

Halal Food and Beverage Trade: Do Restriction on Religion, Halal Certification, and OIC Membership have any Impact?

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This study determined the worth of the Halal food and beverage trade. We imposed the Poisson Pseudo-Maximum Likelihood after applying the gravity model (PPML). The economic size of trading partners, regional trade agreements, a shared border, and a shared language are determinants with a strong beneficial effect on commerce. On the other hand, the negative trade factors are the distance between trading parties, the exporting country's income, the exchange rate comparison, and landlocked trade. In the meantime, the income level of the importing nation and the colonial relationship appeared to have little impact on trade, as does OIC trade cooperation. Halal certification has a considerable beneficial influence. However, limitations on religious considerations (GRR and SHR) have a significant negative impact on trade.

Key words: Religious Restriction, Halal Trade, Gravity Model, Organization of Islamic Countries (OIC).

1. INTRODUCTION

Despite the fast growth of the Halal sector over the past few decades, few empirical studies have been conducted on the factors that influence international Halal trade. This study is a preliminary investigation into the elements that affect the value of Halal commerce flow. It focuses on the Halal Food & Beverage industry, the largest section of the Halal economy. To overcome the limitations of the Halal trade database, the study utilized the WTO assumption when assigning HS codes to the specific trade concerns database (in the case of Halal food and beverage) and the Shariah principle of "presumption of permissibility" to estimate the value of Halal F&B trade between nations.

The examined samples include bilateral trade data from 59 countries (20 OIC members) chosen based on their economic size and the value of their F&B exports. The estimation period spans the years 2007 through 2016. The examination period is constrained due to the availability of restricted religious data, one of the variables of interest. In addition, the period of the global financial crisis (2007-2008) was not excluded from the analysis due to the necessity of F&B products, which are less elastic to the effects of the financial crisis.

In terms of methodology, we used the gravity model, which is the dominant empirically tested model of international trade, as the base model of the analysis and the Poisson Pseudo-Maximum Likelihood (PPML), which is highly recommended and widely accepted as a workhorse estimator for the gravity model, as the primary method of the regression test. The method is advantageous for dealing with heteroscedasticity, heterogeneity, autocorrelation, and zero-valued trade observation in bilateral commerce.

Because the OIC contains more than 80 percent of the world's Muslim population, which is the primary consumer of halal products, the focus of the study was on the Halal

food and beverage trade to the OIC market. It did not investigate the trade flow from OIC to non-OIC markets since the OIC has such a large deficit in F&B commerce that it must import food from non-OIC nations. Rather of focusing on exports, the organization should prioritize increasing domestic food production to reduce the imbalance. In addition, the study did not examine the trade flow between non-OIC nations to determine the accuracy of the Halal F&B assumption.

1.1 Stylized Facts on Halal Trade (Food and Beverage)

According to the gathered Halal trade data, we discovered several intriguing facts, which will be detailed below. First, the trade data confirms the rise in Halal F&B trade value (Figure 1). The value of commerce between the sample nations was less than \$600 billion in 2007 and rose steadily to around \$900 billion in 2016. F&B companies and policymakers must focus on this market sector because of the increasing demand for Halal food and beverages, which demonstrates the market's potential. However, when we examine the expansion of trade in greater detail, we find that non-OIC nations mostly drive it. In contrast, the export value of OIC nations is significantly smaller than that of non-OIC countries and has remained nearly constant over the years. This suggests that one of the major concerns for the OIC is the group's inability to grow food production or add value to its food and beverage goods.

The top five countries exporting the most Halal food and beverages are the United States, Netherlands, Germany, Brazil, and China, as determined by a detailed examination of the top exporters. None of the top ten exporting nations are members of the Organization of Islamic Cooperation, while Indonesia, the leader among OIC members, ranked just eleventh throughout the observation period. Figure 2 depicts the top Halal food and beverage exports over the analyzed period. This also suggests a problem with the OIC's food efficiency and value-added output.

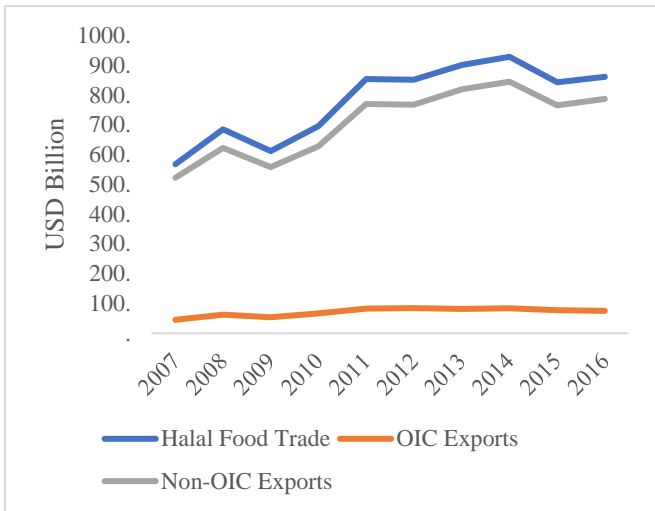


Figure 1: The Value of Halal Food Trade Between Sample Countries

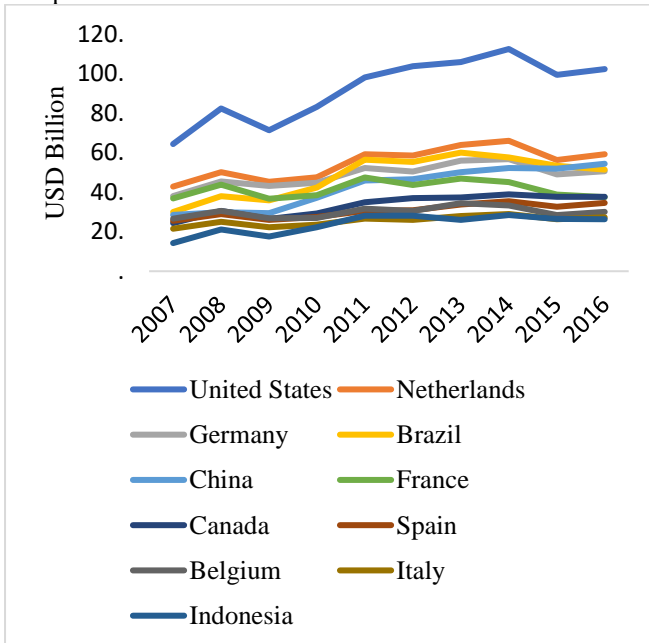


Figure 2: Top World Halal F&B Export Countries

In addition, we observe rising export and import trends when explicitly focusing on the OIC trade. However, the distance between the two is widening (as shown in Figure 3). This widening disparity indicates an expanding food trade imbalance among OIC members, which signifies that during the past decade, OIC countries have been unable to produce enough food and beverages to meet the needs of their populations and have relied heavily on food imports. The expanding deficit gap resolves the group's food security concern. In the event of global food scarcity or a sudden increase in the price of oil and petroleum, the OIC countries are likely to face significant difficulties if they do not enhance their food production.

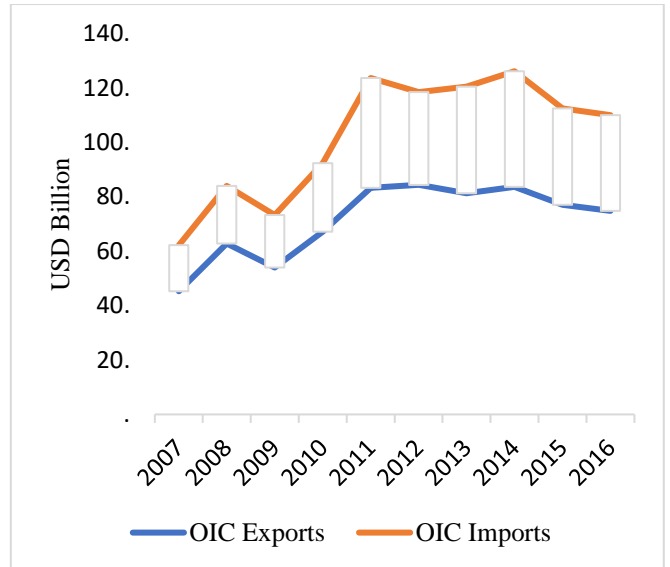


Figure 3: The Total Halal Food Exports and Imports of The Observed OIC Countries

Indonesia, Malaysia, Turkey, Morocco, and Egypt are the top five exporters of Halal food to the rest of the world in terms of OIC F&B exports (Figure 4). According to the report, only Indonesia and Turkey have high export growth patterns. From 2007 to 2011, Malaysia performed well, but its exports have declined since 2011. This necessitates more inquiry by the nation into the source of the fall in export value. Moreover, the data indicate that Morocco and Egypt have maintained an almost consistent export value. Nonetheless, it acknowledges the countries need to address the competitive challenge in F&B commerce.

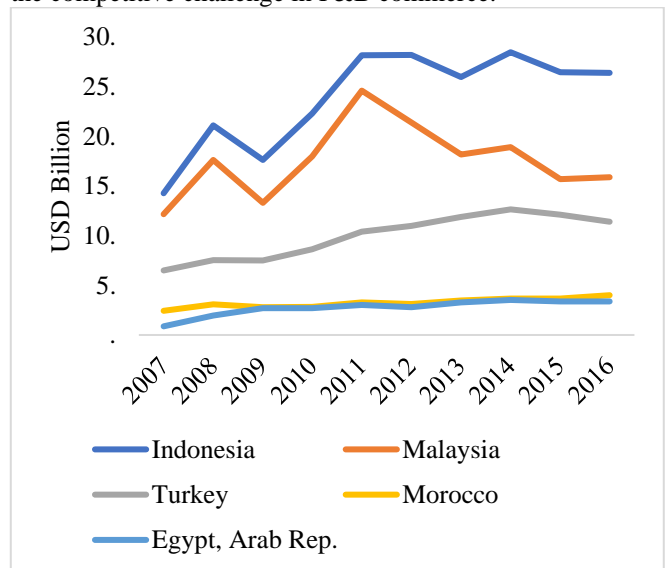


Figure 4: Top OIC Halal F&B Exporting Countries

Furthermore, a detailed examination of OIC imports revealed that most food imports come from non-OIC nations (as shown in Figure 5). This also indicates that most Halal food and beverage supplies to OIC nations come from non-OIC countries. This level is also rising, although the value of imports from intra-OIC has remained nearly steady throughout the observation.

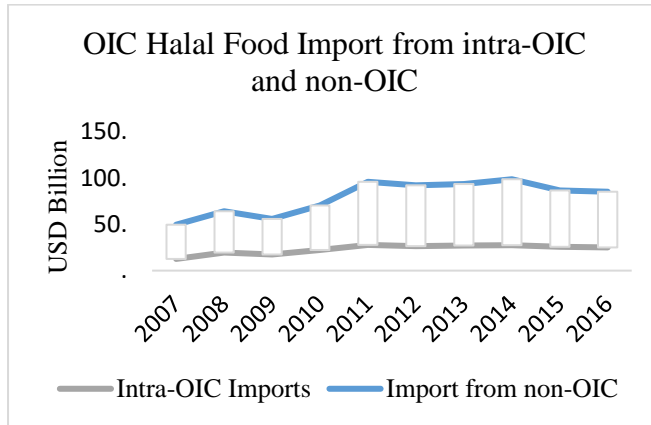


Figure 5: Sources of Halal Food Imported to The OIC Countries

According to Halal trade data, the value of international Halal food and beverage commerce is increasing. Even though the sector is tied to Islamic principles, non-OIC exports dominate the market. The value of OIC countries' food and beverage exports lags significantly behind, and the members must rely heavily on food imports from outside the organization. The group should prioritize increasing the efficiency of food and beverage production, and food security is a concern for policymakers.

1.2 Stylized facts on Restrictions on Religion

Although journalists and human rights organizations have reported for many years on the persecution of minority faiths, outbreaks of sectarian violence and other pressures on religious groups in many countries, no quantitative study that could provide measurements or indicators of the level of restrictions on religion had been conducted until the work of the Pew Research Center's Forum on Religion and Public Life. The survey, undertaken for the first time in 2007, examined various sources to determine how governments and private entities violate religious beliefs and practices worldwide. As a result of the study, a list of two indicators, namely the government restrictions index (GRI) and the social hostilities index (SHI) for 198 countries and self-governing territories, is provided (Grim, 2012). Following is a description of the indexes:

"The government restrictions index measures government laws, policies, and actions that restrict religious beliefs and practices. It comprises 20 measures of restrictions, including efforts by the government to ban

particular faiths, prohibit the conversion, limit preaching or give preferential treatment to one or more religious groups.

The social hostilities index measures acts of religious hostility by private individuals, organizations, or groups in society. This includes religion-related armed conflict or terrorism, mob or sectarian violence, harassment over attire for religious reasons, or other religion-related intimidation or abuse." (Center, 2017)

The GRI and SHI have limitations. Grim (2012) has explained that "the indexes are designed to measure obstacles to religious expression and practice. It does not look at the amount of religious diversity nor determine whether the restrictions are justified or unjustified. It also does not analyze historical, demographic, cultural, religious, economic, and political factors that might explain why restrictions have arisen". However, they do have benefits in providing a quantitative measurement of the issue. The indexes have been recognized and used for several empirical types of research related to religious freedom (Peace, 2014).

The GRI and SHI statistics indicated that religious limitation is one of the most difficult problems in the world today. According to the data, government restrictions on religion (GRR) and social hostility towards religion (SHR) are on the rise. 53% of the 198 nations surveyed in 2015 reported evidence of official harassment against religious groups, and 40% of those countries had high or very high levels of restrictions. Figures 6 and 7 illustrate the proportion of the 198 countries observed with high GRR and SHR, respectively.

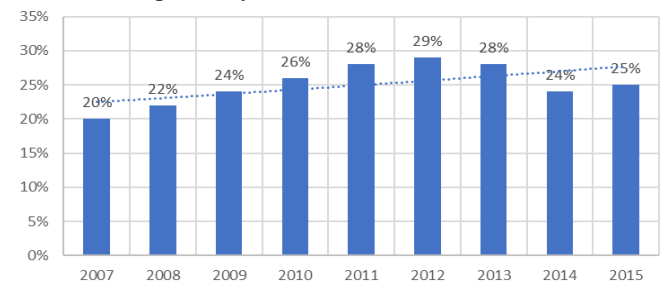


Figure 6: Percentage of countries with high level of GRR (198 observation countries)¹

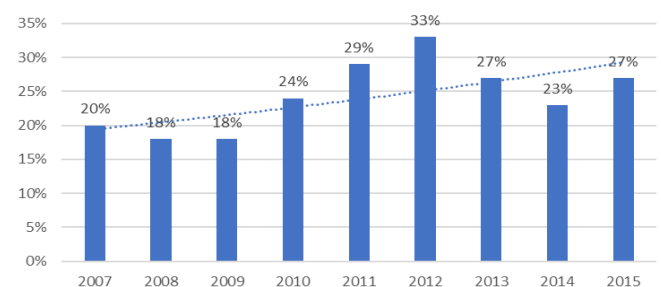


Figure 7: Percentage of countries with high level of SHR from 198 observation countries²

¹ The percentage from 198 countries. Data from Pew Research Center (2017)

² The percentage from 198 countries. Data from Pew Research Center (2017)

According to the survey, Muslim-majority nations such as Pakistan, Indonesia, Egypt, Iraq, and Saudi Arabia are among the highest in terms of limitations. However, the greatest increase occurred in non-Muslim majority countries, particularly in Europe, and Muslims appear to be the most targeted group by both GRR and SHR. Islamophobia is a term coined by academics to describe the global wave of fear, bigotry, and prejudice towards Islam and Muslims, which is growing rapidly. There is a possibility that the extent of religious restrictions can have a major effect on trade performance, particularly for Halal products. The supporting intuition for the hypothesis is that religious limitations have been empirically investigated and found to have a strong negative association with institutional quality (Grim et al., 2014), which substantially impacts commerce (Karam et al., 2019). In addition, consumers who share the same religious beliefs as the persecuted minority may form a bad opinion of a country's goods if a high level of religious restrictions exists. In addition, Halal is a religious value for which the consumer's confidence in the Halal certification is crucial. To produce a legitimate Halal certification, the country needs Islamic organizations with sufficient strength to support its procedure. This appears to be challenging for countries with strong limitations.

Nonetheless, no study has confirmed the connection between Islamophobia or the amount of religious restrictions and the Halal trade. Grim et al. (2014) explained that religious freedom is significantly associated with a more robust institutional framework. Previous research has also established a correlation between institutional environment and trade performance for certain product categories (Bournakis et al., 2016; Krammer et al., 2018; Mehrara et al., 2017). But Halal and other religious products have never been evaluated.

Anderson et al. (2003) was one of the few academics to examine the correlation between religion and commercial flow. Between 1996 and 1999, he utilized the gravity model to investigate the effect of religion on the bilateral trade flows of 33 selected nations. After controlling for other variables, such as oil-exporting countries and regional trade agreements, his empirical research revealed that, on average, Muslim-majority countries trade less than countries with a majority of Christians, Buddhists, or other religions. Guo (2004) examined the impact of religion and other cultural factors on U.S.-China trade. Overall, he discovered that the impact of religious similarities on U.S.-China commerce is minimal. However, there is evidence that religious differences harm the trade between the United States and China with low-income partners. Helble (2007) examined the global impact of religion on the trade of 151 nations. His premise was that having the same religion as trading partners would boost mutual trust and promote commerce. However, based on the empirical findings, he could not establish that a shared faith has a major favorable effect on trade. However, he discovered that countries that host a range of religions or have a

greater degree of religious tolerance perform substantially better in international trade.

Regarding the problem of religious restriction, empirical research on its relationship with commerce is rarely witnessed. However, some study links the restriction to the nation's economic progress. They suggested that restrictions on religious liberty are intimately linked to persecution, bloodshed, and war. It harms the general business climate, political stability, and consumer sentiment, and it restricts the chances for firms doing business in those nations (Finke, 2013; Grim et al., 2010). Conflict heightens business perceptions of country risk and discourages foreign investment (Alon et al., 2005). It also decreases nations' competitiveness and economic progress (Grim et al., 2014; Uddin et al., 2017). Anderson et al. (2003) was one of the few academics to examine the correlation between religion and commercial flow. Between 1996 and 1999, he utilized the gravity model to investigate the effect of religion on the bilateral trade flows of 33 selected nations. After controlling for other variables, such as oil-exporting countries and regional trade agreements, his empirical research revealed that, on average, Muslim-majority countries trade less than countries with a majority of Christians, Buddhists, or other religions. Guo (2004) examined the impact of religion and other cultural factors on U.S.-Chinese trade. Overall, he discovered that the effects of religious similarities on U.S.-China commerce are minimal. However, there is evidence that religious differences harm the trade between the United States and China with low-income partners. Helble (2007) examined the global impact of religion on the trade of 151 nations. His premise was that having the same religion as trading partners would boost mutual trust and promote commerce. However, based on the empirical findings, he could not establish that a shared faith has a major favorable effect on trade. However, he discovered that countries that host a range of religions or have a greater degree of religious tolerance perform substantially better in international trade.

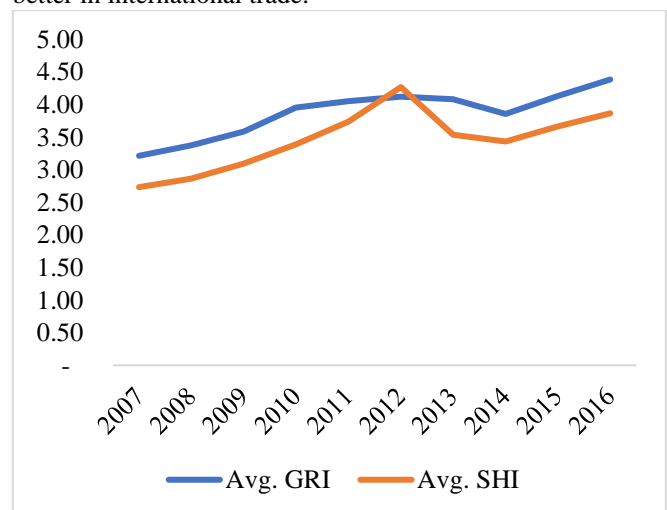


Figure 8: The Average Level of GRI And SHI of The Sample Countries

Through preliminary descriptive analysis, we determined that both the government restriction index (GRI) and the societal hostility index (SHI) indicate an increase in the level of religious restriction (as shown in Figure 8). The average level of indices was approximately 3.0 in 2007 and has continued to rise to around 4.0 in 2016. This reinforces the claim by Grim et al. (2014) that the issue is one of the most pressing challenges facing the world today and that policymakers must address it. According to them, the indicators are substantially inversely related to the institutional environment and the country's stability, which are crucial for economic growth.

Comparing OIC and non-OIC countries, the restriction levels in OIC countries are higher than in non-OIC countries, and the rate is increasing in both groups (as in Figure 9). However, we discovered that the level is increasing rapidly in non-OIC countries, particularly the SHI, which reflects religiously-related societal conflicts. In 2007, the difference between OIC and non-OIC nations in SHI was approximately two points; by 2016, this disparity had shrunk to about one point (as in Figure 10). This suggests that social disputes between religious groups are becoming more severe in non-OIC nations compared to the previous decade. This is feasible due to the cause of Muslim migration into non-Muslim majority nations and the effect of media-created Islamophobia (Reuters, 2017).

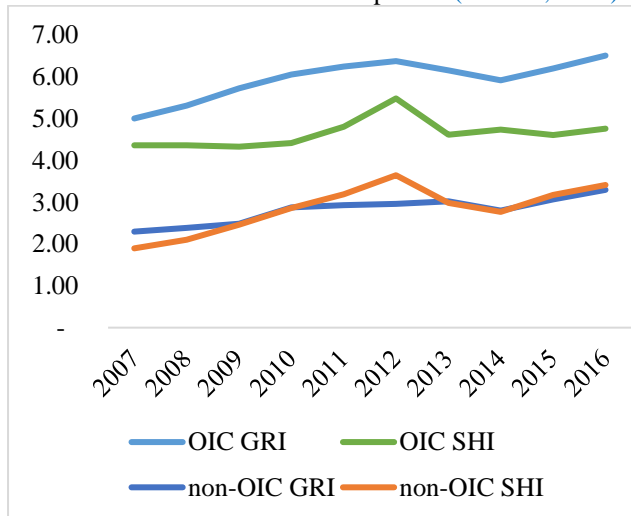


Figure 9: The Average Level of GRI And SHI Between OIC And Non-OIC Countries

1.3 Halal Certification and Trade

Halal certification began in the 1970s and has become an influential commercial designation for Muslim consumers' shopping decisions (Samori et al., 2014). Halal logos have a crucial part in consumer choice-making, according to several studies (Abdul et al., 2009; Awan et al., 2015; Krishnan et al., 2017; Sherwani et al., 2018). However, empirical research into its effect on the value of Halal commerce flow remains limited.

Numerous Halal Certification Organizations (HCO) have been established to provide certification services in

response to the increasing demand from halal producers. For instance, France alone has 50 HCOs, whereas the United Kingdom has 20 HCOs that compete to issue certifications (Adidaya, 2016). The most recent concern with Halal certification is acknowledging Halal standards among commercial partners. Some nations, including Malaysia and Indonesia, have established the Halal certification system for food and beverage imports. In their countries, only products with a list of certified Halal trademarks are permitted to be imported.

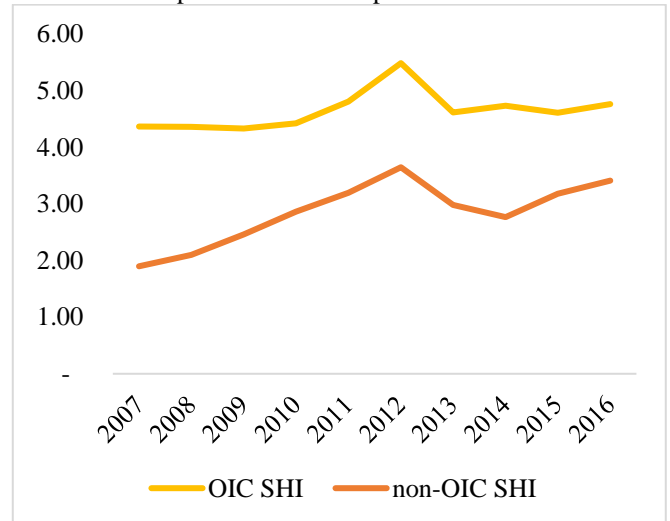


Figure 10: The SHI Scores Between OIC and Non-OIC Countries

A well-recognized Halal certification should give the country a competitive edge in Halal exports. According to Blind et al. (2018), the standard certificate has a substantial positive impact on commerce. The certification minimizes information asymmetries and transaction costs between commercial partners. However, little limited empirical evidence exists to support this claim.

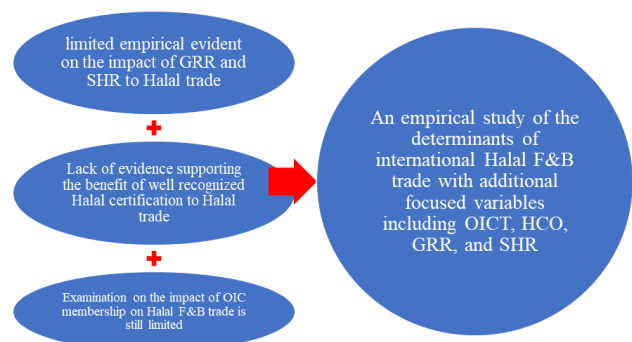


Figure 11: The Conceptual Framework of The Research

Because there is no international record of certified Halal trade, the lack of accessible data is the greatest obstacle to Halal trade determinant research. However, we believe that awareness of the Halal trade characteristic is necessary for industry participants and governments that view the Halal market as a possible source of revenue. Therefore, it

is preferable to discover an acceptable measure of the Halal trade dataset and then perform the study, as waiting for a complete dataset to become accessible could take considerable time. This research offers an alternate method to circumvent the lack of data for the empirical Halal trade analysis. It used the WTO assumption for assigning HS codes to the specific trade concerns database (in the instance of Halal food) and the Shariah principle of "presumption of permissibility" to estimate the estimated value of Halal F&B trade between nations. Doing so can pioneer the empirical work of Halal trade determinant study using the standard model and approved estimation method. On the other hand, it broadens the scope of international trade literature to include the Halal F&B industry, which, to our knowledge, has not been studied previously.

Model Specification

The theoretical gravity model and earlier studies on trade determinants provide a collection of variables that regularly influence the value of bilateral trade flows between trading partners. Since as far as we are aware, Halal food is the only sector that has not been analyzed expressly for the elements influencing its trade value. Before digging into the specifics of other factors of interest, it is crucial first to examine the impact of this group of common determinants. To answer this question, the following empirical study model is proposed:

$$HFE_{ijt} = k + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln DIST_{ij} + \theta Control_{ijt} + \varepsilon_t \dots\dots\dots (1)$$

Where

$$Control_{ijt} = \theta_1 RTA_{ij} + \theta_2 LAN_{ij} + \theta_3 FX_{ijt} + \theta_4 GDPC_{it} + \theta_5 GDPC_{jt} + \theta_6 Border_{ij} + \theta_7 Col_{ij} + \theta_8 Landlock_{ij} \dots\dots\dots (2)$$

The HFE_{ijt} is the dependent variable representing the value of the Halal food trade from the country I to country j at time t. The variables in Eq.1 are taken from the theoretical gravity model where GDP_{it} and GDP_{jt} represent the size of the economy of the trade partners at the time t, and $DIST_{ij}$ is the distance between the two countries.

The list of control variables tested in Eq.2 is collected from the common variables found in the gravity kinds of literature, which are already discussed in the previous Chapter, including the relative exchange rate of trade partners (FX_{ijt}), income level of their population, which is proxied by the GDP per capita ($GDPC_{it}$ and $GDPC_{jt}$). In addition, some dummy variables, including regional trade agreement (RTA_{ij}), common official language (LAN_{ij}), common border ($Border_{ij}$), colonial relationship (Col_{ij}), and trade involvement with the landlocked country ($Landlock_{ij}$), are added for the examination.

According to the gravity theory and the literature, the value of trade flow is positively related to the economic size of trade partners and inversely influenced by the distance between them. Thus, we expect that impact of GDP_{it} ,

GDP_{jt} , and $DIST_{ij}$ According to the literature explored, the trade will align with Halal food. For the list of control variables in Eq.8, we expect that the variables that should benefit the Halal food trade are: regional trade agreement (RTA_{ij}), income level of the importer ($GDPC_{jt}$), common language (LAN_{ij}), common border ($Border_{ij}$), and colonial relationship (Col_{ij}).

Regional trade agreement (RTA_{ij}) can benefit the trade flow since it reduces the trade barriers, such as customs and tariffs between its members (Shepherd et al., 2019). The income level of the importer ($GDPC_{jt}$) increases the consumption capability of people within the country and creates demand for more imported products (Ramezzana, 2000). In terms of countries that share a common border ($Border_{ij}$), it should comparatively be more convenient for goods transportation between them, resulting in a higher value of trade (Cheong et al., 2018; Didier, 2018; M. U. Fratianni, 2007; Gani, 2017; Gundogdu, 2009; Hatab et al., 2010; Liu et al., 2020; Miran et al., 2013; Rautala, 2015). Lastly, the countries which have a common official language (LAN_{ij}) and colonial relationship (Col_{ij}) should trade more, according to the kinds of literature (Cheong et al., 2018; Elliott et al., 2019; M. Fratianni et al., 2006; Gani, 2017; Hatab et al., 2010).

The factors that are expected to have negative impacts on trade include the relative exchange rate of the exporter over the importer (FX_{ijt}), the income of the exporter ($GDPC_{it}$), and dealing with landlocked countries ($Landlock_{ij}$). The exchange rate (FX_{ijt}) is the portion of one unit of the exporter's currency to the importers. It determines the price of the exporter's product in the eye of the importer. Thus, a higher level of this relative exchange rate means more expensiveness of the product from the importer's perspective (Bhattacharyya et al., 2018; Masron et al., 2014). Therefore, the exchange rate variable (FX_{ijt}) is expected to impact the Halal food trade's total value negatively. The higher income of exporting countries ($GDPC_{it}$) can reduce the number of exports due to higher demands of local consumption (Abidin et al., 2013; Hatab et al., 2010; Masron et al., 2014). The landlocked country ($Landlock_{ij}$) has a natural barrier to trade due to its limitation in transportation (Kharel et al., 2010).

We added four additional variables to the previous model, including the OIC trade dummy (OICT), the recognized Halal certificate organization (HCO), and the level of restriction on religion in the exporting country. The limitation on religion variable is divided into the government restriction (GRI) and the social restriction (SHI). The following model is proposed for the empirical investigation:

$$HFE_{ijt} = k + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln DIS_{ij} + \beta_4 OICT_{ij} + \beta_5 HCO_i + \beta_6 GRI_{it} + \beta_7 SHI_{it} + \theta Control_{ijt} + \varepsilon_t \dots\dots\dots (3)$$

The $OICT_{ij}$ represents the trade between OIC countries. This is expected to examine the effectiveness of the OIC policy in encouraging its intra-member trade in the sector

of Halal F&B. The effectiveness of the cooperation policy should result in the same direction as the regional trade agreement factor (RTA) that provides a significant positive impact on the value of trade flow (Cheong et al., 2018; Doan et al., 2018; M. U. Fratianni, 2007; Masron et al., 2014; Saucier et al., 2017; Urata et al., 2010).

The HCO_{it} represents the trade from the exporting country where it has a well-accepted Halal certification. According to the literature, the Halal certificate is one of the most important concerns for Muslim consumers (Shafie et al., 2006). It also plays the role of certification that helps reduce information asymmetries and transaction costs between trading partners (Blind et al., 2018). The country with well-recognized Halal certification should have more advantage in the Halal food trade.

GRI_{it} and SHI_{it} represent the level of government and social restrictions on religion, respectively. The higher the value, the higher the restrictions. The negative significance of the variable will confirm the statement of Grim (2012) and Mehrara et al. (2017) that an increase in restriction distorts economic growth and obstruct trade, especially in the related sector to religious beliefs like Halal food.

1.4 Estimation Model

Using our study objectives as a guide, we propose using Poisson Pseudo-Maximum Likelihood (PPML) as the primary method for our panel data analysis. Due to its capacity to resolve econometric challenges of gravity trade estimation, the approach is one of the most often used estimators in recent scholarship (Kuik et al., 2019; Shepherd et al., 2019). Silva et al. (2006) identified several crucial aspects that must be considered while evaluating gravity models. Due to heteroscedasticity, heterogeneity, and autocorrelation, the employment of a log-linearized model can result in very misleading and skewed estimates. They underlined that several econometric applications ignore the fundamental fact that the expected value of the logarithm of a random variable is distinct from its expected value ($E(\ln y) \neq \ln E(y)$). In heteroskedasticity, such as huge volumes of cross-sectional data, interpreting parameters using log-linearized model estimation generates skewed estimations of the genuine elasticities. The gravity model is one of the instances in which heteroscedasticity, heterogeneity, and autocorrelation are found due to the composition of cross-sectional data distributed through time, the variance in country characteristics, and the volume of trade flow between small and major nations.

The second economic concern is the regular occurrence of zero trade values in the bilateral trade observation. The presence of a dependent variable with a zero value complicates the usage of the log-linear form of the gravity equation. The logarithm of 0 is undefined in mathematics. Two typical approaches have been used to address the zero-trade flow issue: (i) removing the zero-trade pairs from the data set and (ii) altering the data by adding minor values, such as one to the value of the dependent variable,

and then estimating the model in log-linear form. However, both methods present estimating difficulties. The zero-trade value has statistical significance; omitting or altering it might result in sample selection bias and inconsistent estimators of the parameters of interest (Kabir et al., 2017).

To address these econometric concerns, Silva et al. (2006) proposed estimating the gravity equation using the PPML. The method is consistent in the presence of heteroscedasticity and gives a simple solution to deal with dependent variable values of zero. Since the PPML estimator is not required to linearize the model through logarithms, the issue of zero-trade value is eliminated (Shepherd et al., 2019). It retains total trade flows between the actual and estimated bilateral trade matrices, resolving the "adding up" problem posed by other gravity model estimators (in which total forecast trade surpasses total actual trade).

The Poisson regression model is defined by Silva et al. (2010) as follows:

$$\Pr(y_i = j | x_i) = \frac{\exp(-\lambda)\lambda^j}{j!}, \quad j = 0, 1, 2, \dots \quad (4)$$

where λ is generally specified as $\lambda = \exp(x_i' \beta) = \exp(\beta_0 + \beta_1 x_{1i} + \dots)$. The β is the vector of parameters of interest which can be estimated by maximizing the log-likelihood function given by

$$\ln L(\beta) = \sum_{i=1}^n [-\exp(x_i' \beta) + (x_i' \beta) y_i - \ln(y_i!)] \quad (5)$$

The PPML is widely accepted and has been used as the primary estimation method in numerous recent gravity publications, including Head et al. (2010), Dai et al. (2014), Dutt et al. (2020), Bojnec et al. (2015), Cestepe et al. (2015), Saucier et al. (2017), Larch et al. (2018).

The robustness of the PPML estimation result will be evaluated by comparing it to the Heckman Sample Selection (HSS) estimation result. Shepherd et al. (2019) also advocated HSS as an alternative gravity model estimator with PPML. HSS is innately able to incorporate zero trade observations into the dataset. It permits independent data-generation procedures for zero and non-zero values. Compared to PPML, the HSS is less advantageous when dealing with heteroskedasticity. As a result, it is less frequently utilized as a gravity model workhorse estimator. Nonetheless, newer works such as Natale et al. (2015) and Ehrich et al. (2018) used the HSS as their primary estimation technique.

To determine the consistency of estimated coefficients, we also decided to compare the estimation result with the classic log-linearized model, including ordinary least squares (OLS), two-stage least squares (2SLS), and random effects model (RE). The dependent variable was modified to incorporate zero observations in the dataset. Even though Silva et al. (2006) do not suggest this method, it is still one of the most common methods used in the literature for comparison and robustness testing (Natale et al., 2015). Notably, we decided to compare the estimated

findings of the random effect model over the fixed effect model since certain of our dependent variables, including OICT and HCO, are time-invariant. The fixed effect model cannot quantify the effects of various Halal trade drivers.

2. DATA AND SOURCES

The study utilized data collected between 2007 and 2016. This examination period is constrained by the availability of restricted religious data, one of the variables of interest. In addition, the study did not omit the period of the global financial crisis (2007-2008) due to the necessity of F&B products to be less elastic to the effects of the financial crisis. There are 58 countries and 1 self-governing territory in the sample data (Hong Kong). These can be classified into 20 OIC nations chosen based on their economic size (among the top 100 countries in the world) in 2017. Other 39 non-OIC members were chosen based on the value of their food and beverage exports to the global market, as reported by the UN Comtrade Database. The sample nations are listed in Appendix A.

The limited Halal commerce database is one of this study's greatest obstacles. As far as we know, no specific trade statistic captures the value of certified Halal items, except Malaysia's self-reporting (International Trade Centre, 2015 pp X). To determine the value of the Halal trade, we apply the WTO assumption on the trade concerns database (STC) when allocating HS codes, which states:

"To assign an HS code to this product, some assumptions had to be made. In particular, when an STC refers to

- 1. Food-related products. A broad definition is, in general, used. This includes all HS codes at the 4-digit level from 01 to 04, 07 to 12, 15 to 22, and 33. Note that for:*
- c. Halal products: a broad definition of food excluding swine meat, live animals, and alcoholic beverages*
- d. Halal food: defined as Halal products excluded cosmetics."*

(Technical Barriers to Trade: Specific Trade Concerns Database, 2018)³

The value of exports (in US dollars) was employed as a proxy for bilateral trade flows. According to Shepherd et al. (2019), the factors used in the gravity model should be included in bilateral trade. He also stated that the worth must be expressed in nominal rather than actual terms. Multilateral resistance terms, which consist of price indices, significantly decrease the export value. Consequently, deflating exports using various price indices, such as the CPI or the GDP deflator, would not sufficiently represent the unobserved multilateral resistance terms and could give misleading results.

Similarly, nominal GDP (USD) was utilized as a proxy for the economic size of trade partners. According to the gravity model, the GDP is a suitable proxy. However,

nominal aggregate GDP numbers, not real terms or GDP per capita, are misleading (Shepherd et al., 2019). In gravity literature, the GDP per capita has occasionally been employed as a separate independent variable to represent the income level but not the economic scale specified in the theoretical gravity model.

In this analysis, the distance (in kilometers) between the capital cities of the partners was utilized. The greater distance results in increased transport costs and delivery times, which inhibits trade flows. Since economic distance data is unavailable for all sample countries, the use of geographic distance is acceptable. It has been utilized in the majority of published works, such as Antonucci et al. (2006), Francois et al. (2013), Natale et al. (2015), Wong et al. (2016), and others.

The variables of interest include the effect of OIC membership (OICT), well-recognized Halal certification (HCO), and the degree of religious restriction in the exporting nation (GRI and SHI). We imposed dummy variables for trade between OIC members (OICT) and exporters having a recognized Halal certification organization (HCO) in their respective countries. The benchmark for the recognition certifications is a list of Halal certifying bodies accredited by Malaysia's JAKIM and Indonesia's MUI, the two most widely recognized Halal standards and accreditation systems. In addition, we include countries that are members of the Standards and Metrology Institute for the Islamic Countries (SMIIC), which serves as the OIC's agency for harmonized standards. Appendix D contains an illustration of the approved Halal certification dummy's specifics.

Since 2007, the Pew Research Center's government restrictions index (GRI) and social hostility index (SHI) have served as proxies for the degree of religious freedom limitations. The Pew study uses the methodology of Grim et al. (2010) to quantify and measure the degree to which governments and social groupings interfere with the practice of religion in 198 countries and self-governing territories. According to the Pew research, the indices are analyzed using documentary sources and survey questionnaires with a double-blind coding procedure.

The GRI is based on indications of national and local government restrictions on religion, including coercion and violence. The SHI is based on indicators of ways private individuals and social groupings infringe on religious beliefs and practices, including religiously biased crimes, mob violence, and measures to halt the growth or operation of particular religious groups. The values of both indexes were calculated and adjusted according to the value range of zero to ten, with a larger index value indicating a higher level of religious restriction. In addition to the exchange rate, level of income, regional trade agreement, shared language, common border, colonial

³https://www.wto.org/english/res_e/publications_e/readme_tbt_stc_e.doc

relationship, and landlocked commerce, other control factors were drawn from the common significant variables discovered in research on gravity trade. The statistics for these variables were acquired from reputable sources such as the World Bank's World Development Indices (WDI), The CIA's World Factbook, and others. Table 4 offers a summary of the factors utilized in the investigation.

3. RESULTS AND DISCUSSION

The estimation follows the same process as the earlier question. The PPML result is displayed in Table 1 below.

The table above displays six different regression results. The first result is for the base model, followed by adding specific individual focus variables to regressions 2 to 5. The result displays both the focus and control variables.

Most base model variables are statistically significant, and the coefficient signal follows most kinds of literature

Table 1

	(1)	(2)	(3)	(4)	(5)	(6)
	HFEIJ	HFEIJ	HFEIJ	HFEIJ	HFEIJ	HFEIJ
LGDPJ	0.643*** (18.73)	0.584*** (15.19)	0.645*** (18.19)	0.668*** (18.38)	0.672*** (21.57)	0.635*** (16.00)
LGDPJ	0.681*** (16.57)	0.675*** (15.92)	0.683*** (16.28)	0.679*** (16.15)	0.679*** (16.59)	0.678*** (15.25)
LDIST	-0.432*** (-6.85)	-0.403*** (-5.84)	-0.429*** (-6.66)	-0.478*** (-7.79)	-0.467*** (-7.53)	-0.458*** (-6.96)
LFXIJ	-0.0453*** (-2.60)	-0.0372** (-2.09)	-0.0452*** (-2.60)	-0.0490*** (-2.69)	-0.0416** (-2.45)	-0.0395** (-2.20)
LGDPCI	-0.155*** (-3.80)	-0.126*** (-2.87)	-0.154*** (-3.73)	-0.243*** (-5.24)	-0.241*** (-6.27)	-0.262*** (-5.58)
LGDPJ	0.00377 (0.06)	0.00606 (0.10)	0.00491 (0.08)	0.00799 (0.13)	-0.00213 (-0.04)	0.00952 (0.16)
RTA	0.848*** (7.29)	0.861*** (6.39)	0.856*** (7.17)	0.730*** (6.19)	0.826*** (7.15)	0.788*** (5.99)
LAN	0.312** (2.32)	0.218 (1.61)	0.299** (2.16)	0.345** (2.53)	0.300** (2.28)	0.216 (1.55)
BORDER	0.765*** (4.97)	0.815*** (4.97)	0.764*** (4.97)	0.776*** (5.05)	0.732*** (4.84)	0.788*** (4.98)
COL	-0.0826 (-0.55)	-0.0502 (-0.35)	-0.0737 (-0.49)	-0.161 (-1.01)	-0.0737 (-0.49)	-0.0828 (-0.53)
LANDLOCK	-0.751*** (-4.85)	-0.831*** (-5.26)	-0.744*** (-4.76)	-0.755*** (-4.57)	-0.738*** (-4.73)	-0.792*** (-4.79)
HCO		0.694*** (4.78)				0.628*** (4.35)
OICT			0.105 (0.62)			0.241 (1.31)
GRII				-0.0770*** (-3.27)		-0.0517** (-2.21)
SHII					-0.0842*** (-6.49)	-0.0667*** (-4.93)
_cons	-12.22*** (-6.84)	-11.56*** (-6.18)	-12.39*** (-6.46)	-11.33*** (-6.19)	-11.44*** (-6.54)	-10.79*** (-5.42)
N	34220	34220	34220	34220	34220	34220
R-sq	0.617	0.606	0.617	0.611	0.612	0.600

Note: t statistics are in parentheses (). Statistical significance at the 10%, 5% and 1% levels are indicated by *, ** and *** respectively.

except that which is common (LAN).

For the four additional factors, we discovered that Halal certification (HCO) had a considerable beneficial effect on the value of Halal food and beverage commerce (estimations 2 and 6). With all other conditions held constant, nations with recognized Halal certification have a 0.6% greater ability to export Halal food and drink than those without such accreditation. Numerous studies have emphasized the importance of halal certification on consumer decision-making, particularly among Muslim consumers, and this result is consistent with the literature and theoretical predictions (Blind et al., 2018; Shafie et al., 2006).

The OIC membership (OICT) appears to have a negligible impact on the value of Halal F&B commerce (estimates 3 and 6), indicating that there is no substantial difference in the value of trade between OIC members compared to trade with non-OIC nations. The outcome is contrary to our expectation that this component would have a major beneficial influence due to the OIC's overarching purpose and 10-year action plan.

Comparing this conclusion to the trade agreement factor (RTA), which has a strong positive impact on trade, suggests that OIC membership does not produce considerable trade benefits between its members, at least in the case of Halal food and beverages. It could be due to a lack of food production or the distance between members. Nonetheless, this raises questions for OIC officials on the need for more improvements if they wish to maximize the value of intra-member commerce. This conclusion confirms the findings of Gundogdu (2009), who suggested that the increase in intra-OIC trade was related to oil price spikes and currency fluctuations rather than the cooperation's effectiveness.

The government restriction on religion (GRII) and social hostility concerning religion problem (SHII) have a substantial detrimental influence on the Halal food and beverage industry (estimations 4, 5, and 6). The result demonstrates that religious restrictions have a distorting effect on the Halal trade. Generally, nations with higher GRII and SHII will have less success exporting Halal food and beverages than countries with lower restrictions. The result verifies the assertions of Grim (2012) and Krammer et al. (2018) that an increase in the amount of a restriction distorts economic growth and can be a significant trade disincentive, particularly in a religiously-motivated sector like Halal.

3.1 Robustness Test

We explore the robustness of our regression finding by retesting the determinants using multiple estimating techniques, including HSS, POLS, 2SLS, and RE. The outcome of the robustness test is displayed in the table below.

Focusing primarily on the four focus variables of this topic (HCO, OICT, GRII, and SHII), we discovered the consistency and robustness of the four variables'

estimation results across most estimation methods. Only an estimation using RE demonstrates negative significance for OICT and insignificance for SHII, whereas all other approaches demonstrate insignificance for OICT and negative significance for SHII.

Consequently, based on PPML and the robustness test, we can conclude that the nations that have recognized Halal certification (HCO) considerably benefit the export value of Halal food and beverages. There is no substantial variation in the value of Halal F&B commerce between intra-member trade and trade between OIC and non-OIC countries due to OIC membership (OICT). The level of religious restriction in a country (both GRII and SHII) has a detrimental impact on the value of its Halal food and beverage exports.

4. CONCLUSION

The 59 sample countries were picked jointly from OIC and non-OIC nations. The OICs were chosen based on their economical size, while the non-OICs were nominated based on the value of their exports of food and beverages. The estimation period is between 2007 and 2016 because of data availability for one variable of interest, religious restriction. The study adhered to the standard and most widely known technique for international trade research. It used the gravity model of international trade as the foundational model. It estimated the result using the PPML method, which is the workhorse and most recommended estimator for the gravity model (Shepherd et al., 2019). The tested variables included the size of the economy (LGDPJ and LGDPI), the distance (LDIST), the level of income (LGDPCI and LGDPPCJ), the exchange rate (LFXIJ), the regional trade agreement (RTA), the common border (BORDER), the common language (LAN), the colonial relationship (COL), and landlocked trade (LANDLOCK). Additionally, we added a few more variables that we deemed important for examining their influence on the Halal F&B trade. These additional variables include Halal certification (HCO), OIC membership (OICT), and religious restriction (GRII and SHII).

According to the gravity model, the impact of economic size (LGDPJ and LGDPI) and distance (LDIST) on trade flows between two countries are proportionate to their economic size and inversely proportional to the distance between them (Bialynicka-Birula, 2015). In the case of Halal F&B commerce, this proposition holds across all levels of tested estimations. For additional components, which are regarded to be a component of "the total of all trade resistance terms except distance" or the R_{ijt} term in the gravity with gravitas model of Anderson et al. (2003), we discovered: The income level of trading partners has varying effects on the value of Halal food and beverage trade between them. While the exporting country's income level (LGDPCI) harms the value of its Halal F&B exports, the importing country's income level (LGDPCJ) does not affect the trade. The increased income level implies a higher production level and a rise in consumer demand.

The conclusion may indicate that, in general, individuals prefer home food and beverages that are tailored to their tastes over international items. Thus, when individuals have more disposable income, their increased demand for domestic F&B diminishes the value of exportable goods (in the case of LGDPCI). Alternatively, when food production is higher, it reduces the demand for imported foodstuffs (in the case of LGDPCJ). In a global context,

the exchange rate (LFXIJ) that determines the pricing element of the items continues to play a significant role in the trade flow. From the perspective of importers, the exporter's products become more expensive due to the appreciation of their currency. Thus, the country's ability to import is diminished, and it may seek alternative trading partners that can provide identical products at a lower price.

In terms of geographical determinants, the outcome of

Table 2

	(1) PPML	(2) HSS	(3) POLS	(4) 2SLS	(5) RE
LGDPJ	0.635*** (16.00)	0.941*** (23.78)	1.966*** (30.88)	1.966*** (30.90)	1.476*** (23.25)
LDIST	-0.458*** (-6.96)	-0.805*** (-15.58)	-1.280*** (-10.79)	-1.280*** (-10.80)	-0.923*** (-7.17)
RTA	0.788*** (5.99)	1.115*** (9.39)	1.287*** (5.43)	1.287*** (5.44)	2.210*** (8.82)
LAN	0.216 (1.55)	0.454*** (3.44)	1.492*** (4.68)	1.492*** (4.68)	1.715*** (5.12)
LFXIJ	-0.0395** (-2.20)	-0.00641 (-0.53)	-0.0754*** (-3.65)	-0.0754*** (-3.65)	-0.0845*** (-3.72)
LGDPCI	-0.262*** (-5.58)	-0.312*** (-7.04)	-0.946*** (-11.92)	-0.946*** (-11.93)	-0.597*** (-8.42)
LGDPCJ	0.00952 (0.16)	0.0722** (2.07)	0.220*** (3.58)	0.220*** (3.58)	0.154** (2.43)
BORDER	0.788*** (4.98)	0.835*** (4.64)	0.0517 (0.12)	0.0517 (0.12)	0.340 (0.76)
COL	-0.0828 (-0.53)	0.244* (1.88)	-0.331 (-1.03)	-0.331 (-1.03)	-0.671** (-1.97)
LANDLOCK	-0.792*** (-4.79)	-0.864*** (-7.26)	-1.752*** (-5.66)	-1.752*** (-5.66)	-1.675*** (-5.40)
HCO	0.628*** (4.35)	0.999*** (10.91)	1.075*** (6.37)	1.075*** (6.37)	1.407*** (7.95)
OICT	0.241 (1.31)	0.206 (1.40)	0.467 (1.19)	0.467 (1.19)	-0.687* (-1.79)
GRII	-0.0517** (-2.21)	-0.113*** (-5.49)	-0.430*** (-12.14)	-0.430*** (-12.15)	-0.165*** (-7.28)
SHII	-0.0667*** (-4.93)	-0.0395** (-2.38)	-0.328*** (-8.64)	-0.328*** (-8.65)	0.0177 (1.30)
_cons	-10.79*** (-5.42)	-15.30*** (-11.60)	-42.40*** (-16.58)	-42.40*** (-16.59)	-37.49*** (-14.83)
N	34220	34220	34220	34220	34220
R-sq	0.600		0.351	0.351	

Note: t statistics are in parentheses (). Statistical significance at the 10%, 5% and 1% levels are indicated by *, ** and *** respectively.

landlocked trade (LANDLOCK) conforms to the theoretical prediction. Trade with landlocked nations is more difficult and demands higher transportation costs. According to a World Bank Policy Research Working Paper, the cost of transportation in landlocked nations is, on average, 30% higher than in coastal nations, making landlocked nations the source of the majority of low-income economies (20 out of 54) Arvis et al. (2007). The negative significance of the variable LANDLOCK at all analysis levels confirms this trade barrier's impact. Theoretically, having a shared border is advantageous for trade between the two countries due to the ease of transporting commodities. In general, the LAN continues to serve an important role in facilitating bilateral trade. On a global scale, it appears that the impact of COL on the Halal food and beverage economy is diminishing. The insignificant outcome validates Head et al. (2010)'s hypothesis that the superior influence of colonial relationships on international trade has diminished after decades of colonial rule.

Regarding trade cooperation determinants, we utilize the RTA variable to stand in for major trade agreements such as EU, AFTA, LAIA, ASEAN, NAFTA, and SAARC. Then we separate the OICT variable to assess the influence of OIC trade cooperation. Overall, the data demonstrate that RTA remains a potent tool for boosting member trade. In addition, the subject of religious freedom restrictions is one of our variables of interest. We believe this is one of the most significant issues distorting the Halal food and beverage industry, as the industry is tied to religious principles and a high restriction is likely to harm the nation's competitiveness. In addition, the significant restrictions in non-OIC countries indicate a lack of flexibility for Muslim minorities to practice their Halal organization. The regression result verifies our hypothesis that the limitation on religion (GRII and SHII) has a detrimental effect on the total value of Halal F&B commerce. This gives empirical evidence for the theory and Reuters (2017) Bejarano's assertion that religious bias is a significant obstacle to Halal trade. Although we cannot infer whether the restriction is justified, current research indicates that high levels of GRI and SHI are closely associated with institutional environment and national competitiveness-distorting conflict (Grim et al., 2014). For the entire country's population's benefit, preserving the harmony between the many religious groups in society is necessary.

REFERENCES

- Abdul, M., Ismail, H., Hashim, H., & Johari, J. (2009). Consumer decision making process in shopping for halal food in Malaysia. *China-USA Business Review*, 8(9), 40-47. Retrieved from <https://www.researchgate.net/profile/Mohani-Abdul/publication/299619092>
- Abidin, I. S. Z., & Sahlan, R. (2013). The determinants of exports between Malaysia and the OIC member countries: A gravity model approach. *Procedia Economics and Finance*, 5, 12-19. doi: [https://doi.org/10.1016/S2212-5671\(13\)00004-X](https://doi.org/10.1016/S2212-5671(13)00004-X)
- Adidaya, Y. A. (2016). *Halal in Japan: History, issues and problems-the effect of the "Halal Boom" phenomenon on Japanese society and industry*. Retrieved from <https://www.duo.uio.no/bitstream/handle/10852/52149/oppginnlev-ea997fbd-e41c-436f-9332> (1-38)
- Alon, I., & Chase, G. (2005). Religious freedom and economic prosperity. *Cato J.*, 25, 399. Retrieved from <https://heinonline.org/HOL/LandingPage?handle=hein.journals/catoj25&div=37&id=&page=>
- Anderson, J. E., & Van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American Economic Review*, 93(1), 170-192. doi: <https://doi.org/10.1257/000282803321455214>
- Antonucci, D., & Manzocchi, S. (2006). Does Turkey have a special trade relation with the EU?: A gravity model approach. *Economic Systems*, 30(2), 157-169. doi: <https://doi.org/10.1016/j.ecosys.2005.10.003>
- Arvis, J.-F., Raballand, G., & Marteau, J.-F. (2007). *The cost of being landlocked: logistics costs and supply chain reliability* (Vol. 4258): World Bank Publications. Retrieved from <https://books.google.co.in/books?hl=en&lr=&id=9sODt2nCz5wC&oi=fnd&pg=PA3&dq=Arvis>
- Awan, H. M., Siddiquei, A. N., & Haider, Z. (2015). Factors affecting Halal purchase intention—evidence from Pakistan's Halal food sector. *Management Research Review*, 38(6), 640-660. doi: <https://doi.org/10.1108/MRR-01-2014-0022>
- Bhattacharyya, R., & Rit, B. (2018). On the relationship between the nominal exchange rate and export demand in India. *South Asian Journal of Macroeconomics and Public Finance*, 7(2), 260-282. doi: <https://doi.org/10.1177/2277978718795777>
- Bialynicka-Birula, J. (2015). Modelling international trade in art—modified gravity approach. *Procedia Economics and Finance*, 30, 91-99. doi: [https://doi.org/10.1016/S2212-5671\(15\)01258-7](https://doi.org/10.1016/S2212-5671(15)01258-7)
- Blind, K., Mangelsdorf, A., & Pohlisch, J. (2018). The effects of cooperation in accreditation on international trade: Empirical evidence on ISO 9000 certifications. *International Journal of Production Economics*, 198, 50-59. doi: <https://doi.org/10.1016/j.ijpe.2018.01.033>
- Bojnec, Š., & Fertő, I. (2015). Institutional determinants of agro-food trade. *Transformations in Business & Economics*, 14(2), 35-52. Retrieved from <http://real.mtak.hu/34051/1/se35.pdf>
- Bournakis, I., & Tsoukis, C. (2016). Government size, institutions, and export performance among OECD economies. *Economic Modelling*, 53, 37-47. doi:

- <https://doi.org/10.1016/j.econmod.2015.11.011>
Center, P. R. (2017). Global Restrictions on Religion Rise Modestly in 2015, Reversing Downward Trend. Pew Research Center Report. Retrieved from <https://www.pewresearch.org/religion/2017/04/1/global-restrictions-on-religion-rise-modestly-in-2015>
- Cestepe, H., Yıldırım, E., & Bahtiyar, B. (2015). The impact of trade liberalization on the export of MENA countries to OECD trade partners. *Procedia Economics and Finance*, 23, 1440-1445. doi: [https://doi.org/10.1016/S2212-5671\(15\)00427-X](https://doi.org/10.1016/S2212-5671(15)00427-X)
- Cheong, J., & Tang, K. K. (2018). The trade effects of tariffs and non-tariff changes of preferential trade agreements. *Economic Modelling*, 70, 370-382. doi: <https://doi.org/10.1016/j.econmod.2017.08.011>
- Dai, M., Yotov, Y. V., & Zylkin, T. (2014). On the trade-diversion effects of free trade agreements. *Economics Letters*, 122(2), 321-325. doi: <https://doi.org/10.1016/j.econlet.2013.12.024>
- Didier, L. (2018). Economic diplomacy: The “one-China policy” effect on trade. *China Economic Review*, 48, 223-243. doi: <https://doi.org/10.1016/j.chieco.2016.11.003>
- Doan, T. N., & Xing, Y. (2018). Trade efficiency, free trade agreements and rules of origin. *Journal of Asian Economics*, 55, 33-41. doi: <https://doi.org/10.1016/j.asieco.2017.12.007>
- Dutt, P., Santacreu, A. M., & Traca, D. A. (2020). The gravity of experience. 47. doi: <https://dx.doi.org/10.2139/ssrn.2411949>
- Ehrich, M., & Mangelsdorf, A. (2018). The role of private standards for manufactured food exports from developing countries. *World Development*, 101, 16-27. doi: <https://doi.org/10.1016/j.worlddev.2017.08.004>
- Elliott, D., & Bonsignori, C. (2019). The influence of customs capabilities and express delivery on trade flows. *Journal of Air Transport Management*, 74, 54-71. doi: <https://doi.org/10.1016/j.jairtraman.2018.09.007>
- Finke, R. (2013). Presidential address origins and consequences of religious freedoms: A global overview. *Sociology of religion*, 74(3), 297-313. doi: <https://doi.org/10.1093/socrel/srt011>
- Francois, J., & Manchin, M. (2013). Institutions, infrastructure, and trade. *World development*, 46, 165-175. doi: <https://doi.org/10.1016/j.worlddev.2013.02.009>
- Fratianni, M., & Kang, H. (2006). Heterogeneous distance-elasticities in trade gravity models. *Economics Letters*, 90(1), 68-71. doi: <https://doi.org/10.1016/j.econlet.2005.07.007>
- Fratianni, M. U. (2007). The gravity equation in international trade. 31. Retrieved from <https://ssrn.com/abstract=1013348>
- Gani, A. (2017). The logistics performance effect in international trade. *The Asian Journal of Shipping and Logistics*, 33(4), 279-288. doi: <https://doi.org/10.1016/j.ajsl.2017.12.012>
- Grim, B. J. (2012). Rising Restrictions on Religion: A Global Overview. *BYU L. Rev.*, 5(3), 17-34. Retrieved from <https://heinonline.org/HOL/LandingPage?handle=hein.journals/byulr2012&div=40&id=&page=>
- Grim, B. J., Clark, G., & Snyder, R. E. (2014). Is religious freedom good for business?: A conceptual and empirical analysis. *Interdisciplinary Journal of Research on Religion*, 10(4), 119. Retrieved from www.religjournal.com/pdf/ijrr10004.pdf?inf_contact_key
- Grim, B. J., & Finke, R. (2010). *The price of freedom denied: Religious persecution and conflict in the twenty-first century*. Cambridge University Press. Retrieved from <https://books.google.co.in/books?hl=en&lr=&id=mofX6zdChgcC&oi=fnd&pg=PR7&dq=Grim>
- Gundogdu, A. S. (2009). Determinant of Intra-OIC Trade; Policy or Exchange Rate. *Journal of Economic Cooperation & Development*, 30(3), 1-42. Retrieved from <https://web.p.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl>
- Guo, R. (2004). How culture influences foreign trade: evidence from the US and China. *The Journal of Socio-Economics*, 33(6), 785-812. doi: <https://doi.org/10.1016/j.socec.2004.09.045>
- Hatab, A. A., Romstad, E., & Huo, X. (2010). Determinants of Egyptian agricultural exports: A gravity model approach. *Modern Economy*, 1(03), 134. doi: <https://doi.org/10.4236/me.2010.13015>
- Head, K., Mayer, T., & Ries, J. (2010). The erosion of colonial trade linkages after independence. *Journal of international Economics*, 81(1), 1-14. doi: <https://doi.org/10.1016/j.jinteco.2010.01.002>
- Helble, M. (2007). Is God good for trade? *Kyklos*, 60(3), 385-413. doi: <https://doi.org/10.1111/j.1467-6435.2007.00377.x>
- Kabir, M., Salim, R., & Al-Mawali, N. (2017). The gravity model and trade flows: Recent developments in econometric modeling and empirical evidence. *Economic analysis and policy*, 56, 60-71. doi: <https://doi.org/10.1016/j.eap.2017.08.005>
- Karam, F., & Zaki, C. (2019). Why don't MENA countries trade more? The curse of deficient institutions. *The Quarterly Review of Economics and Finance*, 73, 56-77. doi: <https://doi.org/10.1016/j.qref.2018.04.017>
- Kharel, P., & Belbase, A. (2010). *Integrating Landlocked Developing Countries into international trading system through trade facilitation*. Retrieved from.

- Retrieved from <https://www.econstor.eu/bitstream/10419/64312/1/640220983.pdf>.
- Krammer, S. M., Strange, R., & Lashitew, A. (2018). The export performance of emerging economy firms: The influence of firm capabilities and institutional environments. *International Business Review*, 27(1), 218-230. doi: <https://doi.org/10.1016/j.ibusrev.2017.07.003>
- Krishnan, S., Aderis, M., Azman, M. N., & Kamaluddin, M. N. A. (2017). Halal food: Study on non-Muslim acceptance. *American Journal of Economics*, 7(1), 41-45. doi: <https://doi.org/10.5923/j.economics.20170701.05>
- Kuik, O., Branger, F., & Quirion, P. (2019). Competitive advantage in the renewable energy industry: Evidence from a gravity model. *Renewable energy*, 131, 472-481. doi: <https://doi.org/10.1016/j.renene.2018.07.046>
- Larch, M., Wanner, J., & Yotov, Y. V. (2018). Bi-and Unilateral trade effects of joining the Euro. *Economics Letters*, 171, 230-234. doi: <https://doi.org/10.1016/j.econlet.2018.08.001>
- Liu, A., Lu, C., & Wang, Z. (2020). The roles of cultural and institutional distance in international trade: Evidence from China's trade with the Belt and Road countries. *China Economic Review*, 61, 101234. doi: <https://doi.org/10.1016/j.chieco.2018.10.001>
- Masron, T. A., Fujikawa, T., Azman, N., & Hadiyan, N. (2014). Malaysian Exports to Middle Eastern Asian Countries: Trends and The Role of Trade Agreements. *Asian Academy of Management Journal*, 19(2), 141-159. Retrieved from <https://core.ac.uk/download/pdf/89468863.pdf>
- Mehrra, M., Sejjani, S., & Karsalari, A. R. (2017). Determinants of high-tech export in developing countries based on Bayesian model averaging. *Zbornik radova Ekonomskog fakulteta u Rijeci: časopis za ekonomsku teoriju i praksu*, 35(1), 199-215. doi: <https://doi.org/10.18045/zbfri.2017.1.199>
- Miran, B., Atiş, E., Bektaş, Z., Salalı, E., & Cankurt, M. (2013). *An analysis of international raisin trade: A gravity model approach*. Retrieved from doi:<http://dx.doi.org/10.22004/ag.econ.152200>.
- Natale, F., Borrello, A., & Motova, A. (2015). Analysis of the determinants of international seafood trade using a gravity model. *Marine policy*, 60, 98-106. doi: <https://doi.org/10.1016/j.marpol.2015.05.016>
- Peace, T. I. f. E. a. (2014). *A Global Statistical Analysis on the Empirical Link Between Peace and Religion*. Retrieved from www.economicsandpeace.org
- Ramezzana, P. (2000). *Per capita income demand for variety, and international trade: Linder reconsidered*: Centre for Economic Performance, London School of Economics and Political ... Retrieved from <http://eprints.lse.ac.uk/id/eprint/20184>
- Rautala, V. (2015). *Gravity models of international trade: estimating the elasticity of distance with Finnish international trade flows*. Itä-Suomen yliopisto, Retrieved from https://erepo.uef.fi/bitstream/handle/123456789/14925/urn_nbn_fi_uef-20150356.pdf
- Reuters, T. (2017). State of the Global Islamic Economy Report 2017/18. .
- Samori, Z., Ishak, A. H., & Kassan, N. H. (2014). Understanding the development of halal food standard: Suggestion for future research. *International Journal of Social Science and Humanity*, 4(6), 482. doi: <https://doi.org/10.7763/IJSSH.2014.V4.403>
- Saucier, P., & Rana, A. T. (2017). Do preferential trade agreements contribute to the development of trade? Taking into account the institutional heterogeneity. *International Economics*, 149, 41-56. doi: <https://doi.org/10.1016/j.inteco.2016.10.001>
- Shafie, S., & Othman, M. N. (2006). *Halal certification: an international marketing issues and challenges*. Paper presented at the Proceeding at the International IFSAM VIIIth World Congress: University of Malaya Press Kuala Lumpur 28, 1-11. Retrieved from <https://mail.google.com/mail/u/0/#inbox>
- Shepherd, B., Doytchinova, H., & Kravchenko, A. (2019). The gravity model of international trade: a user guide [R vision]. 1-61. Retrieved from <https://hdl.handle.net/20.500.12870/113>
- Sherwani, M., Ali, A., Ali, A., Hussain, S., & Zadran, H. G. (2018). Determinants of muslim consumers' Halal meat consumption: applying and extending the theory of planned behavior. *Journal of Food Products Marketing*, 24(8), 960-981. doi: <https://doi.org/10.1080/10454446.2018.1450173>
- Silva, J. S., & Tenreyro, S. (2006). The log of gravity. *The Review of Economics and statistics*, 88(4), 641-658. doi: <https://doi.org/10.1162/rest.88.4.641>
- Silva, J. S., & Tenreyro, S. (2010). On the existence of the maximum likelihood estimates in Poisson regression. *Economics Letters*, 107(2), 310-312. doi: <https://doi.org/10.1016/j.econlet.2010.02.020>
- Uddin, M. A., Ali, M. H., & Masih, M. (2017). Political stability and growth: An application of dynamic GMM and quantile regression. *Economic Modelling*, 64, 610-625. doi: <https://doi.org/10.1016/j.econmod.2017.04.028>
- Urata, S., & Okabe, M. (2010). The impacts of free trade agreements on trade flows: An application of the gravity model approach. *Free trade agreements in the Asia Pacific*, 11(52), 195. doi: <https://books.google.co.in/books?hl=en&lr=&id>

[=4BsQ9D9bIaAC&oi=fnd&pg=PA195&dq=Ura
ta](#)

Wong, K.-M., & Chong, T. T.-L. (2016). Does monetary

policy matter for trade? *International Economics*,
147, 107-125. doi:

<https://doi.org/10.1016/j.inteco.2016.04.001>