MALAYSIA-OIC TRADE: A GRAVITY APPROACH

MAWAR MURNI YUNUS & MOHD ADIB ISMAIL

ABSTRACT

This study examines the bilateral exports between Malaysia and OIC membership countries using the gravity model and the data is covering from 1980 – 2006. The empirical results based on the panel data analysis demonstrate that the GDP of Malaysia, GDP of OIC member countries, FDI, exchange rate, distance and border are the main determinants of Malaysian exports. The finding also suggests that that there is also considerable room for improvement trade between Malaysia and OIC membership countries.

Keywords: gravity model; OIC; Malaysia; export; trade.

1. Introduction

Trends in international merchandise trade shows that the volume of merchandise trade among Organization of Islamic Conferences (OIC)[1] member countries has been rapidly increasing in recent two decades along with the tidal wave of globalization that began in the late 1980s. Both exports and imports of the OIC member countries increased rapidly in recent years after an interruption in 2001 due to the global economic slowdown in the early 2000s accompanied by fluctuations in oil prices. More than half of the total exports of the OIC belong to the group of Fuel Exporting Countries (FECs), and this share has been steadily increasing in recent years. Their share in total imports, at the same time, has also been on the rise to the detriment of the group of Middle-Developed Countries (MDCs), whose share accounted for almost two-thirds of the total imports in 2000. Malaysia is one of the MDCs. Although the share is rising largely due to higher oil and other commodity prices, it also highlights the fact that OIC countries, with the exception of Malaysia, Turkey and Indonesia, have not notably diversified away from primary commodities to a broader export basket.

Malaysia's exports of halal products and services were expected to increase significantly in the coming years due to the growing demand from the member countries of OIC. Exports of processed food to the OIC countries increased by 26.2% last year with the major export items being dairy products, increasing by 115%, sugar and sugar confectionary by 64.6%, and prepared cereals and flour preparations by 3.1%. Among the OIC countries, Indonesia was the major export destination for processed food last year, followed by Saudi Arabia, the United Arab Emirates and Brunei.

Almost all of the OIC member countries are developing countries. Even more, 21 of them are categorized under least developed low income countries. These countries constitute more than half of total OIC population. Therefore, collective actions should be taken urgently

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[1] The OIC was first established 39 years ago. It was founded in Rabat, Morocco on 25 September 1969 following the incident of criminal arson perpetrated on 21 August 1969 by Zionist element against Mosque al-Aqsa (OIC, 2008). The First Islamic Conference of Ministers of Foreign Affairs held in Jeddah on March 1970 to set up a permanent general secretariat. They chose Jeddah as the HQ but permanent HQ will be in Jerusalem. The OIC adopted the Charter of the Organization two and half years after the Rabat Summit. The aim of the charter is to strengthen solidarity and cooperation among Islamic states in the political, economic, cultural, scientific and social fields. In order to achieve this ultimate aim the OIC constructed main bodies, secondary organs, institutions and specialized committees (OIC, 2008).

by well developed member countries to help least well members. This research will suggest trade actions that can be taken. Trade is a simple treatment for unbalanced development among members. This willingness to help will show the spirit of Muslim brotherhood.

2. Research Background

The organization that promotes multilateral trade is played by World Trade Organization (WTO). It was established after the collapse of GATT (General Agreement for Tariff and Trade). Since 23 July 2008, WTO has 153 countries in its membership, most of them are Muslims. It main function is to smooth the trade activities. Its spirit is most favoured nation integrated with non-discrimination respect to all members. Therefore, establishment of trade cooperation among OIC members is likely seemed as another process of regionalism. The process of regionalism is like putting another distortion into the world trading system. This will cause trading system to be like a spaghetti bowl.

However, some economists believe that in order to establish a pure multilateral trade without distortions is the first best[2] solution but it is something impossible to happen in this complicated world order. They argue that putting another distortion does not mean complicating world trade pattern. It is based on the Second Best Theory. Based on this, the researcher justifies that the trade cooperation among OIC member countries as multilateral trade activities rather than regional trade activities.

Nevertheless, the further analysis of this study will take into account OIC trade cooperation as a Preferential Trade Arrangement (PTA)[3] that promotes intrabloc trade. Besides, other than only participating in the OIC trade cooperation, the member countries also join other trade agreements created by themselves such as Arab Maghreb Union (AMU), Council of Arab Economic Unity (CAEU), the Gulf Cooperation Council (GCC) and the Economic Cooperation Organization (ECO) or created by non-members such as Asia-Pacific Economic Cooperation (APEC).

This study is aimed to conduct an empirical research to assess the effect of OIC membership on Malaysia exports**.** This study is a response to the call for doing research and development on Muslim countries to measure the effectiveness of OIC in promoting trade among member countries. There are much potential for them to trade among each other.

3. Previous Studies

The Gravity model that will be used in the analysis part of this research has been used by many previous researchers like Frankel et.al (1995), Rajapakse and Arunatilake (1997) and Hassan (2001). Frankel et.al (1995) examine the PTA in American continent. They argue that the bilateral trade is unable to be explained only by natural variables such as national income, geographical size, and common language and border.

Rajapakse and Arunatilake (1997) and Hassan (2001) investigate the South Asian Association for Regional Cooperation (SAARC). They find that the SAARC needed trade reformation to enhance trade among them (Rajapakse and Arunatilake, 1997) because volume of trade between each other is small compared to trade with others (Hassan, 2001). This situation happened due to (1) production of similar products, (2) small scale of production,

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[2] According to Suranovic (2003) this kind of economic condition was introduced by Lipsey and Lancaster (1956). Lipsey and Lancaster (1956) argue that inserting one restriction into general equilibrium that prevents Pareto optimality to happen though other conditions fulfilled, it does not needed anymore.

[3] PTA is loosest economic integration. It decreases trade barriers among member countries while trading with non-members will face various tariff and non-tariff barriers.

and (3) political confrontation among country members (Rajapakse and Arunatilake, 1997). Hassan (2001) concludes that the main factor contributed to this situation is the low level of industrialization in most country members. Therefore, he argues that the SAARC would gain intrabloc increase if all country members gave much focus on industries.

Ceglowski (2000) and Okubo (2004) demonstrate that implementation of PTA will decrease effects of common border variable. Clarete et. al (2003) argue that different PTA gave different intra bloc trade effect. They also find that there are PTAs that give effect contrary to the theory.

4. Methodology and Data

This research will adopt the gravity model to examine the impact of OIC membership on Malaysian exports. The literatures show that this model is widely used in order to examine the bilateral flows of trade. The model explained the volume of trade flows in terms of the ratio of the product of the gross domestic product (GDP) of countries *i* and *j* to the distance between them.

$$\text{Trade}_{ij} = A \frac{(GDP_i.GDP_j)}{\text{Distance}}$$

By taking the logarithm we get the following:

$$\ln(\text{Trade}_{ij}) = A + \beta_1 \ln(GDP_i. GDP_j) - \beta_2 \ln(\text{Distance}_{ij}) + \varepsilon_{ij}$$

The gravity model employed in this study is as follows:

$$\ln X_{mjt} = \alpha_0 + \alpha_t + \alpha_j + \beta_1 \ln GDP_{mt} + \beta_2 \ln GDP_{jt} + \beta_3 \ln ENDOW_t + \beta_4 \ln FDI_{mt} + \beta_5 \ln FDI_{jt}$$
$$+ \beta_6 \ln POP_{mt} + \beta_7 \ln POP_{jt} + \beta_8 \ln EXCR_{mt} + \beta_9 \ln EXCR_{jt} + \beta_{10} \ln DISTANCE_{mj}$$
$$+ \beta_{11} BORDER_{mj} + \beta_{12} OIC_j + \varepsilon_{jt}$$

where α_0 is constant; α_t is year-specific effect but common to all countries; α_j is country-specific effect which is common to all years; ε_{jt} error term in log assumed to normally distributed; β_k are estimated parameters, for all $k = 1,2,...,12$; *GDP* is Gross Domestic Product (GDP); ENDOW is absolute difference between GDP_{mt} and GDP_{jt}; FDI is inward flows of foreign direct investment (FDI); POP is number of population, EXCR is end-of-period exchange rate of national currencies per a dollar; DISTANCE is distance between exporting and importing countries; BORDER is dummy for common border; and OIC is dummy for OIC membership. If the coefficient on OIC dummy is positive and significant, then the trading activities between Malaysia and OIC members are judged to expand. Given the log linear specification of the gravity model regression equation, the impact of trade between Malaysia and OIC member countries can be computed in percentage terms as 100 x [exp(β_{12}) − 1.00]. The dependent variable is total export of merchandise. The subscript *m* indicates the exporting country. In this model, Malaysia is the exporting country, and the subscript *j* indicates the Malaysia trading partners.

5. The Data

The data set consists of a panel of observations for a group of 96 Malaysian trading partners and the sample period is covering from 1980-2006. Within these sample countries, there are 36 OIC member countries[4]. Some OIC member countries are excluded from the sample in order to avoid outliers in the dataset especially the least developing OIC countries.

The Malaysian exports dataset to these trading partners are obtained from Direction of Trade Statistics, International Monetary Fund (IMF) CDROM. Annual data on GDP converted to US dollar is obtained from World Economic Outlook Database, IMF's website. FDI dataset are gathered from World Investment Report (WIR, 2008), which are available online at UNCTAD's website. Population and exchange rate dataset are collected from International Financial Statistics, IMF CDROM. Distance is taken from Jon Haveman's website. The OIC membership is taken from OIC's website.

Export, GDP, FDI and exchange rates are in nominal terms. These nominal terms are used instead of real terms because the terms can show current demand on goods. This has been argued by Jakab et al. (2001) and Sapir (2001). The coefficients of GDP are assumed to be positive to indicate the economy with larger size trades more. The difference of GDP between the exporter and the trading partners indicate the relative effect of endowment on export. FDI is expected to be positively affect the export to show that FDI drives trade activities.

Population is an indicator of market size. The sign of its coefficients can either be positive to show the economies of scale where the economies with large population exports more; or negative to indicate the absorption capacity where 'demand creates its own supply' applies because the large population absorb the supply of goods domestically. On the other hand, the coefficients of exchange rate are assumed to be positive for the exporter where the depreciation of its currency makes the price of export to be cheaper and increase the demand on it. On contrary, for the importing countries, the depreciation of their countries means the import is more expensive which thus reduces the demand on import.

The distance between the exporter and its trading partners is measured in kilometres. The variable is used as a proxy of transportation costs. The farther is the distance the more the cost to export goods. On the other hand, the closer is the distance the more to trade. This is measured by a dummy variable of value one if Malaysia, as the exporting country shares a common border with its trading partners.

Finally, a dummy is used to measure the effect of OIC membership on Malaysian exports. This dummy is assumed to be positive as being an OIC member it will encourage trading between members of country.

6. Empirical results

The gravity model is estimated using ordinary least squares (OLS), generalized least squares (GLS) and panel corrected standard error (PCSE) OLS. The OLS estimates usually biased as it assumes constant variance across time and countries. As alternatives, the model is again estimated using GLS and PCSE. However, the GLS estimates and their associated standard errors are calculated using inverse of $\hat{\Sigma}_{i,j} = \frac{\hat{e}_i'\hat{e}_j}{T}$ where $\Omega = \Sigma_{m \times m} \otimes I_{T_i \times T_i}$. Beck and Katz (1995) show that the variance matrix is of rank at most min (T, m). Therefore, in order to obtain valid GLS results T must be at least as large as m (number of panels). Beck and Katz

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[4] These countries are Albania, Algeria, Azerbaijan, Bahrain, Bangladesh, Brunei, Cameroon, Cote D'Ivoire, Egypt, Gabon, Guyana, Indonesia, Iran, Iraq, Jordan, Kazakhstan, Kuwait, Kyrgyz, Lebanon, Libya, Morocco, Nigeria, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Suriname, Syria, Tajikistan, Tunisia, Turkey, Turkmenistan, UEA, Uzbekistan.

(1995) suggest using OLS estimates with asymptotic standard errors that are corrected for correlation between the panels i.e. PCSE. PCSE allows the panel to be balanced and unbalanced but does not need similar requirement as *T* must be at least as large as *m* as GLS needs.

Table 1 shows the results of OLS, GLS and PCSE estimations, which reveal that there is close similarity in the coefficient parameters, significance and sign among these three estimators except the errors. The results demonstrate that GDP of Malaysia and its trading partners affects Malaysian exports positively. This is consistent with the hypothesis that the economy with larger size trades more. The depreciation of trading partners' currencies affects Malaysian exports negatively. Conversely, this indicates that the appreciation of the importers' currencies affects Malaysian exports positively since Malaysian exports become relatively cheaper. FDI inward in Malaysian trading partners also positively influences Malaysian exports. This relationship suggests that FDI is related closely to trade activities. Usually, a country is expected to trade with neighbours more than the others. In contrast, the dummy variable of BORDER is significantly negative. This finding is however consistent with Normaz (2008), who finds that border is negative and statistically significant determinant of trade.

Table 1 Estimation Results of Gravity Model

	OLS	GLS	PSCE
α_0	147.600 (118.978)	147.600 (118.516)	147.600 (119.576)
α_t	-0.078 (0.064)	-0.078 (0.063)	-0.078 (0.064)
α_j	0.005 (0.001)***	0 .005 (0.001)***	0.005 (0.001)***
$\ln GDP_{mt}$	0.608 (0.285)**	0 .608 (0.284)**	0.608 (0.283)**
$\ln GDP_{jt}$	0.843 (0.029)***	0 .843 (0.027)***	0.843 (0.027)***
$\ln ENDOW_t$	0.054 (0.023)**	0 .054 (0.023)**	0.054 (0.022)***
$\ln FDI_{mt}$	0.017 (0.058)	0 .017 (0.058)	0.017 (0.059)
$\ln FDI_{jt}$	0.143 (0.019)***	0 .143 (0.019)***	0.143 (0.018)***
$\ln POP_{mt}$	3.920 (2.435)	3.920 (2.425)	3.920 (2.423)
$\ln POP_{jt}$	-0.014 (0.022)	-0.014 (0.022)	-0.013 (0.019)
$\ln EXCR_{mt}$	0.020 (0.323)	0 .020 (0.321)	0.020 (0.322)
$\ln EXCR_{jt}$	-0.045 (0.010)***	-0.045 (0.010)***	-0.045 (0.010)***
$\ln DISTANCE_{mj}$	-1.915 (0.058)***	-1.915 (0.057)***	-1.915 (0.051)***
$BORDER_{mj}$	-0.959 (0.182)***	-0.959 (0.182)***	-0.959 (0.174)***
OIC_j	-0.010 (0.070)	-0.010 (0.070)	-0.010 (0.068)
R-square	0.83		0.83

Note: Standard errors are in parentheses. *** and ** indicate 1% and 5% levels of significance.

The dummy variable to capture the effect of OIC membership is negative and statistically insignificant determinant of Malaysian exports. The estimated coefficient of -0.010 implies that trade between Malaysia and OIC trading partners decreases slightly by 1.005%[5]. Therefore, there is also considerable room for improvement the trading activities between Malaysia and OIC member countries.

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[5] 100 x [exp(0.010) – 1.00] = 10.52%

7.   Conclusion

This study examines the impact of OIC membership on Malaysian exports for the period 1980 – 2006 using the gravity model. From a basic gravity equation, this study identifies the GDP of Malaysia, GDP of OIC member countries, FDI, exchange rate, distance and border are the main determinants of Malaysian exports. The empirical results also show that there is also considerable room for improvement trade between Malaysia and OIC membership countries.

The empirical finding suggest that in order to encourage trade among OIC members, Muslim countries should actively promote and integrate markets and reduce tariff and non-tariff barriers' promote free trade agreements (FTA) among member countries while working towards an Islamic Common Market. They should actively work on trade matching of buyers and sellers by working closely with relevant trade bodies, government and non-government, in member countries as well as with commercial and export - import banks and promote sourcing of goods and services from Muslim countries while not compromising on quality.

For future researches, the use of disaggregate data may be useful to further the study on the impact of OIC trade relationship from a perspective of particular goods. In addition, this study covers 27 years of data period. In this long period of data, certain OIC member countries were not stable due to war. Besides, many OIC member countries are oil-exporting countries which may divert their trades into developed countries. Therefore, dummy variables can be used to represent the effects.

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