations in importer countries. Indonesian automobile export is possible because the size of Indonesia's domestic market creates such a minimum average production cost resulting in a more competitive price in the export market. Figure 1 illustrates how much the gap between the domestic sales and export where the

✉Correspondence to : abi.revyansah@bps.go.id

Received: 3 February, 2021
Accepted: 10 March, 2021
Published: 30 March, 2021

domestic market dominates the production of Indonesian automobile. To reduce the gap, Indonesia must expand the automobile export to prospective countries.

Thus, this paper proposes the Middle-east countries as the relevant export destination countries because first, there are no previous paper studies the Middle-east countries specifically as export destination countries where mostl are Asian countries (Huda, 2006; Siburian, 2012; Wardhana, 2011; Zuhdi & Suharno, 2015), major importer countries (Hasibuan et al., 2012; Hermawan, 2011; Huseyni et al., 2019; Nurhayati et al., 2018; Sari et al., 2014; Virginia & Novianti, 2020; Yulismi & Siregar, 2007), other regions (Osabuohien et al., 2019; Wardani & Mulatsih, 2017), or the world (Abedini & Péridy, 2009; Natale et al., 2015; Peridy & Abedini, 2008). The determination of export destination countries is fundamental since different regions require specific bilateral policies. Second, Despite some Middle-east countries are being stricken by war conflicts such as Syria, Palestine, and Yemen, the Middle-east countries generally have high Gross Domestic Product (GDP) per capita. Third, Indonesia has a long relationship with most of the Middle-east countries in the Organization of Islamic Cooperation (OIC) since 1969 which can be used as easiness access to economic bilateral relations. Therefore, the Middle-east countries are potential countries as trading partners and relevant to be further studied.

Based on the background, this paper attempts to fill both research gaps, the export commodity and the export destination countries. Hence, this paper analyzes the export determinants of Indonesian automobile in the selected Middle-east countries.

LITERATURE REVIEW

GDP per Capita

GDP is the economic size of a country and commonly used in many economic papers. GDP per capita is GDP divided by the total population which explains the wealthiness of the people in a country. The higher GDP per capita, the wealthier people of a country which indicates an increasing ability to purchase imported goods and services.

Economic Distance

Export and import activities have a negative relationship with the distance between two exporter and importer countries where the farther the distance the more expensive the transportation cost is. The expensiveness of the transportation cost can reduce the export potential.

Some previous papers utilize the economic distance to measure the elasticity transportation cost which involve the importer country's GDP. Sari et al. (2014) propose the economic distance formula as follows:

$$ED_{xmt} = \frac{GD_{xm} \times GDP_{mt}}{GDP_{Mt}}$$

where:

ED_{xmt} : the economic distance between exporter country and importer country in year t;
GD_{xmt} : the geographical distance between exporter country and importer country in year t;
GDP_{mt} : importer country's GDP in year t;
GDP_{Mt} : total selected importer countries' GDP in year t.

Exchange Rate

The exchange rate, usually measured by the Local Currency Unit (LCU) against the US$, indicates the purchasing power of a country to import commodities because mostly import are paid by the international currency, the US$. When a country's LCU depreciated, it means that the country's importing power is weakened.

Since most developed countries in the Middle-east adopt fixed exchange rate regime and to capture the effect of the exchange rate on the analysis, this paper utilizes Dinh's et al. (2011) exchange rate formula:

$$ER_t = \frac{ER_{it}}{ER_{mt}}$$

where:

ER_t : exchange rate in year t;
ER_{xt} : Indonesia's average exchange rate in year t;
ER_{mt} : the importer country's average exchange rate in year t.

Dummy variables

Dummy variables are specific characters that some importer countries have or something that happened during a particular period. Since most of the Middle-east countries are the world oil suppliers and some of them are also automobile producers, this paper utilizes the oil price crisis as the dummy variable. This paper attempts to capture the effect of the oil price crisis during the middle 2010s.

The Gravity Model

The main idea of the gravity model is to measure how much a country will be able to export to another country based on the determinant variables. This paper imitates the classical gravity model from Wardani & Mulatsih (2017) to measure Indonesian automobile export. Based on Wardani & Mulatsih (2017), the gravity model of Indonesian automobile export can be expressed as follows:

$$\ln AX_t = \beta_0 + \beta_1 \ln GDPpC_{it} + \beta_2 \ln GDPpC_{mt} - \beta_3 \ln ED_{imt} + \beta_4 \ln ER_t + \beta_5 OC + \varepsilon_t$$

where:

$\beta_0, \ldots, \beta_5$: regression coeffcients;
AX_t : Indonesian automobile export value in year t;
$GDPpC_{it}$: Indonesia's GDP per capita in year t;
$GDPpC_{mt}$: importer country's GDP per capita in year t;
ED_{imt} : the economic distance between exporter country and importer country in year t.
ER_t : exchange rate in year t;
OC : the dummy variable when the oil price crisis occurs.
ε_t : error term in year t;

THE FORMULATION OF HYPOTHESES

Effect of GDP per Capita on Automobile Export

Since GDP per capita measures the wealthiness level of people, both exporter and importer countries interact with each other. When importer countries' GDP per capita increases, export tend to rise to result in also an increase in the exporter country's GDP per capita.

All of the previous papers show that importer countries' GDP per capita has a positive effect on export. However, Wardani & Mulatsih (2017) finds that the exporter country's GDP has a negative sign. It argues that export commodities tend to be consumed more by the domestic market when the exporter country's economy is getting better.

H1: Indonesia's GDP per capita has a positive effect on Indonesian automobile export.

H2: importer countries' GDP per capita has a positive effect on Indonesian automobile export.

Effect of Distance on Export

Since the distance is the proxy of transportation cost, all previous papers are consistent that the distance has a negative effect on export either using the geographical distance or the economic distance.

H2: the economic distance between Indonesia and importer countries has a negative effect on Indonesian automobile export.

Effect of Exchange Rate on Export

The exchange rate in Dinh et al., (2011) and Sari et al. (2014) show a positive effect. However, the exchange rate does not give significant effect on Turkish automobile export (Huseyni et al., 2019). The possible answer is Turkish automobile import is higher than export. Virginia & Novianti (2020) also show that the exchange rate is not significant on Indonesian clove export. The import tariff is also the possible answer to the insignificancy.

H5: the exchange rate between Indonesia and importer countries has a positive effect on Indonesian automobile export.

Effect of Dummy Variables on Export

Each previous paper utilizes different dummy variables depending on the characteristics of importer countries, export commodities, and period.

Abedini & Péridy (2009) and Peridy & Abedini (2008) utilize common language and automobile types on automobile export. Abedini & Péridy (2009) and Peridy & Abedini (2008) finds that automobile types have a positive effect. However, only Peridy & Abedini (2008) shows that common language affects Iranian automobile export significantly.

Dinh et al. (2011) employ cultural gap and strategic partnership dummy variables on Vietnam's export. It concludes that the cultural gap has a significant positive effect while the strategic partnernship is not significant.

Hermawan (2011) uses the Association of Southeast Asian Nations (ASEAN) and Asia-Pacific Economic Cooperation (APEC) membership, and country border on Indonesian textile commodities. All dummy variables have negative signs on fibre export. In contrast, the ASEAN membership and the country border have positive effects while the APEC membership is insignificant on yarn and fabric export. Since there is are inconsistency dummy variable coefficients, Hermawan (2011) proposes its final gravity model without the dummy variables.

Gul & Yasin (2011) utilizes border, language, the South Asian Association for Regional Cooperation (SAARC) and Economic Cooperation Organization (ECO) membership as the dummy variables on Pakistani export. The border has a negative effect due to political conflict with India, language has a positive effect, and SAARC and ECO membership are not significant variables.

Natale et al. (2015) employ regional trade agreement (RTA) on seafood global export which indicates a positive effect. Natale et al. (2015) warn that the RTA does not always provide a relevant explanation because the effect depends on the implementation of RTA in particular importer countries and specific commodities.

Huseyni et al. (2019) use the European Union (EU) membership on Turkish automobile export and concludes that the EU membership gives a significant impact on Turkish automobile export.

Osabuohien et al. (2019) utilize the landlocked region of exporter and importer countries on the Economic Community of West African States (ECOWAS) member countries. The result concludes that importer countries located in the landlocked region have difficulty in importing commodities. However, landlocked exporter countries do not find difficulty in exporting their commodities.

RESEARCH METHODS

This paper employs the gravity model in natural logarithmic form since the analysis involves the selected Middle-east countries as research subjects within a fixed period.

Research Sample and Period

From 15 Middle-east countries, only 10 countries have been Indonesian automobile importer countries. Unfortunately, Yemen is eliminated from the selected countries due to war conflict. Thus, this paper includes only 9 Middle-east countries in the analysis, they are Bahrain, Bahrain, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia (SA), and the United Arab Emirates (UAE). The selected period is between 2006 and 2019 when the selected Middle-east countries imported Indonesian automobile consistently. Therefore, the primary data in this paper is longitudinal data.

The data is annual secondary data which is obtained and calculated from *Centre d'Etudes Prospectives et d'Informations Internationales* (CEPII), UN Comtrade, and World Bank. Automobile export is all export commodities with HS code 8703 (Motor cars and other motor vehicles; principally designed for the transport of persons) based on UN Comtrade classification.

Data Analysis Technique

Since this paper employs the gravity model with longitudinal data, the model can be solved by applying Ordinary Least Square (OLS) regression analysis. However, to acquire the Best Linear Unbiased Estimator (BLUE), the regression analysis must fulfil the classical assumptions. All calculations are processed by using the EViews 10 program.

RESULTS AND DISCUSSION

Multicollinearity Test

Based on Table 1, all of the cross-correlation values is under 0.80 which mean there is no multicollinearity among the independent variables.

OLS Regression Analysis

Before continuing to other classical assumption tests, the model identification must be run first. In longitudinal data analysis, the OLS regression basically provides three models, Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM).

Based on Table 2, The model with the highest R-squared is the FEM. The Chow test result suggests choosing the FEM rather than the CEM because the probability is lower than 0.05 (Table 3). Also, the Hausman test is invalid and the EViews program rejects the test because there are at least one of the independent variables which do not fulfil the REM requirement. Therefore, the FEM is better than REM.

Heteroscedasticity Test

The Glejser test is performed to check whether there is any heteroscedasticity problem on the FEM. To perform the Glejser test, the independent variable, $\ln AX_t$, is replaced by $|\varepsilon_t|$, the absolute value of the FEM's residuals. Then, re-regress $|\varepsilon_t|$ as the FEM.

The Glejser test result displays that the FEM has a heteroscedasticity problem since two of independent variables have the probability higher than 0.05 (Table 4).

Autocorrelation Test

This paper employs the Durbin-Watson (DW) test to check the autocorrelation on the FEM.

The DW test compares between DW statistic value with the Durbin Upper (DU) value and the Durbin Lower (DL) value from the Durbin-Watson table. There is a positive autocorrelation if DW statistic < DL or a negative autocorrelation if DW statistic > 4-DU.

Based on the EViews program, the DW statistic value is 1.4682 (Table 5). From the DW table with 5 dependent variables (k) and 126 observations (n), the DW table shows that DU = 1.7923 and DL = 1.6276. Because DW statistic < DL, then the FEM has a positive autocorrelation problem.

Normality Test

Figure 1 Figure 2 illustrates that the FEM's residuals are not normally distributed since the Jarque-Bera test has the probability 0.0017 which is below 0.05.

Seemingly Unrelated Regression (SUR) Cross-Section Weights on the FEM

Because the FEM suffers from heteroscedasticity, positive autocorrelation, the FEM need to be re-regressed with SUR cross-section weights so the SUR weighted FEM can be free from heteroscedasticity and autocorrelation problems (Nurhayati et al., 2018).

Based on Table 6, The constant coefficient equals –13.6632 which means if all independent variables equal to zero then Indonesia imports automobile from the selected countries instead of exporting automobile.

The coefficient of Indonesia's GDP per capita is 0.7513 which states that if Indonesia's GDP per capita increases 1% then Indonesian automobile export rises 0.75% *ceteris paribus*.

The coefficient of importer country's GDP per capita is 1.6787 which states that if importer country's GDP per capita increases 1% then Indonesian automobile export rises 1.68% *ceteris paribus*.

The coefficient of economic distance is –2.0661 which states that if the economic distance between Indonesia and an importer country increases 1% then Indonesian automobile export decreases 2.06% *ceteris paribus*.

The coefficient of oil price crisis is –0.2551 which states that if the oil price crisis occurs in the world then Indonesian automobile export decreases 0.26% *ceteris paribus*.

Also, Figure 3 displays that The SUR Weighted FEM passes the Normality test because the probability of the Jarque-Bera test is 0.2500 which is larger than 0.05.

Coefficient Determination (Adjusted R-Squared)

According to Table 6, **Figure 1**the value of the adjusted R-squared is 0.9817. This means that the gravity model can describe Indonesian automobile export about 98.17% while the rest 1.83% is influenced by other variables.

F-Test

Figure 1F-statistic is 516.8146 with the probability of 0.0000 which is lower than 0.05 (Table 6). This means that Indonesia's GDP per capita, importer country's GDP per capita, economic distance, exchange rate, and oil price crisis simultaneously have a significant effect on Indonesian automobile export.

t-Test

Indonesia's GDP per capita has t-statistic = 4.6474 with the probability = 0.0000. So, the hypothesis is accepted that Indonesia's GDP per capita has a significant effect on Indonesian automobile export.

Importer country's GDP per capita has t-statistic = 9.8547 with the probability = 0.0000. So, the hypothesis is accepted that the importer country's GDP per capita has a significant effect on Indonesian automobile export.

Economic distance has t-statistic = –9.1120 with the probability = 0.0000. So, the hypothesis is accepted that the economic distance between Indonesia and the importer country has a significant effect on Indonesian automobile export.

Exchange rate has t-statistic = 10.4522 with the probability = 0.0000. So, the hypothesis is accepted that the exchange rate has a significant effect on Indonesian automobile export.

Oil price crisis dummy variable has t-statistic = –4.8034 with the probability = 0.0000. So, the hypothesis is accepted that the oil price crisis has a significant effect on Indonesian automobile export.

Effect of Indonesia's GDP per Capita

The analysis result concludes that Indonesia's GDP per capita has a significant effect positively on Indonesian automobile export.

This finding is inline with Hermawan (2011) where Indonesia's GDP per capita has a positive effect on Indonesian fibre export. However, it is different from Wardani & Mulatsih (2017) where Indonesia tend to lose

tires export demand when the domestic consumption increases.

The result indicates that the increase of Indonesians wealthiness also rises Indonesian automobile export. The increase of wealthiness causes the automobile demand in the domestic market to increase. As a result, the average cost of automobile production can be minimized creating a more competitive price in automobile export.

Effect of Importer Country's GDP percapita

The analysis result finds that the importer country's GDP per capita is a significant determinant variable on Indonesian automobile export.

This finding is inline with Hermawan (2011), Nurhayati et al. (2018), Wardani & Mulatsih (2017) where the importer country's GDP per capita has a positive effect on Indonesian export commodities.

The result indicates that the wealthiness of the importer country's people influences their purchasing power. The increase of wealthiness causes the automobile demand in the importer country also rises. Therefore, Indonesia can expand automobile export in the importer country's market.

Effect of Economic Distance

The analysis result concludes that the economic distance between Indonesia and an importer country affects negatively Indonesian automobile export.

This finding is inline with Nurhayati et al. (2018), Sari et al. (2014), Virginia & Novianti, (2020), Wardani & Mulatsih (2017) where the economic distance between Indonesia and the importer country has a negative effect on Indonesian export commodities.

The result indicates that the further the location of an importer country from Indonesia, the more expensive the export transportation cost is which results in import discouragement from Indonesia.

Effect of Exchange Rate

The analysis result finds that the exchange rate has a significant influence positively on Indonesian automobile export.

This finding is inline with Dinh et al. (2011) since this paper utilizes the same exchange rate equation. The economic distance between Indonesia and the importer country has a negative effect on Indonesian export commodities.

The result indicates that the higher the exchange rate the cheaper the export price of Indonesian automobiles are. Since most of the selected Middle-east countries adopt the fixed exchange rate regime, the exchange rate between Rupiah and US$ should be concerned on this gravity model. Nevertheless, Rupiah devaluation is not a good answer to increase automobile export because Indonesia still requires importing raw and intermediate materials for automobile production. Rupiah depreciation can also raise automobile price because the imported material becomes more expensive.

Effect of Oil Price Crisis

The analysis result concludes that the oil price crisis can weaken Indonesian automobile export significantly.

The oil price crisis is a unique dummy variable that is utilized in this paper. This dummy variable is used to capture the phenomenon of economic contraction in particular Middle-east countries such as Bahrain, Kuwait, Oman, Qatar, SA, and UAE during 2016 – 2018. Since oil is the primary export commodity of these countries, their income highly depends on the world oil price. Thus, the collapse of oil price in the period impacted their importability.

CONCLUSION

Despite of war conflict often strikes in particular countries, the Middle-east countries are potential for Indonesian automobile export since they have such a large GDP from exporting oil.

The determinant variables which give a positive effect significantly on Indonesian automobile export to the selected Middle-east countries are Indonesia's GDP per capita, the importer country's GDP per capita, and the exchange rate.

On the other hand, the determinant variables which give a negative effect significantly on Indonesian automobile export to the selected Middle-east countries are the economic distance between Indonesia and the importer country and the oil price crisis.

REFERENCES

Abedini, J., & Péridy, N. (2009). The Emergence of Iran in the World Car Industry: An Estimation of its Export Potential. *World Economy*, *32*(5), 790–818. https://doi.org/10.1111/j.1467-9701.2008.01153.x

BPS-Statistics Indonesia. (2021). *Jumlah Tenaga Kerja Industri Besar Dan Sedang Menurut Sub Sektor, 2008-2017*. Industri Besar Dan Sedang. https://www.bps.go.id/statictable/2011/02/14/1063/jumlah-tenaga-kerja-industri-besar-dan-sedang-menurut-subsektor-2000-2017.html

CEPII. (2021). *CEPII - GeoDist*. Data GeoDist. http://www.cepii.fr/CEPII/en/bdd_modele/download.asp?id=6

Dinh, T. T. B., Nguyen, V. D., & Hoang, M. C. (2011). Applying Gravity Model To Analyze Trade Activities of Vietnam. *Forum for Research in International Trade*, 1–24.

Gaikindo. (2021). *Indonesian Automobile Industry Data*. Data. https://www.gaikindo.or.id/en/indonesian-automobile-industry-data/

Gul, N., & Yasin, H. M. (2011). The Trade Potential of Pakistan: An Application of the Gravity Model. *The Lahore Journal of Economics*, *16*(1), 23–62. https://doi.org/10.35536/lje.2011.v16.i1.a2

Hasibuan, A. M., Nurmalina, R., & Wahyudi, A. (2012). Analisis Kinerja dan Daya Saing Perdagangan Biji Kakao dan Produk Kakao Olahan Indonesia di Pasar Internasional. *Buletin Riset Tanaman Rempah Dan Aneka Tanaman Industri*, *3*(1), 57–70. https://doi.org/10.21082/jtidp.v3n1.2012.p57-70

Hermawan, M. (2011). The Determinant and Trade Potential of Export of the Indonesia' s Textile Products: A Gravity Model. *Global Economy and Finance Journal*, *4*(2), 13–32.

Huda, S. (2006). Analisis Beberapa Faktor yang Mempengaruhi Ekspor non Migas Indonesia ke Jepang. *Jurnal Ilmu-Ilmu Ekonomi*, *6*(2), 117–124.

Huseyni, I., Çelik, A. K., & Eren, M. (2019). Application of Panel Quantile Regression and Gravity Models in Exploring the Determinants of Turkish Automotive Export Industry. In *Understanding the Role of Business Analytics* (pp. 31–44). Springer. https://doi.org/10.1007/978-981-13-1334-9

Lubis, A. D. (2013). Analisis Faktor Yang Mempengaruhi Kinerja Ekspor Indonesia. In *Pusat Penelitian dan Pengembangan Perdagangan Luar Negeri* (Issue 5). http://www.kemendag.go.id/files/pdf/2013/04/25/-1366874912.pdf

Natale, F., Borrello, A., & Motova, A. (2015). Analysis of the Determinants of International Seafood Trade Using a Gravity Model. *Marine Policy*, *60*(2015), 98–106. https://doi.org/10.1016/j.marpol.2015.05.016

Nurhayati, E., Hartoyo, S., & Mulatsih, S. (2018). Analisis Pengembangan Ekspor Cengkeh Indonesia. *Jurnal Ekonomi Dan Kebijakan Pembangunan*, *7*(1), 21–42.

Osabuohien, E. S., Efobi, U. R., Odebiyi, J. T., Fayomi, O. O., & Salami, A. O. (2019). Bilateral Trade Performance in West Africa: A Gravity Model Estimation. *African Development Review*, *31*(1), 1–14. https://doi.org/10.1111/1467-8268.12359

Peridy, N. J., & Abedini, J. (2008). The Growing Influence of Emerging Countries in the World Car Industry: An Estimation of Export Potentials in a World Trade Model. *Global Economy Journal*, *8*(3), 1–26. https://doi.org/10.2202/1524-5861.1394

Sari, A. R., Hakim, D. B., & Anggraeni, L. (2014). Analisis Pengaruh Non-Tariff Measures Ekspor Komoditi Crude Palm Oil (CPO) Indonesia Ke Negara Tujuan Ekspor Utama. *Jurnal Ekonomi Dan Kebijakan Pembangunan*, *3*(2), 111–135. https://doi.org/10.29244/jekp.3.2.111-135

Siburian, O. (2012). Analisis Faktor-Faktor yang Mempengaruhi Ekspor Karet Alam Indonesia ke Singapura Tahun 1980-2010. *Economics Development Analysis Journal*, *1*(2). https://doi.org/10.15294/edaj.v1i2.480

The Ministry of Industry Republic of Indonesia. (2018). *Making Indonesia 4.0*. The Ministry of Industry Republic of Indonesia. https://www.kemenperin.go.id

The Ministry of Trade Republic of Indonesia. (2021). *Perkembangan Ekspor Non Migas (Komoditi)*. Portal Statistik Perdagangan. http://statistik.kemendag.go.id/growth-of-non-oil-and-gas-export-commodity

UN Comtrade. (2021). *UN Comtrade: International Trade Statistics*. https://comtrade.un.org/data

Virginia, A., & Novianti, T. (2020). Non-Tariff Measures (NTMs) and Indonesian Natural Rubber Export to the Main Export Destination Countries. *Journal of Developing Economies*, *5*(1), 57–69. https://doi.org/10.20473/jde.v5i1.18609

Wardani, M. A., & Mulatsih, S. (2017). Analisis Daya Saing dan Faktor-Faktor yang Memengaruhi Ekspor Ban Indonesia ke Kawasan Amerika Latin. *Jurnal Ekonomi Dan Kebijakan Pembangunan*, *6*(1), 81–100. https://doi.org/10.29244/jekp.6.1.81-100

Wardhana, A. (2011). Analisis Faktor-faktor yang Mempengaruhi Ekspor non Migas Indonesia ke Singapura Tahun 1990-2010. *Jurnal Manajemen Dan Akuntansi*, *12*(2), 99–102.

World Bank. (2021). *The World Bank Data*.

https://data.worldbank.org/indicator

Yulismi, & Siregar, H. (2007). Determinant Factors of Indonesia Palm Oil Export to Major Importing Countries: an Error Correction Model Analysis. *Economics and Finance in Indonesia*, *55*(1), 65–88. https://econpapers.repec.org/article/lpeefijnl/200704.htm

Zuhdi, F., & Suharno. (2015). Analisis Daya Saing Ekspor Kopi Indonesia dan Vietnam di Pasar ASEAN 5. *Jurnal Habitat*, *26*(3), 152–162. https://doi.org/10.22437/jiseb.v20i1.5028

List of Tables

Table 1. Multicollinearity Test

Variables	$\ln GDPpC_{it}$	$\ln GDPpC_{mt}$	$\ln ED_{imt}$	$\ln ER_t$
$\ln GDPpC_{it}$	1.0000	0.0751	0.0097	0.0288
$\ln GDPpC_{mt}$	0.0751	1.0000	0.2076	0.2994
$\ln ED_{imt}$	0.0097	0.2076	1.0000	-0.0759
$\ln ER_t$	0.0288	0.2994	-0.0759	1.0000

Source: EViews Output

Table 2. Multiple Regression Analysis

Variables	CEM		FEM		REM	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Constant	-6.2116*	3.2493	-13.5109***	4.1341	-4.1168	2.9869
$\ln GDPpC_{it}$	1.4816***	0.3841	0.8011***	0.2755	1.5895***	0.2228
$\ln GDPpC_{mt}$	0.6121***	0.1084	1.8359***	0.5547	0.1811	0.3223
$\ln ED_{imt}$	0.8547***	0.1089	-2.4430***	0.6965	0.3269	0.3639
$\ln ER_t$	-0.01926	0.0461	2.6158***	0.3390	0.5361***	0.1592
OC	0.0648	0.2812	-0.3251*	0.1657	-0.1680	0.1568
R-squared		0.5514		0.8894		0.366055
Adjusted R-squared		0.5327		0.8766		0.339641
F-statistic		29.497		69.2950		13.8582
Prob(F-statistic)		0.0000***		0.0000***		0.0000***

Source: EViews Output

Notes: (*) significant at 0.1, (**) significant at 0.05, and (***) significant at 0.01

Table 3. Model Identification Test

Chow Test				Hausman Test			
Effects Test	Statistic	d.f.	Prob.	Test Summary	Chi-Sq. Statistic	Chi-Sq d.f.	Prob.
Cross-section F	42.7981	(8,112)	0.0000***	Cross-section random	0.0000	5	1.0000
Cross-section Chi-Sq.	176.4563	8	0.0000***	Cross-section test variance is invalid. Hausman statistic set to zero.			

Source: EViews Output

Notes: (*) significant at 0.1, (**) significant at 0.05, and (***) significant at 0.01

Table 4. Heteroscedasticity Test on the FEM

	Glejser Test			
Variable	Coefficient	Standard Error	t-Statistic	Probability
Constant	4.7195	0.9436	5.0018	0.0000***
$\ln GDPpC_{it}$	-0.4061	0.1115	-3.6407	0.0004***
$\ln GDPpC_{mt}$	-0.1095	0.0315	-3.4789	0.0007***
$\ln ED_{imt}$	0.0081	0.0316	0.2550	0.7992
$\ln ER_t$	-0.0079	0.0134	-0.5917	0.5552
OC	0.2245	0.0816	2.7500	0.0069***

Source: EViews Output

Notes: (*) significant at 0.1, (**) significant at 0.05, and (***) significant at 0.01

Table 5. Autocorrelation Test on the FEM

Durbin-Watson Test				
DW statistic	**k**	**n**	**DL**	**DU**
1.4682	5	126	1.6276	1.7923

Source: EViews Output and Durbin-Watson Table

Table 6. The SUR Weighted FEM Analysis

Variable	Coefficient	Standard Error	t-Statistic	Probability
Constant	-13.6632	2.1461	-6.3664	0.0000***
$\ln GDPpC_{it}$	0.7513	0.1617	4.6474	0.0000***
$\ln GDPpC_{mt}$	1.6787	0.1703	9.8547	0.0000***
$\ln ED_{imt}$	-2.0661	0.2267	-9.1120	0.0000***
$\ln ER_t$	2.5790	0.2467	10.4522	0.0000***
OC	-0.2551	0.0531	-4.8034	0.0000***
R-squared	0.9836		F-statistic	516.8146
Adjusted R-squared	0.9817		Prob(F-statistic)	0.000000

Source: EViews Output

Notes: (*) significant at 0.1, (**) significant at 0.05, and (***) significant at 0.01

List of Figures

Figure 1. Indonesian Automobile Domestic Sales and Export (Units)

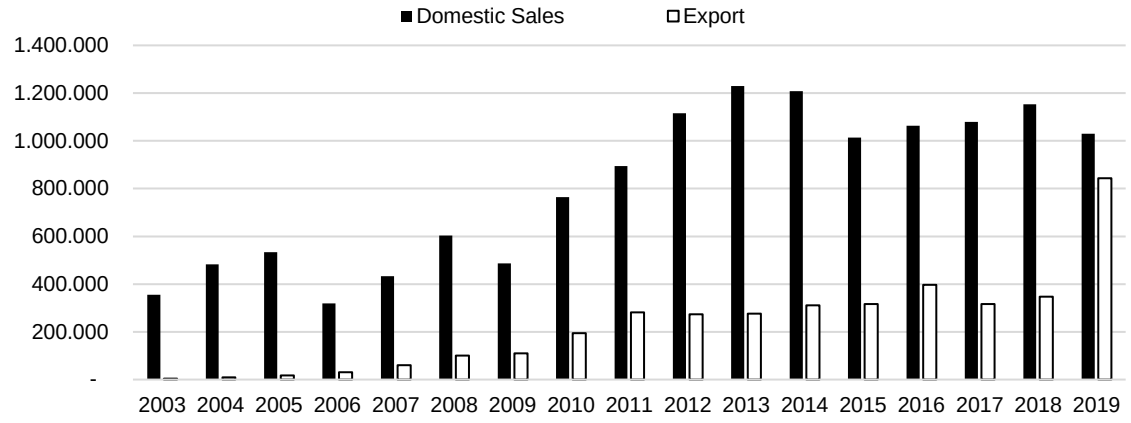
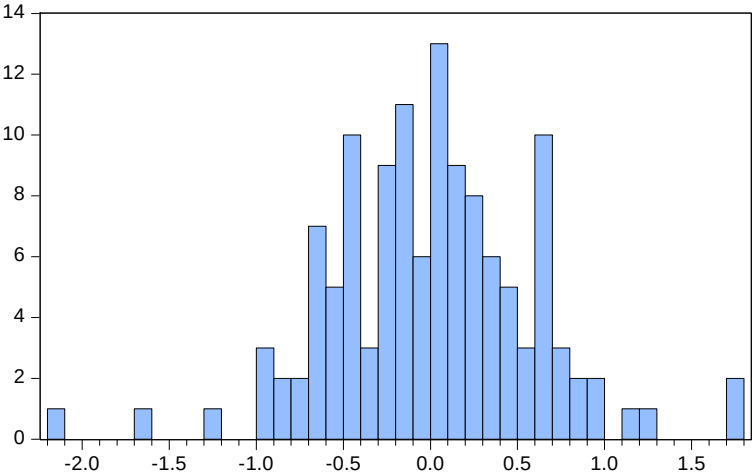


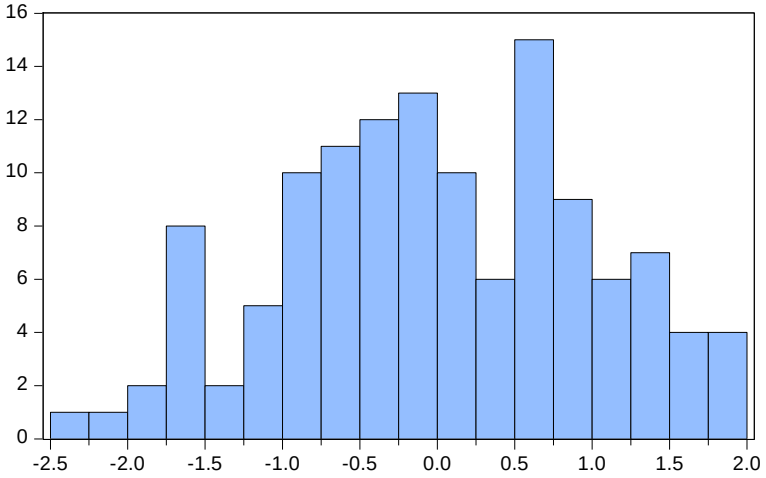
Figure 2. The FEM Residuals Normality Test



Series: Standardized Residuals
Sample 2006 2019
Observations 126

Mean	-4.23e-17
Median	0.019909
Maximum	1.778329
Minimum	-2.161856
Std. Dev.	0.584490
Skewness	-0.113092
Kurtosis	4.543560
Jarque-Bera	12.77712
Probability	0.001681

Figure 3. The SUR Weighted FEM Normality Test



Series: Standardized Residuals
Sample 2006 2019
Observations 126

Mean	6.14e-16
Median	-0.007704
Maximum	1.834444
Minimum	-2.325406
Std. Dev.	0.983390
Skewness	-0.140477
Kurtosis	2.329782
Jarque-Bera	2.772670
Probability	0.249990