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ARE IMPORTS AND EXPORTS OF OIC MEMBER COUNTRIES COINTEGRATED? AN EMPIRICAL STUDY

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Abstract

The present study examines the presence of a long run relationship between imports and exports for 27 Organization of Islamic Conferences (OIC) member nations. The results of unit root and cointegration tests indicate that only four of them, namely Benin, Burkina Faso, Cameroon, and Guyana show a long run relationship between volume of imports and exports. This finding indicates that exchange rate and macroeconomic monetary or fiscal) policies may be effective to improve the countries' trade balances in the long run. For other countries (no cointegration between their imports and exports), they are in violation of their international budget constraint, and exchange rate. Besides that, other macroeconomic policies are unfavorable to countries' external balances in the long run.

Keywords: Cointegration; Exports; Imports; Organization of Islamic Conferences (OIC).

1. Introduction

The exchange rate policy in any country is always accompanied by other macroeconomic policies (fiscal or monetary), it finds to be difficult to assess the effects of one policy without controlling for the others. Thus, the combined effects of all policies on the trade balance are considered. The presence of a long-run relationship among imports and exports of a country might indicate that the macroeconomic policies as well as devaluation can be possible implemented in order to correct the trade imbalance

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(Bahmani-Oskooee and Rhee, 1997). Meanwhile, Arize (2002, p.102) has added that knowledge of whether imports and exports are cointegrated is essential for the design and evaluation of current and future macro-policies aimed at achieving the trade balance.

Bahmani-Oskooee (1994) has investigated the effectiveness of Australian external accounts to macroeconomic policies by investigating the long-run convergence between Australian imports and exports. The application of cointegration technique revealed that Australian imports and exports are indeed cointegrated with cointegrating coefficient very close to unity indicating that indeed Australia's macroeconomic policies have been effective in the long-run. For the Korean case, using quarterly data 1963-1991, Bahmani-Oskooee and Rhee (1997) have found that Korea's imports and exports are cointegrated based on Johansen and Juselius (1990) technique. This indicates that Korea is not in violation of its international budget constraint, and exchange rate. Besides that, other macroeconomic policies are favorable to country's external balances. Using a sample of five ASEAN economies, Tang (2002) has found that a cointegrating relation between imports and exports exists for Malaysia and Singapore, but not for the Philippines, Indonesia and Thailand. These findings are based on annual data for the period 1968-1998 (1974-1998 for Singapore) and an application of unrestricted error correction model; bounds test (Pesaran *et al*., 2001).

Using a sample of 50 countries, Arize (2002) has found that 35 of them are in favour of cointegration employing Johansen's technique based on quarterly data from 1973 to 1998. However, cointegration has been confirmed for all countries (except Mexico) by using Stock and Watson (1988) technique as a complementary test to Johansen's. Therefore, the author concludes that macroeconomic polices have been effective in the long run and suggests that these countries are largely not in violation of their international budget constraint. Among the included OIC member countries are Indonesia, Malaysia, Pakistan, Egypt, Iran, Jordan, Kuwait, Morocco, Nigeria, and Tunisia. The imports and exports of all of these countries are cointegrated using Stock and Watson (1988) technique but, except Jordan, and Morocco based on Johansen test.

The present study aims to empirically investigate the presence of a long run relationship between imports and exports for the selected Organization Islamic Conferences (OIC) member countries (see Appendix 1) using cointegration technique. As we know, there aren't any existing study in the empirical literature, which examine the cointegrating relation between imports and exports for OIC member countries. The reason for choosing the OIC member countries lies basically in the presence of her trade deficits. By observing the period 1990-2000, most of the OIC member countries have experiencing unfavorable trade deficits from 1990 to 2000 (see Appendix 1 for the selected sample countries). They are Bangladesh, Benin, Burkina Faso, Chad, Egypt, Gambia, Guinea-Bissau, Guyana, Jordan, Mali, Mauritania, Morocco, Niger, Pakistan, Senegal Sierra Leone, Togo, and Tunisia. However, trade deficits also happened for Algeria in 1990, 1993-1995 and 1998; Cameroon in 1999; Indonesia in 1995-1997; Iran in 1990-1993 and 1998; Malaysia in 1991 and 1993-1995; Nigeria in 1993; 1998-1999; and Syria in 1991-1998. Cote d'Ivoire and Gabon have not had trade deficit over the period 1990-2000 (World Bank, various issues).

Other than that, some macroeconomic characteristics of these countries have been illustrated in Appendix 2. Firstly, almost all of the examined OIC countries are in low income (17 countries) (8 countries in lower middle income) based on 1999 World Bank classification, except Gabon and Malaysia (upper middle income). Secondly, in terms of economic structure, agricultural sector is a major contributor to Gross Domestic Product over these countries comparing to manufacturing sector. The countries with share of agriculture as percentage of GDP (in 1999) under the range of 30% and 47% p.a. are Benin, Burkina Faso, Cameroon, Chad, Gambia, Guyana, Mali, Niger, Nigeria, Sierra Leone, and Togo. The lowest is 2% for Jordan. In addition, the value added of manufacturing as percentage of GDP (in 1999) is found to be higher than agriculture in Egypt, Indonesia, Jordan, Malaysia, Syria, and Tunisia.

Here, we also briefly illustrate the macroeconomic performance of the selected OIC countries for the average period 1990-1999. The average growth of real GDP is ranged between -4.8% and 6.3% p.a., and the lowest and the highest values are for Sierra Leone, and Malaysia respectively. Most of these countries, which are in 3% to 5% p.a.(16 countries) comparing to 8 countries are in 1% to 3% average growth for 1990-1999. All of the selected OIC countries have recorded a positive average growth of export for the period 1990-1999, except Sierra Leone (-12.2%). The average export growth for Bangladesh and Malaysia is 13.2% p.a. and 11% p.a. respectively. It is due to the exports-led growth strategy implemented by the countries. Half of the sample countries have negative growth of imports over the period 1990-1999, namely Gabon, Guinea-Bissau, Iran, Jordan, Niger, Sierra Leone, and Togo. It indicates an effectiveness of Government's policies (fiscal or monetary) in improving the country's trade balances. We also observe that the imports growth is found to be higher than exports growth in Algeria, Benin, Burkina Faso, Cameroon, Gambia, Morocco, and Nigeria. Furthermore, inflation is a major determinant of trade flows. It measures the growth of domestic prices (proxy by consumer price index, CPI), and an increase of domestic price will make imports cheaper, consequently, the demand for imports will rise. The average growth of inflation rate is above 10% p.a. for the period 1990-1999 in Algeria (21.4%), Guinea-Bissau (36.7%), Guyana (26.1%), Indonesia (16%), Iran (25.5%), Nigeria (29.2%), Pakistan (10%), and Sierra Leone (41%). Meanwhile, the exchange rate data (local currency/US$) shows that all of these countries have devaluated their currencies (positive average growth of exchange rate) for the period 1990-1999, except Syria. Some countries achieved more than 10% exchange rate growth as in Algeria (21.7%), Egypt (13.6%), Guinea-Bissau (30.9%), Guyana (18.8), Indonesia (14.9%), Iran (31.9%), Nigeria (25.3%), and Sierra Leone (34.1%).

The present study justifies some interesting differences among the previous works. Firstly, Engle, Granger, and Hallman (1989) have pointed out that the use of seasonal data to estimate the long run model may give rise to inconsistent estimates of the long run parameters. The above-mentioned previous studies except Tang (2002), have used quarterly data that associated with seasonal component for cointegration analysis. The present study considers this issue by using annual data. Charemza and Deadman (1992, p.153) have suggested using annual data to estimate these long run parameters thereby avoiding to model the seasonality, and the standard tests for cointegration applied. We

also believe that cointegration is a time phenomena, and the cointegration of imports – exports variables cannot work in a short period of a few quarters. In addition, Hakkio and Rush (1991) have documented that increasing the number of observations by using monthly or quarterly data does not add any robustness to the results in the tests of cointegration, but the time span used for analysis.

Secondly, based on the use of annual data in the present study, we employ Engle and Granger's (1987) cointegration technique rather than another popular technique like Johansen's multivariate cointegration test (Johansen and Juselius, 1990; Johansen, 1991). By evaluating the six selected cointegration techniques, Abeysinghe and Tan (1999) used annual data (1963-1992) and have concluded that in small samples, OLS (Engle and Granger, 1987) may still be the best choice. The six estimation techniques are OLS, unrestricted ECM (error correction model) (or autoregressive distributed lag model, ARDL) as in Bardson (1989) and PcGive (Hendry and Doornik, 1996), a fully modified (FM) least squares due to Phillips and Hansen (1992) and Hansen (1992), the 3-step estimator (Engle and Yoo, 1991), OLS regression augmented by leads and lags of the differenced explanatory variables (Hamilton, 1994), and Johansen's multivariate test (Johansen and Juselius, 1990). Tang's (2002) findings may be interpreted with caution since he used unrestricted ECM. Meanwhile, the present study involves only two time series variables that are volume of imports and exports when Engle and Granger's (1987) cointegration test is applicable.

Finally, Arize's (2002) study has used the nominal gross domestic product scaled the imports and exports variables in analysis. A concern from Arize's (2002) study is that the ratio of imports or exports to GDP may not give an accurate picture of the trend in imports or exports because the increase of GDP may decrease the trend of these ratios. It is essentially evidenced from early discussions that the involved OIC countries in Arize's (2002) study have been suffering from trade deficits over 1990-2000 even imports and exports (in ratio to GDP) were cointegrated as documented by Arize (2002) supporting the effectiveness of exchange rate and macroeconomic policies. Therefore, the present study employs imports and exports data (in 1995 prices) in levels rather than in ratios.

The next section discusses the data and method used in analysis. The empirical results of cointegration tests are reported in Section 3. The concluding remarks are in the last section.

2. Data and Method

Considering the issues discussed above, the variables used in the present study are volume of imports and exports (in levels rather than in ratios). The examined countries are cited in Appendix 1 due to their data availability. The imports and exports data are measured in index based on 1995 prices (local currency) that are obtained from World Tables (World Bank, various issues). The data have been transferred into natural logarithms (ln).

The Phillip and Perron (1988) unit root test (PP test) is preferred. The PP test is based on the more general autoregressive integrated moving-average (ARIMA) process. In addition, small sample studies show that the PP test is more appropriate when the process is generated by an ARIMA process (Schwert, 1989). The results of PP unit root test are reported in Table 1.

The results of unit root tests reported in Table 1 show that the exports and imports variables for most of the sample countries are nonstatioanry, or in *I*(1) process. Some countries are mixed between *I*(0) and *I*(1) processes, like for Algeria, Bangladesh, Chad, Jordan, Mali, Niger, Pakistan, Senegal, Sierra Leone, and Syria.

Enders (1995, p.374) has noted that by definition, cointegration necessitates that the variables to be integrated of the same order, and if the variables are integrated of different orders, it is possible to conclude that they are not cointegrated. Since the present study aims to examine the cointegrating relation between imports and exports based on a bivariate framework, thus, cointegration analysis is only applicable for nonstationary series of imports and exports but not for mixed integration series. And, no cointegrating relation between imports and exports can be concluded for the above countries can be drawn for Algeria, Bangladesh, Chad, Jordan, Mali, Niger, Pakistan, Senegal, Sierra Leone, and Syria.

Following Arize (2002), Tang (2002), and Bahmani-Oskooee and Rhee (1997), a cointegrating equation to test the presence of a long run relationship between imports and exports can be written as follows.

$$\ln M_t = b_0 + b_1 X_t + e_t \tag{1}$$

where $\ln M$ and $\ln X$ are logarithms (ln) of quantity imports, and exports respectively. e is residuals term.

Considering the use of Engle and Granger's (1987) residual based cointegration technique, the volume of imports and exports are cointegrated if the residuals series of cointegrating Equation (1) is stationary or in *I*(0) process. Testing the null of no cointegration is equivalent to check the stationarity of estimated residual series by using usually used unit root tests like Dickey-Fuller (DF) or Augmented DF (Engle and Granger, 1987). The DF equation, namely, $\mathrm{D}e_t = a + be_{t-1} + u_t$ is first used. If there exist autocorrelation of its disturbance term (based on DW-*d* test) exists, augmented Dickey-Fuller test is used to assume no autocorrelation by adding lagged values of first differenced e_t ($\mathrm{D}e_t$) (see Verbeek, 2000, pp.283-284). If the computed *t*-ratio of *b* lies below the critical value (Davidson and MacKinnon, 1993), the null of no cointegrating relation (*b*=0) can be rejected and a cointegrating relation between the involved variables can be concluded.

Table 1
Phillip-Perron Unit root tests

Countries	ln X	D ln X	ln M	D ln M	Order of integration: [ln X ; ln M]
Algeria	-7.313(3)*		-2.392(3)	-8.185(3)*	[I(0); I(1)]
Bangladesh	-1.456(3)	-8.773(3)*	-3.428(3)***		[I(1); I(0)]
Benin	-1.539(3)	-4.296(3)*	-1.64(3)	-6.009(3)*	[I(1); I(1)]
Burkina Faso	-2.462(3)	-7.232(3)*	-2.679(3)	-6.939(3)*	[I(1); I(1)]
Cameroon	-2.116(3)	-5.674(3)*	-2.062(3)	-5.605(3)*	[I(1); I(1)]
Chad	-4.488(3)*		-2.642(3)	-6.281(3)*	[I(0); I(1)]
Cote d'Ivoire	-3.011(3)	-8.764(3)*	-2.097(3)	-6.196(3)*	[I(1); I(1)]
Egypt	-2.548(3)	-4.892(3)*	-1.659(3)	-4.319(3)*	[I(1); I(1)]
Gabon	-1.501(3)	-4.699(3)*	-1.192(3)	-5.212(3)*	[I(1); I(1)]
Gambia	-2.757(3)	-4.126(3)*	-2.345(3)	-4.496(3)*	[I(1); I(1)]
Guinea-Bissau	-1.572(3)	-7.616(3)*	-2.398(3)	-5.47(3)*	[I(1); I(1)]
Guyana	-1.554(3)	-5.33(3)*	-1.931(3)	-6.075(3)*	[I(1); I(1)]
Indonesia	-2.054(3)	-5.693(3)*	-1.408(3)	-5.411(3)*	[I(1); I(1)]
Iran	-1.997(2)	-3.957(2)*	-2.937(2)	-4.083(2)*	[I(1); I(1)]
Jordan	-2.502(2)	-4.425(2)*	-3.786(2)**		[I(1); I(0)]
Malaysia	-1.012(3)	-4.856(3)*	-2.222(3)	-4.923(3)*	[I(1); I(1)]
Mali	-3.948(3)**		-2.654(3)	-6.507(3)*	[I(0); I(1)]
Mauritania	-2.999(3)	-4.795(3)*	-1.744(3)	-6.448(3)*	[I(1); I(1)]
Morocco	-2.868(3)	-7.497(3)*	-2.448(3)	-5.336(3)*	[I(1); I(1)]
Niger	-3.555(3)**		-2.823(3)	-6.961(3)*	[I(0); I(1)]
Nigeria	-2.388(3)	-5.754(3)*	-1.39(3)	-3.876(3)*	[I(1); I(1)]
Pakistan	-2.109(3)	-6.756(3)*	-3.204(3)***		[I(1); I(0)]
Senegal	-5.014(3)*		-4.612(3)*		[I(0); I(0)]
Sierra Leone	-3.002(3)	-6.937(3)*	-3.669(3)**		[I(1); I(0)]
Syria	-3.073(2)	-4.925(2)*	-4.299(2)**		[I(1); I(0)]
Togo	-1.737(3)	-8.116(3)*	-1.675(3)	-4.107(3)*	[I(1); I(1)]
Tunisia	-1.85(3)	-6.865(3)*	-1.735(3)	-5.626(3)*	[I(1); I(1)]

Notes: ( ) is the lag truncation for Bartlett kernel based on Newey-West suggestion. *, **, *** denote rejection of hypothesis of a unit root based on MacKinnon critical values at 1, 5 and 10% levels. Constant and time trend are included in unit root equation for data in levels, but only constant for data in first differences, D. # denotes the use of cointegration analysis.

3. Empirical Results

In this section, the results of cointegration test for imports and exports for the selected OIC member countries (see Table 1) are discussed. The results of Engle and Granger's (1987) cointegration test are reported in Table 2.

Table 2
Estimates and Results of Cointegration Test (Engle and Granger, 1987)

Dependent variable: ln *M*				
Countries	Constant	Elasticity of ln *X*	*R*-squared	Cointegration test for the null of no cointegrating relation
Benin	1.013*	0.785*	0.942	-4.206 [0][a]
Burkina Faso	-0.146	1.006*	0.875	-3.552 [0][a]
Cameroon	1.152*	0.772*	0.948	-3.661 [0][a]
Cote d'Ivoire	1.434*	0.708*	0.815	-2.058 [0]
Egypt	1.488*	0.718*	0.753	-1.938 [1]
Gabon	0.503**	1.006*	0.863	-1.426 [0]
Gambia	2.335*	0.471*	0.426	-2.882 [1]
Guinea-Bissau	5.485*	-0.148**	0.154	-2.594 [0]
Guyana	0.136	0.986*	0.850	-3.648 [0][a]
Indonesia	-2.926*	1.642*	0.939	-1.783 [0]
Iran	3.824*	0.253	0.086	-1.019 [0]
Malaysia	-0.177*	1.008*	0.987	-2.679 [1]
Mauritania	0.694***	0.825*	0.649	-2.584 [1]
Morocco	-0.278	1.068*	0.880	-1.977 [0]
Nigeria	-0.030	1.089*	0.602	-2.009 [1]
Togo	0.884*	0.854*	0.872	-2.765 [0]
Tunisia	0.710*	0.853*	0.968	-2.113 [0]

Notes: *, **, *** denote the coefficient is significantly different from zero at 1%, 5% and 10% level (two-tailed test). [ ] is order of the included augmented terms. The Davidson and MacKinnon (1993, p.722 Table 20.2) critical values for cointegration test are -3.90, -3.34, and -3.04 at 1, 5 and 10% levels (with two endogenous variables and constant term), respectively. Superscript a denote rejection of the null of no cointegrating relation at 10% level.

The computed Dickey-Fuller test statistics (DF) for Benin, Burkina Faso, Cameroon and Guyana lie below the critical value of -3.04 at 10%. This indicates that the null of non-cointegration can be rejected. Thus, a cointegrating relation between volume of imports and exports does exist for these OIC member countries. It reveals that imports and exports of these countries exhibit random walks, there seems to be a stable long run

relationship between the two variables. The application of cointegration technique has revealed that imports and exports for Benin, Burkina Faso, Cameroon and Guyana are indeed cointegrated with cointegrating coefficient very close to unity indicating that indeed these countries' macroeconomic policies have been effective in the long run. However, this is not the case of the remaining sample countries, which do not have a long run relationship is detected between imports and exports based on unit root and cointegration tests (Tables 1 and 2).

It is not surprising to discover that no cointegration is found between imports and exports for most of the involved OIC member countries in the present study, which runs contrary to Arize's (2002) study, is not surprising. This can be probably explained by the measurement used for imports and exports variables. Arize (2002) used the nominal gross domestic product scaled the imports and exports variables. A reservation for Arize's (2002) study is that the ratio of imports or exports to GDP may not give an accurate picture of the trend in imports or exports. The increase of GDP may decrease the trend of these ratios. The present study uses volume of imports and exports in levels rather than in ratios as in Arize (2002). The different findings of cointegration analysis from Arize (2002) for some selected OIC member countries can be also related to the use of OLS method (Engle and Granger, 1987) in the present study that has been recommended in Abeysinghe and Tan (1999) for small sample study with limited annual observations.

4. Concluding Remarks

The present study has empirically investigated the cointegrating relation between imports and exports for 27 selected OIC member countries using cointegration methodology. Three issues have been considered here. Firstly, this study uses annual data in analysis, so that the problems occurred from using seasonal data, i.e. quarterly data can be avoided (Charemza and Deadman, 1992, p.153). Secondly, the variables used in the present study are measured in levels rather than in ratios considering that the imports or exports ratio to GDP fails to provide an accurate picture about the trend of these series as in Arize (2002). Finally, Engle and Granger's (1987) OLS method has been employed for cointegration test because of its robustness for small sample study (Abeysinghe and Tan, 1999).

The results of unit roots and cointegration tests show only 4 of the 27 selected OIC member countries, namely Benin, Burkina Faso, Cameroon and Guyana, have a cointegrating relation among their corresponding exports and imports. It is noted that the economic structure of these countries is agricultural based with 38%, 32%, 44% and 30% agricultural value added to GDP for the period 1999 (Appendix 2). A probable implication from the finding of a cointegrating relation among imports and exports is that exchange rate (devaluation) and macroeconomic (monetary and fiscal) policies have a favorable outcome on a country's trade balances in the long run. Here, it can be observed that the growth of exchange rate (devaluation) is 6.6% for Benin, Burkina Faso and Cameroon, but 18.8% p.a. in Guyana (Appendix 2). Theoretically, devaluation may increase a country's price competitiveness in international trade, rather than increases

exports and at the meantime decrease imports. However, the statistics from 1990-1999 show the average annual growth of the import demand (1990-1999) is higher than exports growth except Guyana. Guyana's imports growth (9.2%) is almost equal to exports growth (9.3%). In addition, these economies have been suffering from trade deficits for the period from 1990 to 2000, except Cameroon (only in 1999). The inflation rates for Benin, Burkina Faso, and Cameroon are 7.2%, 2.7% and 4.2% p.a. over 1990-1999, but 26.1% p.a. in Guyana. Another implication is that the inflation of the four countries must be kept in check, as the increase of domestic price along with the decrease of import price will increase imports.

For other countries with no cointegration between imports and exports, combined exchange rate and macroeconomic policies (fiscal and monetary) may still be favorable to improve trade balances in the short run basis. Majority of these economies have been classified as low or lower middle income countries except Malaysia and Gabon of upper income level. On the other hand, their economic is classified as agricultural based except for Egypt, Jordan, and Malaysia (value added of agriculture is significantly higher than manufacturing as percentage of GDP in 1999, see Appendix 2). For the period 1990-1999, devaluation has been observed in these economies, as indicated by the average yearly positive growth of exchange rate (see Appendix 2, last column). However, as shown in their trade accounts, trade deficits are still seriously considered. This indicates unfavorable outcome from implantation of exchange rates policy to improve trade balances. The trade deficits can be also linked to the effectiveness of implementing fiscal and monetary policies in particular, to control domestic price or inflation. This study finds that the average inflation rate is above 5% p.a. for these OIC member economies except Jordan (4.3%), Malaysia (3.7%), Morocco (3.4%), Nigeria (4.5%), Senegal (4%), and Tunisia (4.7%). As noted early, higher domestic prices level may cause an increase in imports demand because imported goods are relatively cheaper now. It is well documented that economic growth may have negative implication on trade balances as the increase of income will raise imports, therefore, the policy to reduce Government expenditure, and the increase of import tax, and tariffs can be used to reduce import demand in the short run and consequently, correct the trade disequilibrium. Broadly speaking, an effective domestic demand policy by reducing demand for imported manufacturing goods and consumption goods (which is a major component of total imports for most of the OIC member countries) through encouraging domestic substitution industry is necessary to be viewed as part of a comprehensive trade stabilization plan for OIC member countries.

An attempt is made here to link the findings to the Organization of the Petroleum Exporting Countries (OPEC)[1] included in the present study, namely, Algeria, Indonesia, Iran, and Nigeria. The present study shows that imports and exports of these economies are not cointegrated, indicating feasibility of exchange rate and macroeconomic policies to improve trade balances in the short run, but not in the long run. However, the trade deficits might not be a serious issue for these nations for the past periods, 1990-2000. Algeria had only recorded trade deficits in 1990, 1993-1995 and 1998; 1995-1997 for

[1] OPEC consists of eleven oil-producing and exporting countries, from Africa, Asia, the Middle East, and Latin America.

Indonesia; 1990-1993 and 1998 for Iran; and 1993 and 1998-1998 for Nigeria. Those trade deficits can be explained by the large import flows of manufacture goods that averaged about 69%, 73%, 78%, 78% for Algeria, Indonesia, Iran, and Nigeria based on their available sample periods (World Tables, World Bank, various issues). The strength of these countries' trade account is their export of fuel, which is an essential component of energy demand for many industrial or developed countries like U.S.

In sum, the present study sheds the light to empirical literature by examining the long run equilibrium relationship between imports and exports for OIC member countries. The results provide useful information about the effectiveness of combined exchange rate, and macroeconomic policies (fiscal and monetary) in improving the country's trade account balances. However, two limitations must be considered in the present study: firstly, the present study only includes 27 of 57 OIC member countries due to data unavailability from the well-recognized databases, *World Tables* (World Bank, various issues) for sufficient sample span. The nominal series for imports, exports, and GDP are available for another countries (import price and export price variables are not available). However, as discussed early, these data are do not used for cointegration analysis considering that nominal imports and exports scaled by nominal GDP as in Arize (2002) fail to capture the actual trend of imports and exports. Secondly, the discussed policy implications here are based on the findings of cointegration between imports and exports which is approximately applicable for some countries but not all. Here, not comment has been drawn on the country's trade policies due to unavailable information about the trade policies for all the selected OIC member countries from available published and internet materials. This limitation is commonly acknowledged by many researchers for studying low-income (or less developing) countries like most of the OIC member countries listed in the present study.

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Appendix 1
List of OIC Member Countries

Countries	Sample Period	Countries	Sample Period
Afghanistan	N/A	Malaysia✓	1960-2000
Albania	1991-2000	Maldives	1995-2000
Algeria✓	1960-2000	Mali✓	1976-2000
Azerbaijan	1995-2000	Mauritania✓	1960-2000
Bahrain	N/A	Morocco✓	1960-2000
Bangladesh✓	1960-2000	Mozambique	N/A
Benin✓	1960-2000	Niger✓	1960-2000
Brunei	N/A	Nigeria✓	1960-2000
Burkina Faso✓	1965-2000	Oman	N/A
Cameroon✓	1960-2000	Pakistan✓	1960-2000
Chad✓	1960-2000	Palestine	N/A
Comoros	1980-2000	Qatar	N/A
Côte d'Ivoire✓	1960-2000	Saudi Arabia	N/A
Djibouti	N/A	Senegal✓	1960-2000
Egypt✓	1960-2000	Sierra Leone✓	1967-1999
Gabon✓	1960-2000	Somalia	N/A
Gambia✓	1966-2000	Sudan	N/A
Guinea	1986-2000	Suriname	1980-2000
Guinea-Bissau✓	1970-2000	Syria✓	1975-2000
Guyana✓	1960-2000	Tajikistan	1993-2000
Indonesia✓	1960-2000	Togo✓	1960-2000
Iran✓	1974-2000	Tunisia✓	1961-2000
Iraq	N/A	Turkey	1987-2000
Jordan✓	1976-2000	Turkmenistan	1993-2000
Kazakhstan	1990-2000	Uganda	1982-2000
Kuwait	N/A	United Arab Emirates	N/A
Kyrgyzstan	1992-2000	Uzbekistan	1994-2000
Lebanon	1989-2000	Yemen	1990-2000
Libya	N/A		

Notes: N/A denotes not available for data of volume of imports and exports from World Tables (World Bank, various issues). ✓ shows the selected country for analysis due to its data availability for cointegration analysis.

Appendix 2
Economic Characteristics of the Selected Sample Countries

Countries	Classification [1]	Value added as % of GDP in 1999		Average Growth (%) for the Period 1990-1999				
		Agriculture	Manufacturing	GDP	Exports	Imports	Inflation	Exchange Rate [2]
Algeria	LM	13	11	1.6	2.2	2.8	21.4	21.7
Bangladesh	L	21	17	4.8	13.2	9.2	4.33	4.2
Benin	L	38	8	4.7	1.9	5.1	7.2	6.6
Burkina Faso	L	32	21	3.8	0.4	3.6	2.7	6.6
Cameroon	L	44	11	1.3	2.7	4.0	4.2	6.6
Chad	L	38	11	2.3	5	4.9	6.5	6.6
Cote d'Ivoire	L	24	20	3.7	4.7	2.9	6.0	6.6
Egypt	LM	17	27	4.4	3.1	2.8	9.9	13.6
Gabon	UM	8	5	2.8	2.5	-1.0	5.6	6.6
Gambia	L	30	4	3.3	1.4	2.4	5.2	4.1
Guinea-Bissau	L	23	4	4.2	4.7	-1.2	36.7	30.9
Guyana	LM	30	8	4.8	9.2	9.3	26.1	18.8
Indonesia	L	20	25	4.7	9.2	4.8	16.0	14.9
Iran	LM	N/A	N/A	3.4	0.2	-5.5	25.5	31.9
Jordan	LM	2	15	4.8	7.4	-1.3	4.3	2.1

Notes: [1] country classification by income based on 1999 GNP per capita (World Bank, 2001) that are L =low income, LM =lower middle income, UM = upper middle income, and H = high income. N/A denotes data is not available. [2] in local currency/US$. [3] in fixed exchange rate with 11.225 local currency/US$ since 1988. Data source is World Tables, World Bank (various issues).

Appendix 2 (Continued)
Economic Characteristics of the Selected Sample Countries

Countries	Classification [1]	Value added as % of GDP in 1999		Average Growth (%) for the Period 1990-1999				
		Agriculture	Manufacturing	GDP	Exports	Imports	Inflation	Exchange Rate [2]
Malaysia	UM	14	35	6.3	11.0	10.9	3.7	3.4
Mali	L	47	4	3.6	9.6	2.7	6.4	6.6
Mauritania	L	25	10	4.1	1.6	1.1	5.9	9.2
Morocco	LM	17	17	2.3	3	6.6	3.4	1.4
Niger	L	40	6	2.5	1.7	-4.6	4.5	6.6
Nigeria	L	41	5	2.4	2.5	5.2	29.2	25.3
Pakistan	L	26	17	4.0	2.7	1.9	10.0	8.8
Senegal	L	18	17	3.2	2.6	1.6	4.0	6.6
Sierra Leone	L	44	4	-4.8	-12.2	-5.6	41.0	34.1
Syria	LM	24	27	5.7	4.7	1.0	8.0	0[3]
Togo	L	43	9	1.7	1.5	-1.0	6.5	6.6
Tunisia	LM	13	18	4.6	5.1	3.9	4.7	2.2

Notes: [1] country classification by income based on 1999 GNP per capita (World Bank, 2001) that are L =low income, LM =lower middle income, UM = upper middle income, and H = high income. N/A denotes data is not available. [2] in local currency/US$. [3] in fixed exchange rate with 11.225 local currency/US$ since 1988. Data source is World Tables, World Bank (various issues).