

Research Article

Spatial Analysis of the Effect of Halal Product Export and Import on Current Accounts in OIC Countries

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ORCIDMuhammad Iqbal Fasa: <https://orcid.org/0000-0002-0019-4525>**Abstract.**

OIC countries are countries that have the highest development of the halal industry. Most of the export and import activities carried out by OKI are halal products. Exports and imports of the country's halal products will describe the condition of the current account surplus or deficit. This study aims to determine the spatial dependence on the current account and the effect of exports and imports of halal products on the current account. The method used descriptive quantitative techniques with spatial analysis. This research was conducted in 51 OIC countries in 2021 using secondary data. The independent variable values are obtained from ITC and the dependent variable is obtained from WDI. The results showed that there is a spatial autocorrelation in the current account, and the spatial autoregressive regression (SAR) results show that exports of halal products have a significant positive effect on the current account. Meanwhile, imports of halal products have a negative but not significant effect on the current account.

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1. Introduction

Currently, the halal industry is one of the industries that is growing rapidly globally. This development is shown by the results of the State of the Global Islamic Report 2022 which revealed that there was an increase in investment in the Islamic economic sector by 118 percent or US\$ 25.7 billion in 2020/2021, whereas in the previous year, it only had a value of US\$ 11.8 billion[1]. The high increase in the growth of the halal industry is due to the increasing consumption power of the Muslim community for halal products, which reaches US \$ 2 trillion with a Muslim population in the world reaching 1.9 billion in 2021. This value is the consumption value of the halal food industry, halal pharmaceuticals, halal cosmetics, halal tourism, and sharia media. Meanwhile, in the Islamic financial sector, the value of assets will increase by 7.8 percent, or the equivalent of US\$ 3.6 trillion in 2020/2021[1]. The increase in the halal industry is due

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to the increasing population of Muslims in the world and the diversity of halal products offered[2]. The same thing was also expressed by Siddique and Moha who revealed that three factors made the halal industry grow rapidly globally, namely a large Muslim population, economic development in a country that would increase the purchasing power of Muslims, and the emergence of the potential for the halal industry in non-Muslim countries.[3]. Consuming halal products or services is an obligation for every Muslim, so halal for Muslims is not just a religious matter but is also applied in everyday life.[4]. Therefore, the higher the growth rate of the Muslim population, the higher the demand for halal-based products and services which will increase the growth of the halal industry. This makes the halal industry a large market share opportunity for each country to develop it. Therefore, several studies raise this topic, including those conducted by, Maria Gul et al[5], Sutan et al[6], Elfira[7], Rinita[8], and Grandson[9].

This high opportunity has prompted many countries to carry out developments in the economic sector of the halal industry, both carried out by countries with a majority Muslim population and Muslim minorities. The existence of product development in several countries has made these countries cooperate between countries in the export and import of halal products to meet the needs of each country. In addition to developing halal products, export activities also have an important role in driving economic growth in the country[10]and exports are important for low- and middle-income countries because they can maintain macroeconomic stability[11]. Cooperation in the export and import of halal products is not only carried out by Muslim countries with Muslim countries but also carried out by non-Muslim countries. Like Malaysia, which cooperates with the United States, Singapore, Japan, China, and Thailand in the export and import of halal products[12]. The existence of cooperation carried out by non-Muslim countries has made several countries apply rules regarding halal standards for each importer, such as Malaysia with JAKIM halal standards, Singapore with MUIS halal standards, Indonesia with MUI halal standards, and SMIIC halal standards which are applied to countries that join the OKI[13]. 57 countries are members of the Organization of Islamic Cooperation (OIC) which is an organization that represents the voice of Islam in the world that seeks to protect the interests of its members in the political, economic, and social fields, and create international peace.[14]. In addition, OIC countries are countries that have contributed the most to the development of the global halal industry. Where are the UAE, Indonesia, Malaysia, Saudi Arabia, Egypt, and Turkey which are members of the OIC, including countries that have invested more than 20 transactions in 2020/2021? Most of the import activities carried out by OIC member countries are halal products that are traded globally. In 2018 OIC countries in the export and import of halal services

globally accounted for 6.8 percent and 10.3 percent respectively. Whereas in 2020 the value of imports of halal products carried out by OIC countries reached US \$ 279 billion [1]. Exports made by OIC members to Brazil were valued at US\$ 16.5 billion, India was valued at US\$ 15.4 billion, the United States valued at US\$ 13.2, Russia was valued at US\$ 12.7, and Argentina was valued at US\$ 9.5 billion[15]. The trade-in halal products include the halal food and beverage, clothing, pharmaceutical, and cosmetic sectors. The export and import activities of halal products carried out by OIC countries will affect the value of the current account in that country. This is because the current account in a country shows the trading conditions in a country. The following Figure 1 shows OIC's trade balance (current account) in the halal industry sector in 2020



Figure 1: Halal industry sector trade balance. Source: State of Global Islamic Economy Report 2022.

Figure 1 shows that in 2020 only the clothing sector experienced a trade surplus of US\$ 56 billion, while the other sectors, namely food, pharmaceuticals, and cosmetics, experienced a deficit, where the import value was higher than the export value for these products so that the country OIC experienced a deficit in this sector. Even though Figure 1 only shows the fashion sector experiencing a surplus, this indicates that the Islamic economic sector has the potential to contribute to reducing the deficit in the current account.[16]. This is because the value of the current account is in deficit so the country experiences an increase in import activities or a decrease in export activities which will result in the country experiencing relatively higher inflation compared to other countries.[17]. In addition, the current account value which is in deficit in the long term can increase domestic interest rates, reduce the value of the domestic currency, and make this a burden on the people of that country.[18]. However, a deficit current account value does not always indicate that the country's economy is bad because it all

depends on domestic and international economic conditions[19]. Meanwhile, a surplus current account will lower the cost of living in the country[20].

So the value of a country's current account is influenced by the value of exports and imports made by that country. This is supported by the results of several studies conducted by Yelinda and Heriberta which in their research showed that the exchange rate and imports had a negative and significant effect on the current account balance, while exports had a positive and significant effect on the current account balance in Indonesia in 2006-2020 [21]. The same results were also expressed by research conducted by Mayong and M Handry [22]. And for the halal product category, there is research conducted by Wina and Scientists which revealed that exports of halal industrial products and government spending had a positive and significant effect on the current account balance in Indonesia 2008-2017[23], and Syamsuri et al who revealed that exports of halal products had a positive effect and halal imports had a negative and significant effect on the current account in OIC countries 2015-2019[24]. This shows that the value of a country's current account is very important because it shows the country's export and import conditions which will inform that the country is experiencing a current account surplus or deficit which will affect the state of the country's economy. Based on this explanation, researchers are interested in conducting a spatial analysis of the influence of exports and imports of halal products on current accounts in OIC countries.

2. Literature Review

2.1. Current Account

A *current account* often referred to as the current account balance is part of the value of the balance of payments balance of a country that describes the market value of commodities and services in exports and imports in that country [25]. In the Madura book, it is revealed that the current account balance is the value of the overall flow of funds determined between one or many countries for the purchase of goods and services.[26]. Thus, the current account balance includes all values that are debited and credited resulting from the export and import of goods and services, whether in the form of receipt of income, payments for purchases and gifts, or grants. The current account balance is applied by many countries because it provides information on the condition of the competitiveness of the primary and secondary industries in exports and imports in the country.[27]. The value of the current account balance can show a surplus, which means that the country's exports are higher than imports in this condition the country

can collect more foreign exchange and this is positive for the current account.[24]. The current account can have a surplus in two ways by lowering the price of domestic goods so that people will prefer to buy local products which will reduce imports and increase exports. Then the second is by suppressing imports and making all production activities for each item carried out domestically[20]. In addition, the value of the current account balance that experiences a surplus will affect the condition of the balance of payments which will show more stable conditions from macroeconomic factors in the country[21]. Meanwhile, if the value of the current account balance is negative, then the country has a deficit current account balance, which means that import activities in that country are higher than exports.[28]. One way to minimize the current account deficit is not only by increasing exports but also by increasing the trade balance[19]. So it can be concluded that the current account balance is a valuable portion of the difference between the total value of exports and the total value of imports in a country. Therefore, the current account balance is important for a country to obtain information on the potential activities of international trade in that country.

2.2. Export and Import of Halal Products

Export is an activity carried out by both individuals and institutions to obtain income for both individuals and income for the country[29]. And according to Andrian, exports are the amount of goods and services traded from one country to another, in a certain period.[30]. In addition, export activities in a country reflect trade between countries which will increase the development of international trade[31]. The purpose of export activities in a country is to expand market share, collect foreign exchange, and build cooperation between countries[22]. Meanwhile, imports are purchasing activities or goods and services originating from other countries[29]. Thus, import activities are purchasing activities by entering goods and services originating from abroad into the country, indicating that the country is issuing foreign exchange expenditures and these transactions are carried out to meet domestic needs.

Halal comes from the Arabic word which means permissible. Permissible in this case is that every Muslim must carry out following Sharia law. In its application, halal is not only applied in religious life but also in the daily life of Muslims and this has fardhu law which means it is obligatory for all Muslims.[4]. The use of goods and services following Sharia leads Muslims to consume halal food and avoid unlawful things. Not only that but Halal food should also be considered nutritious and good (tayyib) for each individual's health[32]. So it can be concluded that the export of halal goods is an activity carried

out by a person or institution in the sale of domestically halal goods abroad to obtain income which can be in the form of foreign exchange. And the import of halal goods is an activity of a person or institution that purchases a product of halal goods from abroad or outside their own country so that there will be an expenditure in the form of foreign exchange in that country.

3. Methods

The research method used in this research is descriptive quantitative. Quantitative research is a research method that emphasizes quantification in data collection and analysis[33]. This research uses secondary data 2021 obtained from various literature studies, in the form of journals, books, reports, and websites. This research was conducted in 51 countries that joined the OIC, namely Afghanistan, Algeria, Albania, Azerbaijan, Bahrain, Bangladesh, Benin, Brunei, Burkina Faso, Cameroon, Chad, Comoros, Cote d'Ivoire, Egypt, Gabon, Gambia, Guinea, Guyana, Indonesia, Iran, Iraq, Jordan, Kazakhstan, Kuwait, Kyrgyz, Lebanon, Libya, Maldives, Malaysia, Mali, Morocco, Mozambique, Niger, Nigeria, Oman, Pakistan, Qatar, Saudi Arabia, Senegal, Syria, Sudan, Suriname, Sierra, Tajikistan, Togo, Turkey, Tunisia, Uganda, UAE, Uzbekistan, and Yemen. The variables used in this study are current account values, export values, and import values of halal products. Table 1.

TABLE 1: Research data sources.

No	Variable	Unit	Symbol	Source
1.	Current account balance value	US\$	Ca_1	WDI
2.	Export value of halal products	US\$	Export_1	ITC
3.	Import value of halal products	US\$	import_1	ITC

Spatial Analysis Method

Spatial analysis is used in this study to determine whether the variables used in this research have spatial autocorrelation or dependence between regions. As for conducting spatial analysis, several stages are needed in the test, namely as follows:

Spatial Correlation Matrices (Spatial Weight Matrices) are used to determine the number of neighbors in each research sample. And there are three approaches to weighting the matrix, namely those used in this study, namely Rook contiguity, Bishop contiguity, and Queen contiguity. Rook contiguity is a weighting technique with side to side contact system. Bishop contiguity is a weighting technique with the vertex of

other areas. Meanwhile, Queen contiguity is a method of merging the sides and vertical points between regions[34].

Moran indexes a statistical test used to obtain spatial autocorrelation values for the variables used. The expected value is used from the Moran Index as follows[35]:

$$E(I) = I_0 = -\frac{1}{n-1} \quad (1)$$

Where if the value of $E(I)$ is greater than the value of I_0 then the variable used has a positive autocorrelation value and if it is the other way around then the variable has a negative autocorrelation. Meanwhile, if the value of $E(I)$ is equal to the value of I_0 then the variable used does not have spatial autocorrelation, so it cannot be analyzed spatially.

So the hypothesis formed is as follows:

$H_0: I = 0$ (no spatial autocorrelation)

$H_a: I \neq 0$ (there is spatial autocorrelation)

Spatial regression, in the formation of a spatial regression model there are several forms of spatial models using the regional approach, namely spatial Autoregressive Model (SAR) and Spatial Error Model (SEM).

Spatial Error Models(SEM)

The spatial Error Model (SEM) is a spatial regression model where spatial dependence occurs through error values, where it is assumed that the error of a model is spatially correlated with error values at other locations.

In general, the spatial error regression model is as follows[34]:

$$y_i = \beta_i X_i + \lambda W_{ij} u_j + \epsilon \quad (2)$$

With $\epsilon_i \sim N(0, \sigma^2_i)$

Where:

y_i : dependent variable

β_i : coefficient parameters

X_i : independent variable

W_{ij} : elements of the spatial weighting matrix

ϵ : error on location i

u_j : error on locations

λ : spatial error coefficient parameter

Spatial Autoregressive Model (SAR)

The spatial Autoregressive Model (SAR) also called the Spatial lag Model (SLM) is a model that combines linear regression models with spatial lag in the dependent variable.

This happens if the observed value of the dependent variable is correlated with the dependent variable in other regions so that variables in region one can influence the values of variables in neighboring regions. The SAR regression model in general is as follows[34]:

$$y_i = \rho W_{ij} y_j + \beta_i X_i + \epsilon_i \quad (3)$$

with $\epsilon \sim N(0, \sigma^2)$

Where:

y_i : variable bound

ρ : spatial lag coefficient parameter

W_{ij} : elements of the spatial weighting matrix

β_i : parameter regression coefficient

X_i : variable free

ϵ : error

Where the decision is taken from the two models, namely H_0 is rejected when the Z value is calculated $> Z$ table or $p\text{-value} < \alpha = 5$ percent, so the value of the regression coefficient is significant and feasible to be used in the model.

Best Model Selection

After the selection of the regression model is formed, the selection of the best model will be carried out using the log-likelihood value which can show how appropriate the model is used in research using this data. Where the log-likelihood value can be searched through the Akaike Info Criterion (AIC), which is formulated as follows[36]:

$$AIC = -2\ln(L) + 2K \quad (4)$$

Where:

K: the number of parameters in the statistical model

L: the maximum value of the likelihood function for model estimation.

Where is the decision-making in the log-likelihood, that is, if the model has a higher log-likelihood value among the models used, then the regression model is the best model among the other regression models.

4. Results and Discussion

The Organization of Islamic Cooperation (OIC) is an organization that currently has 57 member countries. OIC countries are countries that have joined to form good cooperation in the political, economic, Islamic, and social fields and aim to achieve international

peace[2]. Currently, the countries that are members of the OIC are countries that have an important role in developing the global halal industry, both in the form of export and import activities. These international trading activities will affect the current account value of each country. The following Figure 1 shows the grouping of the 51 countries that have joined the OIC based on the value of the current account balance.

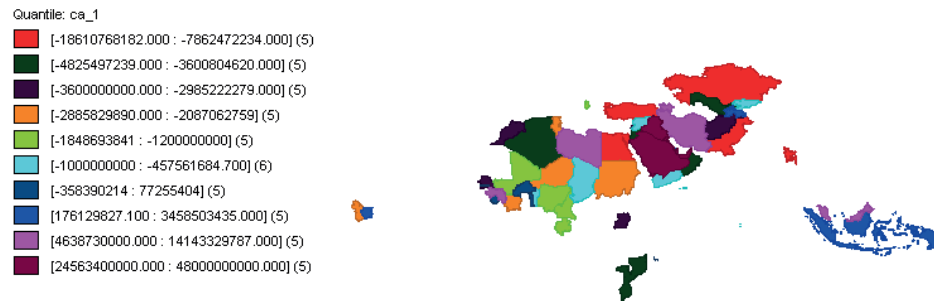


Figure 2: Map of grouping countries based on current account values.

Figure 1. depicts the regions of the 51 countries that joined the OIC, whereas Figure 1. shows there are 10 groups based on the value of each country’s current account. Where the region that has the highest current account balance surplus value is dark purple, there are five countries. then the region that has the highest current account balance deficit value in red is five countries.

4.1. Morans Index Results

Testing the Morans index in this study uses the dependent variable, namely the current account value variable for 2021, in the 51 countries that have joined the OIC. The results of the Morans index test on current account values can be seen in Figure 2. as follows:

Figure 2 shows that the results of managing the Morans index on current account values in the 51 countries that joined the OIC show a value of 0.436229. This value indicates that the I value is greater than the I0 value, namely where the I0 value is -0.02 or $I > I_0$ ($0.436229 > -0.02$) so that it can be concluded that the current account value in the 51 countries has autocorrelation between regions. positive. And in Figure 2. Illustrates that the distribution pattern of current account values tends to be clustered. With the autocorrelation of the current account variable, spatial analysis can be carried out.

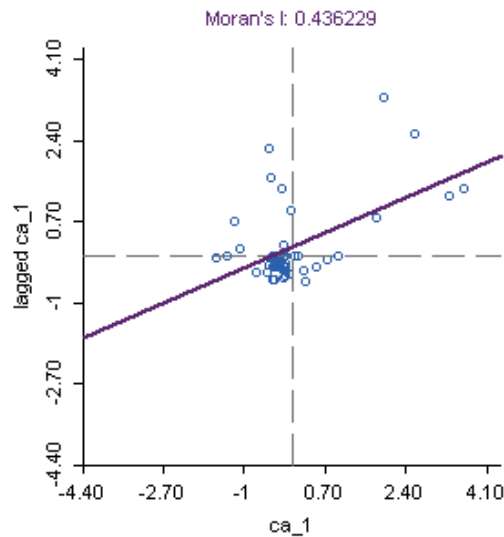


Figure 3: Moran's index value on the current account.

4.2. Spatial Dependency Results

Spatial dependency testing in this study uses the LM test(Lagrange Multiplier) which in the test includes a weighting matrix (W) with the queen approach. The results of the LM (Lagrange Multiplier) test can be seen in Table 1.

TABLE 2: LM Test (Lagrange Multiplier).

Test	Prob	Decision
<i>Lagrange Multiplier (lag)</i>	0.00102	Reject H ₀
<i>Lagrange Multiplier (error)</i>	0.01148	Reject H ₀

Source: data processed 2023, (Geoda)

Table 1 shows that the LM test results for both the LM lag and LM error values each have a probability value smaller than α 5 percent, namely $0.00102 < 0.05$ and $0.01148 < 0.005$, so H₀ is rejected, which means that there is spatial dependence between lag and error. Therefore the models used in this study are the SAR and SEM models.

4.3. Spatial Lag Regression Results

The results of the spatial lag regression test in this study can be seen in Table 2.

Table 2. Shows that the value of ρ and exports of halal products each have a probability value smaller than the α value of 5 percent ($0.003 < 0.05$), ($0.04 < 0.05$), so it can be concluded that at the 95% confidence in the variable export of halal products has a positive and significant effect on the current account in 51 OIC countries

TABLE 3: Spatial Lag Model Estimation Results.

Variable	coefficient	z-values	probability	Decision
ρ	0.393809	2.93988	0.00328	H ₀ rejected
Constanta	-1.11255e+009	-0.622642	0.53352	
import_1	-0.0428103	-0.122178	0.90276	H ₀ accepted
export_1	0.305761	2.0097	0.04446	H ₀ rejected

Source: data processed 2023, (Geoda)

with a correlated spatial lag between countries. Meanwhile, the variable import of halal products has a negative but not significant effect on the current account variable.

4.4. Spatial Error Regression Results

The results of the spatial error regression test in this study can be seen in Table 3.

TABLE 4: Spatial Error Model Estimation Results.

Variable	coefficient	z-values	probability	Decision
Constant	-1.20956e+009	-0.494716	0.62080	
import_1	-0.15384	-0.452448	0.65095	H ₀ accepted
export_1	0.291687	1.93495	0.05300	H ₀ rejected
Lambda	0.407499	3.01835	0.00254	H ₀ rejected

Source: data processed 2023, (Geoda)

Table 3. Shows that the value of lambda and exports of halal products each have a probability value smaller than the α value of 5 percent ($0.002 < 0.05$), ($0.05 = 0.05$), so it can be concluded that at the level 95% confidence in the variable export of halal products has a positive and significant effect on current accounts in 51 OIC countries with correlated spatial errors between countries. Meanwhile, the variable import of halal products has a negative but not significant effect on the current account variable.

4.5. Best Model Selection Results

The results of the log-likelihood (LL) values of the spatial lag and spatial error regression models in this study can be seen in Table 4. Table 4 shows that the log-likelihood value of the Spatial lag model has a statistical value of -1250.12, which is greater than the log-likelihood value of the spatial error model. So it can be concluded that the model resulting from the spatial lag regression model is better than the spatial error model.

TABLE 5: Log likelihood value.

Model	LL	Decision
<i>Spatial Lag Model</i>	-1250.12	Best Models
<i>Spatial Error Models</i>	-1250.90	

Source: data processed 2023, (Geoda)

4.6. Spatial Lag Regression Models

In table 4. Shows that the best model is the Spatial Lag Model, then from Table 2. The Spatial Lag Model can be formed as follows:

$$y_i = \rho W_{ij}y_j + \beta_i X_i + \epsilon_i$$

$$y_i = 0.393809W_{ij}y_j + 0.305761 \text{ export}_1 + \epsilon_i$$

From the formation of the spatial lag model, it can be interpreted that if other factors are considered constant, then when the export value of halal products increases by 10 percent, it will increase the current account value by US 3 dollars. Then the lag value is 0.393809W_{ij}y_j means, that if there is an increase from the lag factor of 10 percent, it will increase the current account value in neighboring countries by US\$ 3.9. This shows that an increase in the value of exports in 51 OIC countries will increase the current account value in that country so that an increase in the export value of halal products will have a positive impact on the country because the country will experience a current account surplus or the country can avoid a current account deficit. which will reduce foreign exchange in the country. The results of this study are supported by the results of research conducted by Syamsuri et al who conducted research in 13 OIC countries where the results of their research showed that the export value of halal products had a positive and significant effect on the value of current accounts in developing countries.[24]. Similar results were also expressed by Wina and Scientists who conducted research in Indonesia, where the export value of halal products had a positive and significant effect on the current account value in Indonesia.[23].

The variable value of imported halal products has a negative effect but has not significantly affected the current account. This is possible because the import value of halal products globally is still low compared to the import value of general products. Where based on the State Global Islamic Report 2022 in 2020 the value of imports of halal products by OIC countries will only reach US \$ 279 billion[1], whereas the total import value of all products carried out by OIC countries in the same year was US \$ 1,539 billion[37]. So it can be concluded that the OIC countries imported halal products only 5.52 percent of the total imports of the OIC countries. This shows that the import

value of halal products is still low so it cannot significantly influence the current account value.

5. Conclusion

From the results of the analysis that has been carried out, several conclusions are obtained, namely that there is a positive spatial autocorrelation in the current account value in the 51 countries that joined the OIC in 2021. This shows that the current account value in a given country can affect the current account value and other variables in neighboring countries. Then the results of the spatial regression analysis using the Spatial Lag Model show that the spatial lag values in the 51 countries have a positive and significant spatial correlation effect on current account values. Of the two independent variables used in this study, namely the export and import values of halal products, only the export value of halal products has a positive and significant effect on current account values in the 51 countries that have joined the OIC. Meanwhile, the import value of halal products in 2021 has a negative but not yet significant effect on the current account value in the 51 countries that have joined the OIC.

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