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Article

Analysis of Indonesia's Car Exports During Vehicle Electrification in Export Destination Countries 2016-2022

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Abstract: The concern for low-emission economic activities has made many countries electrify vehicles as a step to reduce CO2 emissions. The share of electric vehicle (EV) sales in the world continues to increase exponentially, accompanied by a decrease in the average price of EVs in the world. This is feared to threaten Indonesia's car exports, which are dominated by the internal combustion engine (ICE) type. This study aims to analyze the competitive advantage position of Indonesia's car exports as well as the factors affecting Indonesia's car exports in the country with the largest EV share. The research methods used are export products dynamics (EPD) analysis and unbalanced panel regression analysis. The independent variables used are Indonesia's car export prices, GDP per capita of destination countries, average EV prices of destination countries, revealed comparative advantages (RCA) values, and dummy free trade agreements (FTAs). The dependent variable used is the export value of Indonesia's cars with HS code 8703. The results of the study using EPD show that most of Indonesia's car exports in destination countries are in a less expected position, namely falling stars. The results of the regression analysis show that car export prices and EV prices in destination countries have a significant negative effect. GDP per capita and RCA have a significant positive effect, while FTA has no effect.

Keywords: Electric Vehicle, Car Export, EPD, Panel Regression

1. Introduction

Along with the increasing mobility of the world's people, the demand for motor vehicles is also increasing. Motorized vehicles are currently dominated by Internal Combustion Engine (ICE) vehicles that use fossil fuels as their main energy source. Fossil fuel energy consumption produces CO2 gas which causes negative externality problems in the form of environmental damage (Santos et. al., 2010; Williams III, 2016 cit. Astuti & Maryono, 2018). In 2021, the world's total CO2 emissions reached 38 billion tons with the transportation sector as the second largest contributor after the electricity and heat production sector (International Energy Agency, 2023). As many as 86% of countries emphasized measures to mitigate the impact of CO2 emissions to achieve their Nationally Determined Contribution target to the transportation sector, one of which is through vehicle electrification (United Nations Framework on Climate Change Conference, 2023). Research proves that electric vehicles or EVs produce very low CO2 emissions compared to ICE-type vehicles (Veza et al., 2023).

However, the total availability of EV units in the world is still relatively low when compared to the total ICE vehicles. One of the main obstacles is the problem of the price of EV units which is more expensive than ICE vehicles. This has been responded by many countries by enacting policies such as purchase subsidies so that they can reduce EV prices and reduce the price gap between EVs and ICE vehicles. Li & Wang (2023) revealed that purchase subsidies are an efficient policy in overcoming the problem of high prices in EVs.

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The existence of a subsidy policy has a positive effect on the increase in world EV demand trends. The world's EV market share in 2016 did not reach 1%, but in 2022 its market share has increased exponentially to 14% (International Energy Agency, 2023). The data indicates that EVs are a substitute for ICE vehicles. The conjecture is supported by Guo et al. (2021) which found that the substitution of ICE vehicles to EVs in China has a ratio of 1:3 when subsidies are applied.

On the other hand, car exports, which are dominated by ICE types, are one of the commodities that make a positive contribution to Indonesia's trade balance. From 2016 to 2022, there was a positive trend in Indonesia's car exports even though in 2020 there was a decline due to the COVID-19 pandemic. Even so, the growth trend of Indonesia's car exports from 2016-2022 to the destination countries with the world's largest EV share shows a varied trend (United Nations Comtrade, 2024). The world's EV growth is currently dominated by China with a market share of more than 50% (International Energy Agency, 2023). Export destinations such as China with the world's largest share of EVs show a negative trend. Likewise countries such as Germany, United Kingdom, and Netherlands. However, countries such as United States, France, South Korea, Belgium, Japan, and Spain showed a positive trend in the same time frame.

Previous research conducted by Qodri & Widyastutik (2023) showed that Indonesia is in a falling star position and a market with less potential for motor vehicle exports using EPD and X-MODEL analysis, while through regression analysis it was found that the GDP per capita of the destination country, EV policies in Indonesia, and EV policies in the destination country have a significant positive influence. Research written by Yatik (2018) includes the FTA variable, namely the ASEAN-Free Trade Area (AFTA) trade agreement and includes the RCA variable into the regression model, showed that the variables of GDP per capita, RCA and AFTA had a significant effect on Indonesia's cocoa bean exports. Published article by Nugraha et al. (2023) which analyzes the competitive advantage position of Indonesian banana exports shows that the rising star position is in China; the falling star position is in Malaysia, Japan and Singapore; and the lost opportunity position is in the United Arab Emirates. Published article by Nibras & Widyastutik (2019) shows that Indonesia's palm oil exports are superior in competitiveness or in the "rising star" position in 15 OIC countries using EPD analysis, while the regression analysis of panel data found that GDP per capita of destination countries, export prices have significant influence. Conducted research by Anggraini (2006) shows that GDP per capita of the United States, world coffee prices, world tea prices have significant influence on the volume of coffee exports Indonesia to United States. Conducted research by Setyawati et.al (2014) about Indonesia's Natural Rubber Export Demand to the United States shows that the quantity of natural rubber exports in the previous year, the price of natural rubber have significant positive effect; the price of synthetic rubber had a significant negative effect; the gross national income per capita had no effect. Research related to substitution prices was also conducted by Fadhlurrohman (2021) showing that international prices, Indonesia's GDP and substitution prices have a significant effect on the volume of Indonesia's palm oil exports to India, while Indonesia's GDP has no effect in long-terms.

Vehicle electrification policies has proven to be able to reduce the selling price of EV cars, thereby increasing the demand for EV cars. This raises concerns about Indonesia as an exporter of cars dominated by ICE types. In addition, there is still few research focusing on ev impact on car export commodities that the author found. This study aims to analyze the competitive advantages position of Indonesia's car exports as well as the factors affecting Indonesia's car exports during the electrification of vehicles through the reduction of EV prices in the export destination country These factors include the GDP per capita of the destination country, the average price of EVs in the destination country, the value of revealed comparative advantages (RCA), and dummy free trade agreements (FTAs).

2. Materials and Methods

Table 1. Data Details and Sources

Variables	Definition
Export value of Indonesia's car	US dollar currency-based nominal (US Dollar). The data source comes from United Nations Comtrade (2024) based on HS commodity code 8703.
Export price of Indonesia's car	Export price is obtained from the value of exports divided by the export volume (USD/unit) with the calculation formula according to Mahendra (2022) as follows, $$Export\ price = \frac{Export\ value}{Export\ volume}$$ The data source comes from the United Nations Comtrade (2024) which is processed and based on HS commodity code 8703.
Gross Domestic Product per Capita of Destination Country	US dollar currency-based nominal gross domestic product divided by the number of the population of the destination country. The data source comes from World Bank (2024) and symbolizes person income.
EV prices in destination countries	The average price of EVs sold in export destination countries. The data source comes from Statista Market Insight (2023).
Dummy Free Trade Agreements (FTAs)	Whether or not there is an FTA trade cooperation agreement between Indonesia and export destination countries using data with a unit of 0 or 1. Data number 0 shows the period before the FTA cooperation agreement and data number 1 shows the period after the FTA cooperation agreement. The data source comes from FTA Center website owned by the Ministry of Trade of Indonesia (2023).
Revealed Comparative Advantages (RCA)	The data source comes from UN Comtrade data that has been processed. The author uses the formula for calculating the RCA score by Qodri & Widyastutik (2023) as follows, $$RCA = \frac{X_{aj}/X_{bj}}{W_{aj}/W_{bj}}$$ Information: Xaj = Value of Indonesia's car exports to the destination country Xbj = Total value of Indonesia's exports to destination countries Waj = Value of world car exports to destination countries Wbj = Total value of world exports to destination countries

The panel data used is combination of time-series data from 2016-2022 and cross-section data from 10 Indonesian car export destination countries as samples. A total of 10 selected export destination countries represent 87.8% of global EV sales in 2022. These countries are China, the United States, Germany, France, the United Kingdom, South Korea, Belgium, Japan, the Netherlands, and Spain. According Ministry of Finance (2024), the definition of HS commodity code 8703 is a car and other motor vehicle designed primarily for the transport of people, including station wagons and racing cars. The data includes electric car commodities with HS code 870380. According Ministry of Finance (2024), the definition of HS 870380 is another vehicle, only with an electric motor for propulsion. However, Indonesia has not exported electric cars until 2021. In 2022, Indonesia has exported electric cars, but the destination countries for electric car exports are not included in the country objects in this study, namely Nepal, Hong Kong, and India. (Association of the Indonesia Automotive Industries, 2022). Descriptive statistical data using natural logarithms (ln) are presented in Table 2.

Table 2. Descriptive Statistical Analysis

Variables	Export Value (HS 8703)	Export Price (HS 8703)	GDP per capita destination country	Average Price EV destination country	Dummy FTA	RCA Value
Unit	US dollar	US dollar/Unit	US dollar	US dollar	1 or 0	unit
Mean	16706973	18463.33	40426.2	61525.29	0.200	0.068
Median	207303.1	16982.41	41054.96	61500	0.000	0.001
Maximum	167000000	37575.85	76398.59	80180	1.000	0.611
Minimum	2250	7676.073	8094.39	45400	0.000	0.000
Std. Dev.	43946448	6346.237	14358.06	8205.088	0.403	0.162
Observation	63	63	70	70	70	63

Source : data processed by researchers

Model Specification and Methodology

Export Product Dynamics (EPD)

Export Product Dynamics (EPD) analysis is used to analyze the competitive advantages position of an export commodity in the destination country. The analysis was carried out based on observations on the growth of export market share (business strength) and product market share growth (market attractiveness). The results of observations based on these indicators can provide analysis related to the competitive advantages position of commodities through the position matrix so that four categories emerge.

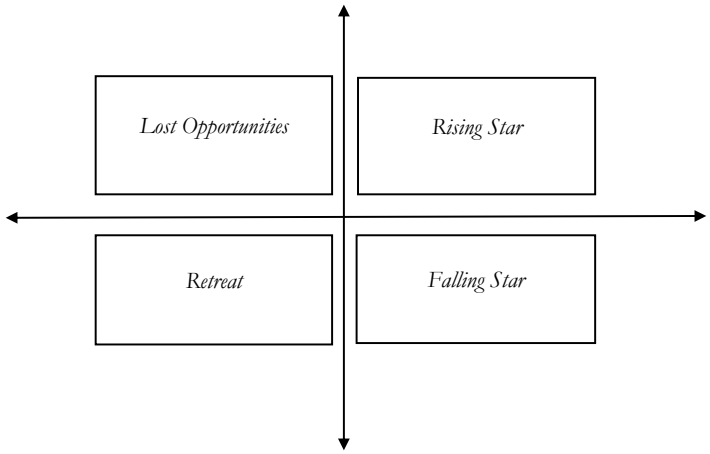

Figure 1. EPD Competitiveness Position Based on Quadrant

Source : Esterhuizen, 2006

Where X-axis is business strength (growth of export market share); and Y-axis is market attractiveness (growth of product market share). The formulation of EPD uses the calculation from Esterhuizen (2006) as follows:

Change in export market share (X-axis)

$$\Sigma\_(t=1)\text{^}t=((X\_aj/W\_aj)\_t \times 100\% -(X\_aj/W\_aj)\_(t-1)\times 100\%)$$

Changes in product market share (Y-axis)

$$\Sigma\_(t=1)\text{^}t=((X\_bj/W\_bj)\_t \times 100\% -(X\_bj/W\_bj)\_(t-1)\times 100\%)$$

Where Xaj is value of car exports from Indonesia to destination countries; Xbj is total value of exports of all products from Indonesia to the destination country; Waj is value of

car exports from the world to the destination country; andWbj is total value of exports of all products from the world to the destination country.

Panel data regression

Formulation of regression models

The author first transforms variable data into a natural logarithm form which aims to compress the scale of variable measurements that have too large a difference due to the difference in variable units (Gujarati, 2004). So, the specifications of the model used by the author are as follows:

lnX_ijt= β_0+ β_1 lnP_ijt+ β_2 ln〖GDPC〗_jt+ β_3 ln〖PEV〗_jit+ β_4 〖lnRCA〗_ijt+〖β〗_4 〖DFTA〗_ijt+ e_ijt

Where X is the value of Indonesia's car exports; P is the export price of Indonesia's cars; GDPC is gross domestic products (GDP) per capita in the export destination country; PEV is the average price of an electric vehicle (EV) in the export destination country; DFTA is dummy free trade agreements (FTAs) and e is random error term.

Selection of the best models

The next step is to select the best model among the common effect model (CEM), fixed effect model (FEM), and random effect model (REM). The panel data regression approach using common effects is based on the assumption that the data behavior between individuals is always the same at different times. The panel data regression approach using fixed effect assumes that the characters between individuals are different, while the individual characters are the same at different times. The random effect approach assumes that the disturbance variables can be interconnected both in data between time and between individuals, so it has another name, namely the Error Component Model (ECM). According to Widarjono (2013), to choose the right model, there are 3 types of testing methods, including: Chow Test, Lagrange Test, and Haussman Test. The chow test is used to select the best model between the common effect model (CEM) or the fixed effect model (FEM). The Lagrange Multiplier test is used to choose between a common effect model (CEM) or a random effect model (REM). The Hausman test is used to choose between a fixed effect model (FEM) or a random effect model (REM).

Classical assumption test

The classical assumption test aims to obtain the Best Linear Unbiased Estimator (BLUE) estimator value. The classic assumption tests used are normality tests, multicollinearity tests, autocorrelation tests and heteroscedasticity tests. The normality test has the purpose of checking the residual or error terms in the normal or abnormal distributed model through histograms and the Jarque-Bera Test. The Multicollinearity Test aims to determine the relationship between independent variables in a regression equation through a correlation coefficient with a value of less than 0.85 (Widarjono, 2013). The autocorrelation test aims to determine the correlation between one perturbation variable and another perturbation variable through the Durbin-Watson Method Statistical Test and the Durbin-Watson Modified Method Statistical Test (Widarjono, 2013 & Gujarati, 2004). The Heteroscedasticity test aims to determine the problems in a regression model characterized by variable variables of inconstant perturbation, the mean variable of perturbation variables is not equal to zero, and perturbation variables are interconnected between observations through the Park test and the Glejser test.

Statistical test

Statistical tests were carried out using the t-test, f-test, and determination coefficient. The t-test is a form of partial regression coefficient test to determine the influence of independent variables on individual dependent variables. The F test is carried out to see the influence of all independent variables together on the dependent variable so that it is also called a simultaneous significance test. The determination coefficient (R2) is used to determine the percentage of total diversity of dependent variables that can be explained by independent variables.

3. Results

Competitive advantages position

Table 3. EPD Results of Indonesia's HS 8703 Car Exports in 10 Destination Countries

Country	Export Market Share Growth (%)	Product Market Share Growth (%)	Market Position
China	-0.0003	0.2188	Lost Opportunity
United States	0.0003	0.0191	Rising star
Germany	0.0000	-0.0071	Retreat
France	0.0000	-0.0060	Falling Star
United Kingdom	0.0000	-0.0057	Falling Star
South Korea	0.0008	-0.0006	Falling Star
Belgium	0.0072	0.0059	Rising star
Japan	0.0393	-0.0165	Falling Star
Netherlands	-0.0001	-0.0111	Retreat
Spain	0.0008	-0.0038	Falling Star

Source : United Nations Comtrade, 2024 (data processed by researchers)

Based on Table 3., the rising star position is found in the United States and Belgium. Falling star positions are found in France, the United Kingdom, South Korea, Japan, and Spain. China is the only one that has a lost opportunity position, while Germany and the Netherlands are in a retreat position.

Determinants of export for HS 8703 Indonesia cars

The selection of the best model using the results of the Chow test is a fixed effect model with probability Chi-square of 0.000 which less than 5%. The model selected based on the Lagrange Multiplier test is a random effect model with a Breusch-Pagan probability value of 0.000 which less than 5%. Furthermore, using the Hausmann test, the following results were obtained is the fixed effect model with a probability value of 0.035 which is less than 5%. So it can be concluded that the best model selected is the fixed effect model (FEM).

The classical assumption test begins with a normality test means that the residual has normally distributed data with a probability value of 0.653819 which is more than 5%. The next test was carried out by a multicollinearity test with result that there is no multicollinearity problem in the model with the correlation coefficient value for all variables having a value of less than 0.85 so as to meet the assumption of multicollinearity.

Testing the autocorrelation problem using the Durbin-Watson table obtained a significance of 1%, the dL value and dU value of (k) and (n) of the same obtained values of 1.248 and 1.598 so that the d value still meets the criteria of dL < d < dU (1,248 < 1,461 < 1,598) which gives no decision. Based on the autocorrelation test using the modification of the Durbin-Watson test at a significance of 5%, a value of d was obtained that met the criteria of d < dU (1,461< 1,767) so that it can be concluded that the model contains a positive autocorrelation problem. Furthermore, the autocorrelation problem was cured

using the GLS method on Eviews by selecting cross-section weights (Kosmaryati et al., 2019). Testing heteroscedasticity problems using the park and gleijser tests showed heteroscedasticity problems with a probability value of the Park test of the DFTA variable of 0.0248 < a significance of 5% and a probability value of the Gleijser test of the DFTA variable of 0.0452 < a significance of 5%. Models containing heteroscedasticity problems can be treated through generalized least squared (GLS) cross-section weights and white heteroscedasticity cross-section standard error & covariance (Widarjono, 2013; Wicaksono et al., 2022).

Overall, the results of the classical assumption test of normality, multicollinearity, autocorrelation, and heteroscedasticity in the model show that there is a problem of autocorrelation and heteroscedasticity. After the model is cured, the model has been free from the problem of classical assumptions so that it produces an estimator that is BLUE, which is unbiased, linear, and has minimal variability.

Table 4. Fixed Effect Regression Estimation Model Using GLS Cross-Section Weights and White Cross-Section Standard Error & Covariance Weighting

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	27.01472	2.787853	9.690150	0.0000
LOG(P)	-0.161803	0.058932	-2.745600	0.0085
LOG(GDPC)	0.830668	0.208981	3.974852	0.0002
LOG(PEV)	-1.380270	0.358362	-3.851606	0.0003
LOG(RCA)	0.993689	0.004023	247.0175	0.0000
DFTA	0.070215	0.074739	0.939481	0.3522
R-squared	0.998861			
F-statistic	3007.022			
Prob(F-statistic)	0.000000			
Durbin-Watson stat.	1.693977			

Source : data processed by researchers

Based on the results of the statistical test using the t-test, the variables P, GDPC, PEV, and RCA have a significant effect on the dependent variable Q. However, the DFTA variable has a insignificant effect on the dependent variable Q. In the f test, the variables P, GDPC, PEV, RCA, and DFTA together have a significant influence on the dependent variable Q. In the determination coefficient test, an R-squared value of 0.998861 is obtained, which means that 99.9% of the dependent variable Q is able to explained by independent variables in the model, namely P, GDPC, PEV, RCA, and DFTA. However, as much as the other 0.1% is explained by other variables outside the model.

Referring to table 4., the equation for the HS 8703 Indonesia car export model can be formulated as follows:

lnX_ijt= 27.0147 - 0.1618 lnP_ijt+ 0.8307 ln〖GDPC〗_jt- 1.3803 ln〖PEV〗_jit+0.9937 〖lnRCA〗_ijt+ 0.0702 〖DFTA〗_ijt+ e_ijt

Based on this model, if there is a 1% increase from the price variable (P), it will reduce Indonesia's car exports by 0.1618% with other variables considered fixed. Then, if there is a 1% increase from the GDP per capita variable of the destination country (GDPC), it will increase Indonesia's car exports by 0.8307% with other variables considered fixed. If there is an increase in the price of electric cars (PEV) in destination countries by 1%, it will reduce Indonesia's car exports by 1.3808% with other variables considered fixed. If there is an increase in the competitiveness of Indonesia's car exports (RCA) by 1%, it will increase Indonesia's car exports by 0.9937% with other variables considered fixed. Then, if there is a free trade agreement (FTA), it will increase Indonesia's car exports.

The above model is a model that takes into account individual diversity as shown through the difference in interception between individuals. If the independent variable

does not have an effect on the dependent variable, then only the total individual effect has an effect on the dependent variable. The total effect of an individual is the sum of the intercept value with the cost. In this study, the largest total effect value was obtained by China, the United States, and Japan.

Table 5. Total Individual Effects

Country	Intersep	Constant	Total Effects
China	2.0982	27.0147	29.1129
United States	1.4926	27.0147	28.5073
Germany	-0.4536	27.0147	26.5611
France	-1.1451	27.0147	25.8696
United Kingdom	-1.0050	27.0147	26.0097
South Korea	-0.0276	27.0147	26.9871
Belgium	-0.6002	27.0147	26.4145
Japan	0.6508	27.0147	27.6655
Netherlands	-1.0015	27.0147	26.0132
Spain	-0.5348	27.0147	26.4799

Source: data processed by researchers

4. Discussion

Dynamics of Indonesia's exports to 10 destination countries

Based on the results of the EPD analysis of Indonesia's HS 8703 car exports in 10 destination countries (Table 3.) shows that the export position of Indonesia's HS 8703 car has a diverse position in export destination countries. The rising star position shows that there has been growth in both product market share and Indonesia's car exports to destination countries. These positions are found in the United States and Belgium. In figure 2., the value of Indonesia's car exports to the United States shows an increase from 2016 to 2019. Despite a decline in car export demand in 2020 which can be caused by the COVID-19 pandemic, the value of Indonesia's car exports has increased again up to 4.5 times in 2022 compared to 2021. The United States is the country with the third largest population and the number one largest importer of HS 8703 cars in the world (Trade Statistics for International Business Development, 2024). The import value of HS 8703 cars by the United States as a whole has increased. by 13.7% from 2021 to 2022 with the largest imports coming from Mexico, Japan, Canada, South Korea, and Germany.

Belgium is the seventh largest exporter of HS 8703 cars in the world in 2022 (Trade Statistics for International Business Development, 2024). The export value of Indonesia's HS 8703 cars decreased by -66% in the 2019-2020 period. This is due to the switch in imports of HS 8703 cars by Belgium from China with a growth of 159% in the same period. Belgium is Indonesia's export destination in 24th place and 5th among European Union countries (Ministry of Foreign Affairs, 2021).

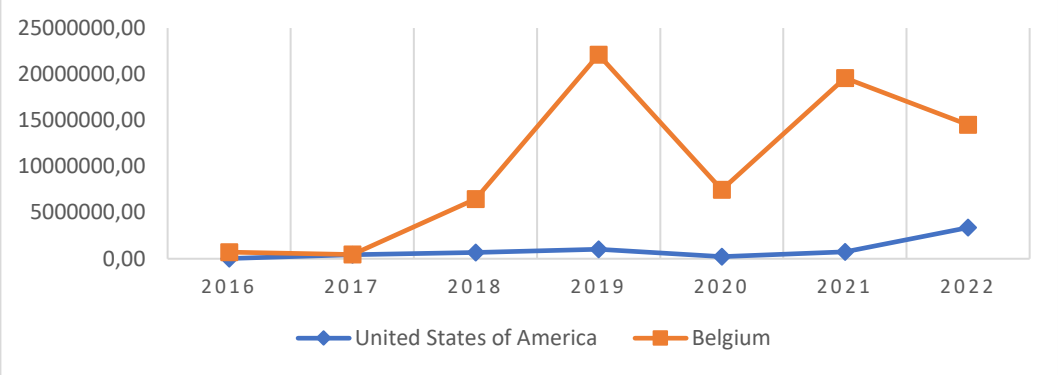

Figure 2. Export Value of HS 8703 Indonesia in Rising Star Countries
Source: United Nations Comtrade, 2024 (data processed by researchers)

The falling star positions are in France, the United Kingdom, South Korea, Japan and Spain. This position shows that there is growth in the export market share but not in the product market. The growth of the market share of products that are not dynamic in France, the United Kingdom, and Spain can be caused by economic integration between these countries. The three countries are members of the European Union. The presence of the European Union is able to increase trade between fellow member states but reduce trade with countries outside EU membership (Akram & Rashid, 2017). South Korea's imports of products have shifted from China, the United States, Australia and Viet Nam in 2018-2019 (Trade Statistics for International Business Development, 2024). In addition, South Korea is a country with a trade balance that experienced a surplus in the 2016-2021 period. Product imports by Japan experienced a shift in imports from Brazil, France, and Viet Nam in the same period (Trade Statistics for International Business Development, 2024).

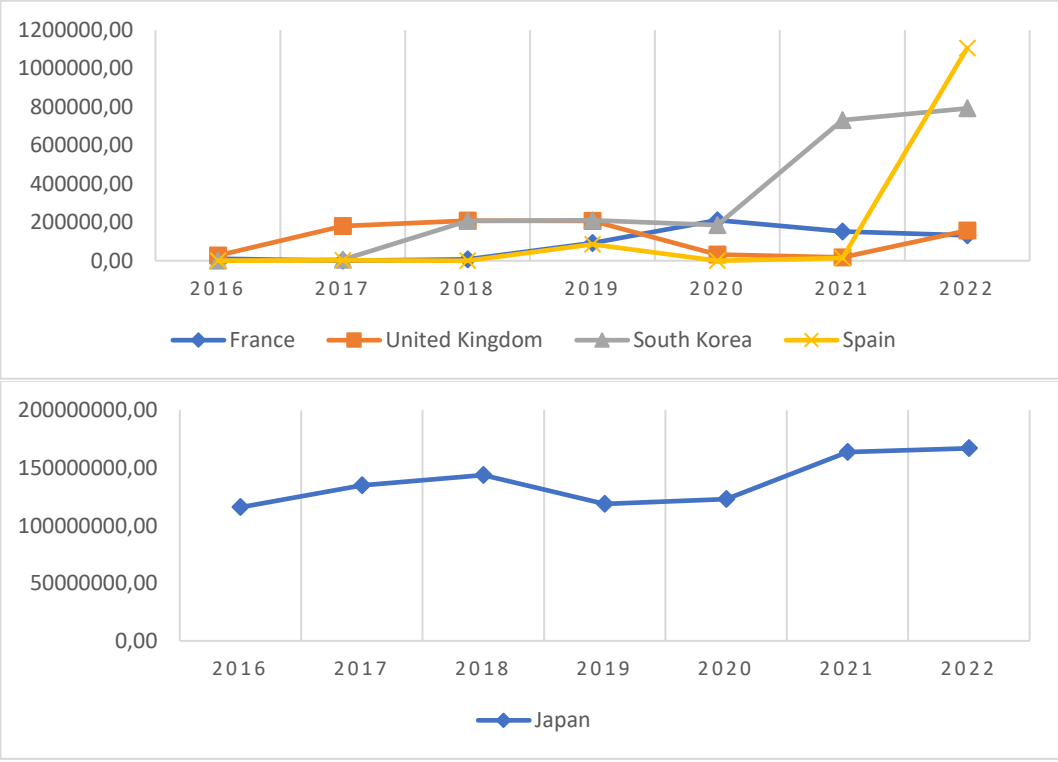

Figure 3. Export Value of HS 8703 Indonesia in Falling Star Countries
Source: United Nations Comtrade, 2024 (data processed by researchers)

The lost opportunity position only occurs in China. This position shows that there is a dynamic change in product share but not in the export market share. The uncompetitive export share of Indonesia's HS 8703 cars can be seen in the RCA value of Indonesia's HS 8703 to China for the period 2016-2022 of 0.0004. The most imports of HS 8703 cars by China during the same period came from Germany, Japan, and the United States. In addition, China is the number one largest car manufacturer in the world in 2022 (International Organization of Motor Vehicle Manufacturers, 2024). The declining export value of Indonesia's HS 8703 cars to China in the period 2017-2022 is also accompanied by an increase in domestic car production in China (Statista, 2024). The increase in production capacity is able to meet the needs of domestic cars in China.

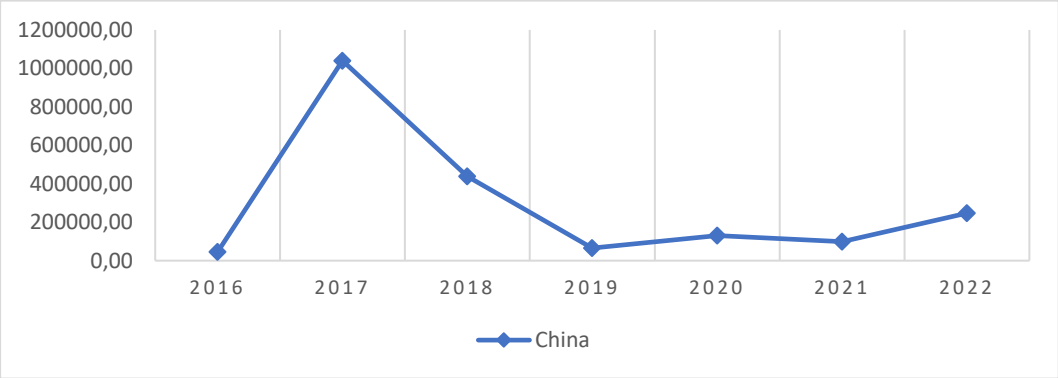

Figure 4. Export Value of HS 8703 Indonesia in Countries with Lost Opportunity Position
Source: United Nations Comtrade, 2024 (data processed by researchers)

The retreat position is a position that shows changes in both export market share and products that are not competitive and tend to be stagnant. This position occurs in Germany and the Netherlands. This can happen because Indonesia's HS 8703 car exports do not have strong competitiveness in the two countries. Through the results of Indonesia's RCA HS 8703 scores in Germany and the Netherlands of 0.0003 and 0.0015. Germany is the number one exporter of HS 8703 in the world, while the Netherlands is ranked 25th in 2022.

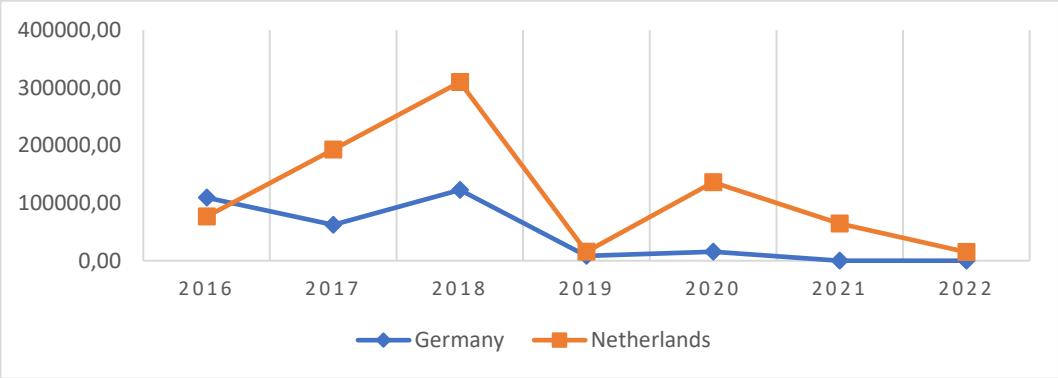

Figure 5. Export Value of HS 8703 Indonesia in Retreat Countries
Source: United Nations Comtrade, 2024 (data processed by researchers)

Overall, most of the market share positions of the HS 8703 Indonesia car are in a position that is less expected, namely falling star, lost opportunity, and retreat. This is in line with the Ministry of Trade (2022) which stated that Indonesia's HS 87 exports are winners in declining global market. The falling star position is the most obtained position in France, the United Kingdom, South Korea, Japan and Spain. The next most positions are in the retreat and rising star positions. The retreat position is in Germany and the

Netherlands, while the rising star position is in the United States and Belgium. The least position, namely lost opportunity, is in China.

Steps that can be taken in responding to the results of Indonesia's competitive competitiveness position above are that Indonesia car manufacturers need to find an export market with demand for Indonesia's HS 8703 cars which has a positive trend and increase the production of new products according to market demand (Ministry of Trade, 2023). Electric vehicles are one of the products with increasingly positive market share development. The form of support that can be provided by the Indonesia government is a reduction in income tax for manufacturers who produce electric vehicles and exemption from import duties on production raw materials (Raharyo et. al., 2022).

Relationship of Indonesia's HS 8703 Car Export Determinants

The HS 8703 car export price variable has a coefficient of -0.162 with a probability value of 0.009 so that it is smaller than the significance of 5%. This shows that the export price of Indonesia's HS 8703 car has a negative effect on Indonesia's car export demand. This result is in line with the demand theory, if the export price of a commodity increases, it will decrease the demand. In line with research conducted by Anggraini (2006) that world coffee prices have a significant negative effect on Indonesia's coffee export demand from the United States with a coefficient value of -0.301. In line with previous research conducted by Nibras & Widyastutik (2019) which showed that Indonesia's palm oil export prices had a significant negative effect on export demand with a coefficient of -0.39. The response that can be made based on the discussion above is that Indonesia car manufacturers need to develop innovations in the car manufacturing process. The process of production innovation can result in low production costs (Schmidt & Porteus, 2000). Low car production costs are able to make car export selling prices more competitive.

The variable GDP per capita of the destination country has a coefficient of 0.831 with a probability value of 0.000, so the value is less than the significance of 5%. Based on this, the results were obtained that GDP per capita had a positive effect on Indonesia's HS 8703 car export demand. Based on the theory of demand that is influenced by income, when there is an increase in income, it will cause an increase in the consumption of a good. The increase in income shows that people's purchasing power has increased so that they can afford to buy more goods. The positive influence of GDP per capita on the export demand of Indonesia's HS 8703 car also shows that the HS 8703 car is a normal good. The results of this study are in line with research related to factors affecting the export of coffee, cocoa beans, palm oil, and automobiles which show that the GDP per capita variable has a significant positive effect on the export demand of these commodities (Anggraini, 2006; Yatik, 2018; Nibras & Widyastutik, 2019; Qodri & Widyastutik, 2023). The step that can be taken by Indonesia car manufacturers is to focus on car exports to countries with high per capita income. In addition, the government can also formulate policies or bilateral cooperation with countries with high per capita income. This aims to make it easier for producers to export to destination countries with high per capita income.

The EV price variable of the destination country has a coefficient of -1.380 with a probability value of 0.000 so that it is smaller than the significance of 5%. This shows that the price of EVs in destination countries has a negative effect on the export demand of Indonesia's HS 8703 cars. The results of the analysis are not in accordance with the initial hypothesis in this study. The negative relationship between EV prices and ICE Indonesia's car export demand is possibly caused consumer behavior driven by reputation motives. According to Buhmann & Criado (2023) in their research entitled "Consumers' preferences for electric vehicles: The role of status and reputation" it was found that consumers will choose EVs over ICE cars when EV prices become more expensive than before. This is because consumers with reputation-driven behavior do not want to be considered to lose their wealth and purchasing power if they buy EV cars at cheaper prices. The inconsistency

of the research results with the hypothesis is also suspected to be caused by the export of Indonesia's HS 8703 car which does not have a comparative advantage. This is shown by the RCA value of HS 8703 Indonesia car exports which is < 1 in 10 export destination countries. This shows that when EV prices increase, the export demand for HS 8703 cars continues to increase but does not come from Indonesia. In 2022, China imported the most HS 8703 cars from Germany, the United States, and Japan. In the same year, the United States imported the most HS 8703 cars from Mexico, Japan, and Canada. Germany itself is the world's number one exporter of HS 8703 cars (Trade Statistics for International Business Development, 2024). Meanwhile, countries in Europe such as the United Kingdom, France, Belgium, the Netherlands, and Spain import the most HS 8703 cars, most of which come from Germany, China, the United States, and Japan. Based on these discussions, Indonesia car manufacturers can focus their car exports to countries with low EV prices. However, Indonesia car manufacturers need to conduct an analysis of consumer tastes related to the preference for buying EV and ICE cars in the destination country. Understanding of consumer desires affects the development of innovation capabilities so that export performance can be maximized (Hortinha et. al., 2011).

The RCA variable has a coefficient of 0.994 with a probability value of 0.000 so that the value is less than the real level of 5%. Based on these results, it can be concluded that the RCA value has a positive effect on the export value of Indonesia's HS 8703 car. The higher the RCA value, the stronger the competitiveness so that a product can compete in the international market. Strong competitiveness shows that export commodities are in demand by foreign consumers, thereby increasing their export demand.

Table 6. RCA HS 8703 Indonesia Scores in 10 Destination Countries

Country	2016	2017	2018	2019	2020	2021	2022	Average
China	0.0001	0.0017	0.0007	0.0001	0.0002	0.0001	0.0002	0.0004
United States	0.0000	0.0003	0.0005	0.0008	0.0002	0.0006	0.0024	0.0007
Germany	0.0008	0.0004	0.0009	0.0001	0.0001	0.0000	0.0000	0.0003
France	0.0002	0.0000	0.0001	0.0015	0.0036	0.0026	0.0026	0.0015
United Kingdom	0.0002	0.0019	0.0022	0.0024	0.0005	0.0002	0.0017	0.0013
South Korea	0.0000	0.0000	0.0010	0.0013	0.0011	0.0039	0.0032	0.0015
Belgium	0.0079	0.0045	0.0667	0.2449	0.0808	0.1968	0.1229	0.1035
Japan	0.4227	0.4584	0.4535	0.4413	0.5621	0.6107	0.5703	0.5027
Netherlands	0.0011	0.0022	0.0038	0.0002	0.0020	0.0007	0.0002	0.0015
Spain	0.0000	0.0000	0.0000	0.0010	0.0000	0.0002	0.0138	0.0021

Source: data processed by researchers

Based on the Table 6., the highest average RCA HS 8703 Indonesia score was obtained in Japan, Belgium, and Spain. However, the RCA HS 8703 score Indonesia in all countries has an average value of <1 for all destination countries. This indicates that Indonesia's HS 8703 car exports have weak competitiveness or do not have a comparative advantage in the 10 destination countries. In 2022, Indonesia ranked 26th out of more than 190 exporting countries for HS 8703 cars. In contrast to the 10 export destination countries in this study, these countries are in a high position including China (6), the United States (3), Germany (1), France (13), the United Kingdom (9), South Korea (4), Belgium (7), Japan (2), the Netherlands (25), and Spain (8) (Trade Statistics for International Business Development, 2024).

The FTA dummy variable has a coefficient of 0.070 with a probability value of 0.352, so the value is more than the real level of 5% so it is not significant. Based on this, it was obtained that the FTA had no effect on Indonesia's HS 8703 car export demand. Until 2022,

Indonesia has agreed on 32 international trade agreements which include PTA/FTA/CEPA (Ministry of Trade, 2023) The following are some of Indonesia's FTA agreements with several export destination countries in this study, including:

a. ASEAN-China Free Trade Agreement (ACFTA)
   The ACFTA agreement officially began to be implemented on August 1, 2019. The ACFTA agreement is an agreement between ASEAN member countries and China. One of the benefits obtained by Indonesia through the agreement is the elimination of tariffs on 94.6% of Indonesia's export tariff routes to China.
b. ASEAN-Korea FTA (AK-FTA)
   The AK-FTA agreement is an agreement between ASEAN member countries and South Korea. AK-FTA began to be implemented on November 12, 2018. The benefit of this agreement is the elimination of tariffs for 80% of goods traded between the member countries of the AK-FTA agreement.
c. ASEAN-Japan Comprehensive Economic Partnership (AJCEP)
   The AJCEP Agreement is an agreement between ASEAN member countries and Japan. The AJCEP Agreement began to be implemented on March 1, 2018. Over time, the agreement then underwent changes contained in the "First Protocol to Amend AJCEP" which was signed on March 2, 2019 and began to be implemented on February 1, 2022. The benefit of the agreement is the elimination of tariffs as much as 84.5% of all tariff posts for exports originating from Indonesia to Japan.

The insignificant influence of FTA in this study can be caused by the export of Indonesia's HS 8703 car manufacturer to 10 destination countries having intensive margin behavior. The presence of FTAs does not affect exports carried out by companies with intensive margin behavior in the short term, but it may affect the exports of companies with extensive margin behavior (Hayakawa, 2015). Intensive margin behavior means an increase in production in commodities that have a comparative advantage or a decrease in production in commodities that do not have a comparative advantage. Research conducted oleh Iladini & Agustina (2020) menyebutkan bahwa adanya ACFTA have a significant effect in the long term but not in the short term on Indonesia's coffee exports to China.

5. Conclusion

The results of the EPD analysis show that most of the competitive competitiveness positions of Indonesia's car exports in the 10 destination countries with the largest share of EVs are in a less expected position, namely falling stars. The most expected position is that the rising star is in the United States and Belgium. The falling star positions are in France, the United Kingdom, South Korea, Japan and Spain. The lost opportunity position occurred in China. Finally, the least expected position is retreat in Germany and the Netherlands. The export price of Indonesia's HS 8703 car has a negative effect on Indonesia's HS 8703 car export demand. This is in line with the demand theory that an increase in price will decrease the demand for an item. The GDP per capita of the destination country has a positive effect on the export demand for Indonesia's HS 8703 car. This is in line with the theory of demand which is influenced by income. When income increases, it will increase the consumption of an item. EV prices in destination countries have a negative effect on the export demand for Indonesia's HS 8703 cars. Consumers with reputation motives do not want to be considered as decreasing their purchasing power if they buy an EV car at a cheaper price. In addition, this is due to Indonesia's car exports which do not have a comparative advantage. The RCA value of Indonesia's HS 8703 car exports has a positive effect on Indonesia's HS 8703 car export demand. The results of the RCA score of Indonesia's HS 8703 car show that Indonesia's car exports do not have a comparative advantage. The highest RCA was obtained in Japan with a value of 0.5027.

The lowest RCA value is in Germany with a value of 0.0003. The existence of an FTA has no effect on Indonesia's HS 8703 car exports. This is an indication that Indonesia's HS 8703 car manufacturer has an intensive margin behavior in HS 8703 car commodities to China, the United States, Germany, France, the United Kingdom, South Korea, Belgium, Japan, the Netherlands, and Spain.

REFERENCES

1. Akram, M., & Rashid, A. (2017). Trade Creation and Diversion Effects of the European Union. Pakistan Journal of Applied Economics, Dec(2016).
2. Anggraini, D. (2006). Faktor-Faktor yang Mempengaruhi Permintaan Ekspor Kopi Indonesia dari Amerika Serikat. (Unpublished master's thesis). University of Diponegoro.
3. Association of the Indonesia Automotive Industries. (2022). export_data_jandec_2022. https://files.gaikindo.or.id/.
4. Astuti, N. P., & Maryono. (2018). Environmental Tax to Control Air Pollution from Transport Sector in Yogyakarta City. Proceeding Biology Education Conference, 15(1): 760-765.
5. Buhmann, K. M., & Criado, J. R. (2023). Consumers' Preferences for Electric Vehicles: The Role of Status and Reputation. Transportation Research Part D, 114(2023) 103530.
6. Estherhuizen D. (2006). Measuring and Analyzing Competitiveness in the Agribusiness Sector: Methodological and Analytical Framework. Pretoria: University of Pretoria.
7. Fadhlurrohman, F. (2021). Pengaruh Luas Lahan, Harga Internasional, Produk Domestik Bruto dan Harga Substitusi Terhadap Volume Ekspor Minyak Kelapa Sawit Indonesia ke India Periode 1986-2018. (Unpublished bachelor's thesis). National University of Islam Syarif Hidayatullah.
8. Gujarati, D. N. (2004). Basic Econometrics, 4th Edition. The McGraw-Hill Inc.
9. Guo, Z., Li, T., Peng, S., & Zhang H. (2021). Environmental and Economic Consequences of The Incentive Policy on Electric Vehicle Industry: A CGE Based Study in China. Resources, Conservation & Recycling, 169(2021), 105542.
10. Hayakawa, K. (2015). Impacts of FTA Utilization on Firm Performance. BE J. Econ. Anal. Policy, 15(3): 1325–1352.
11. Hortinha, P., Lages, C., & Lages, L. F. (2011). The Trade-Off Between Customer and Technology Orientations: Impact on Innovation Capabilities and Export Performance. Journal of International Marketing, 19(3): 36-58.
12. Iladini, K., & Agustina, N. (2020). Analisis Time Series Pendekatan Error Correction Mechanism: Pengaruh Penerapan ACFTA Terhadap Ekspor Kopi Indonesia ke China Periode 2006-2018. Jurnal Statistika dan Aplikasinya (JSA), 4(2).
13. International Energy Agency. (2023). Global EV Outlook 2023. https://www.iea.org/reports/global-ev-outlook-2023.
14. International Energy Agency. (2023). Global Market Share of Electric Vehicles Within Passenger Car Sales Between 2010 and 2022 [Graph]. https://www.statista.com/statistics/1371599/global-ev-market-share/.
15. International Energy Agency. (2023). Greenhouse Gas Emissions from Energy Highlights. https://www.iea.org/data-and-statistics/data-product/greenhouse-gas-emissions-from-energy-highlights.
16. International Organization of Motor Vehicle Manufacturers. (2024). 2022 PRODUCTION STATISTICS. https://www.oica.net/category/production-statistics/2022-statistics/.
17. Kosmaryati K, Handayani C.A., Isfahani R.N., & Widodo E. (2019). Faktor-Faktor yang Mempengaruhi Kriminalitas di Indonesia Tahun 2011-2016 dengan Regresi Data Panel. Indonesian Journal of Applied Statistics. 2(1): 10-20.
18. Li, K., & Wang, L. (2023). Optimal Electric Vehicle Subsidy and Pricing Decisions with Consideration of Ev Anxiety And Ev Preference In Green And Non-Green Consumers. Transportation Research Part E, 170(2023), 103010.
19. Mahendra, G. W. (2022). Analisis Faktor – Faktor yang Memengaruhi Ekspor Udang Indonesia ke Amerika Serikat Pada Tahun 1998 – 2020. (Unpublished bachelor's thesis). University of Islam Indonesia.
20. Ministry of Finance. (2024). Indonesia National Trade Repository. https://www.insw.go.id/intr

21. Ministry of Foreign Affairs. (2021). Indonesia – Belgia. https://www.kemlu.go.id/brussels/id/pages/indonesia_-_belgia/1667/etc-menu
22. Ministry of Trade. (2023). Laporan Kinerja Kementerian Perdagangan 2022. https://www.kemendag.go.id/tentang/sakip-setjen/laporan-kinerja-kementerian-perdagangan-tahun-2022.
23. Nibras, G. S., & Widyastutik. (2019). Daya Saing, Ekuivalen Tarif, dan Faktor-Faktor yang Memengaruhi Permintaan Ekspor Minyak Sawit Indonesia di Negara OKI. Jurnal Ekonomi & Kebijakan Publik, 10(2): 111-124.
24. Nugraha, A. A., Darsono, Marwanti, S. (2023). Analisis Daya Saing Kompetitif Ekspor Pisang Indonesia di Pasar Internasional. UMJember Proceeding Series 2(3): 167-173.
25. Qodri, M. I. A., & Widyastutik. (2023). Kebijakan Rendah Emisi Negara Anggota G20 dan Kinerja Ekspor Kendaraan Bermotor Indonesia. Jurnal Ekonomi dan Kebijakan Pembangunan, 12(1): 41-68.
26. Raharyo, A., Mertawan, G. A., & Baskoro, R. (2022). Competitive Advantage Between Indonesia and Thailand on Electric Vehicle Manufacturing. Journal of Economics and Business Aseanomics, 7(2): 101-121.
27. Schmidt, G. M., & Porteus, L. M. (2000). The Impact of an Integrated Marketing and Manufacturing Innovation. Manufacturing & Service Operations Management, 2(4): 317-336.
28. Setyawati, I. K., Lin, Y. S., Setiawan, B. (2014). Analisis Permintaan Ekspor Karet Alam Indonesia ke Amerika Serikat. AGRISE, 14(2). 89-106.
29. Statista Market Insights. (2023). Electric Vehicles. https://www.statista.com/outlook/mmo/electric-vehicles/worldwide.
30. Statista. (2024). Production of cars in China from 2010 to 2022, by type(in 1,000 units). https://www.statista.com/statistics/281133/car-production-in-china/.
31. Trade Statistics for International Business Development. (2024). Trade Map Database. https://www.trademap.org/Index.aspx.
32. United Nations Comtrade. (2024). Trade Data. https://comtradeplus.un.org/.
33. United Nations Framework on Climate Change Conference. (2023). Synthesis report by the secretariat : Nationally determined contributions under the Paris Agreement. https://unfccc.int/ndc-synthesis-report-2023.
34. Veza, I., Asy'ari, M. Z., Idris, M., Epin, V., Fattah, I. M. R., & Spraggon, M. (2023). Electric vehicle (EV) and Driving Towards Sustainability: Comparison Between EV, HEV, PHEV, and ICE Vehicles To Achieve Net Zero Emissions by 2050 from EV". Alexandria Engineering Journal, 82(2023). 459–467.
35. Wicaksono B.W., Wibowo E.W., Karjono A., & Aditya A. (2022). The Effect of Liquidity, Solvency and Company Size on Financial Performance in Property and Real 102 Estate Companies listed on the Indonesia Stock Exchange 2016-2020. LITERATUS. 4(2): 746–757.
36. Widarjono, Agus. (2013). Ekonometrika Pengantar dan Aplikasinya Edisi Keempat. Yogyakarta, UPP STIM YKPN.
37. World Bank. (2024). GDP per capita (current US$). https://data.worldbank.org/indicator/NY.GDP.PCAP.CD.
38. Yatik, V. (2018). Pengaruh Variabel Ekonomi Makro Terhadap Ekspor Biji Kakao Indonesia ke Malaysia, Singapura, Thailand, India dan China. Jurnal Ilmiah Mahasiswa Fakultas Ekonomi dan Bisnis Universitas Brawijaya, 6(2).