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The Pattern of Macroeconomics and Economic Integration: Evidence on D-8 Economic Cooperation

Lukman Hakim

Mostafa AboElsoud

Jauhari Dahalan

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Lukman Hakim*, Mostafa E. AboElsoud**, Jauhari Dahalan***

Faculty of Economics and Business. Sebelas Maret University, Indonesia*

Faculty of Commerce. Suez Canal University, Egypt**

College of Business. Nothern University of Malaysia, Malaysia***

Abstract: The Organization of the Islamic Conference (OIC) is the second largest inter-governmental organization after the United Nations Organization (UNO) with its 57 members. But until now, the OIC has not focused on economic integration as a whole. Several OIC countries members initiate to build the D-8 which consists of Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan, and Turkey and try to develop a more intense economic cooperation. Therefore, this research will explore the possibility of D-8 economic integration as well as to identify the macroeconomics conditions that would support the existence of such economic integration. Several techniques are employed in the analysis. Johansen cointegration technique is used to estimate the G-PPP model. Panel data analysis and Vector Autoregression (VAR) is employed to analysis macroeconomic condition in D-8. The study found several significant findings in the D-8 economic cooperation. The first finding is based on the G-PPP and output correlation suggests that the D-8 has great prospects for continued cooperation is more intensive. Second, countries belonging to the D-8 have a similarity of patterns such as trade openness, financial sector growth and stability of the exchange rate which is the initial condition necessary to build a stronger economic cooperation.

Keyword: *OIC, economic integration, macroeconomics.*

JEL Classification: *FI5, F36, E52*

Introduction

The Organization of the Islamic Conference (OIC) is the second largest inter-governmental organization after the United Nations Organization (UNO) with its 57 members. The OIC collectively capture for 22 % of world population, 7 % of world GDP, 9 percent of world trade, and 12 percent of intra trade at 2007. This compares to EU with only 8 percent of world population; it commands a world trade share of 35 percent and an impressive intra trade of 60 percent. Meanwhile, Intra-OIC trade stands only about 12 percent of the total trade. It is very ironic, because the potential for intra-OIC trade is great. Therefore, OIC encourage trade

among members to launch many schemes. One of the schemes is the OIC Ten–Year Program of Action, adopted in 2005, which identified increased economic cooperation among OIC members as a key strategy for higher economic growth and welfare. Another important scheme is the Protocol on Preferential Tariff Scheme (PRETAS) initiate in 2007. Thus far a dozen member states have signed PRETAS which proposes a preferential trade regime among the member countries to be effective as of January, 2009.

A special grouping within OIC - the so-called D-8 (developing 8) group was established in 1997 to strengthen economic relationships and to provide the impetus for greater economic integration within the larger OIC community. The D-8 group comprises eight major countries within OIC − Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan, and Turkey. The D-8 member countries have signed a preferential trade agreement with the aim of strengthening intra-trade and their economic relationships for improvements in living standards as well as for world harmony and stability. Various sectors have been identified for cooperation and project development in this trade agreement. These include intra-trade, industry, telecommunications and information, finance, banking and privatization, rural development, science and technology, poverty alleviation and human resources development, agriculture, energy, environment and health. D-8 is a group within the OIC is pushing for economic cooperation to reach a clearer shape with a pioneering and designing economic integration more seriously. Research on the role of economic issues and opportunities OCI is still very limited. Moreover, the research for the D-8 of the OIC-related on macroeconomic patterns and the possibility of economic integration of OIC is also still lacking. This causes the preparation of analysis of economic integration has not been comprehensive as has been done by Naqvi (1998), Hosnijeh (1998), Oksuz (1998), Gurler (2001), Hasan, et. Al (2010).

Therefore, the main purpose of this study was to assess the economic feasibility and to explore patterns of macroeconomic integration for D-8. There are three objectives of the research. The first is to assess whether the D-8 can form economic integration will be reviewed by using the G-PPP and the output correlation. Second, the observed pattern of influence of foreign trade, financial sector and exchange rate by using a VAR for each country. Third, observe the effect of foreign trade, financial sector and the exchange rate of the output for all countries using panel data.

The rest of the paper is organized as follows. Section II discusses the literature review on the theory of economic integration and optimal currency area (OCA). Section III describes the model, data and methodology. The results are reported in section IV. A final section, Section V briefly summaries and concludes.

Literature Review

Evolution Concept of Economic Integration
Economic integration has long been the economic discourse for the region. Especially after the birth of the European Union (EU) that have implemented Economic and Monetary Union (EMU) and the entry into force of the single European currency called the euro in 1999, since then the discussion of economic integration becomes more attractive. The success of the EU has inspired many regions to explore the possibility of doing the same thing, including countries in Asia, especially East Asia and Southeast Asia.

According to Jovanovic (2006) economic integration is a deal of few countries for cooperation in order to improve the welfare among the members which have free movement of goods and services within the group. The level of integration depends on how far the level of freedom in

conducting transactions that include the elimination of tariffs and quotas, mobility of factors of production, and harmonization of fiscal, monetary, transportation and other economic policies.

Following Balassa's view, Javanovic (2006) divides the economic integration into five (5) types consist of free trade area, custom union, common market, economic union, and total economic integration. First, a free trade area is an agreement among countries about the elimination of all tariff and quantitative restriction on mutual trading. Second, a customs union is expanding of a free trade which participating countries introduce a common external tariff on trade with third countries. Third, in a common market apart from a customs unions, there is free mobility of factors or productions and introduce the common regulations on the movement of factors with third countries. Fourth, an economic union among countries extends the common market with the harmonization of fiscal, monetary, industrial, regional, transport and other economic policies. Fifth, a total economic union among countries assumes union with a single economic policy and a supranational government with a great economic authority. There are no administrative barriers to the movement of goods, service and factors, hence prices are equalized net of transport cost.

Jovanovic (2006) also explores two initial condition before free trade area. First, a preferential tariff agreement (PTA) among countries assumes that the tariffs on trade among the signatory countries are lower in relation to tariffs charged on trade with third countries. Second, a partial customs union is formed when the participating countries retain their initial tariffs on their mutual trade and introduce a common external tariffs on trade with third countries.

Crowley (2001) classifies economic integration with the new taxonomy. The first is the most basic level, called the regional autarky is a bilateral agreement such as those in ASEAN. The second, trade integration which consists of free trade area and customs union. Characteristics of Free trade area is to remove tariffs and quotas internally and National tariff retained against outside, while customs unions are free trade are added to the common external tariff. Examples of FTA is the ASEAN after 2015 and examples of customs unions is Mercosur. The third is the scale integration consisting of the common market and economic union. Common Market provide free movement of factors of production, goods and services, while the economics union is harmonizing or coordinating several national policies and transfer to the supranational level. Example of common market and economic union is the EU before EMU. The fourth is the integration policy which consists of monetary and fiscal union. Characteristic of monetary union is to implements single currency and operates single central bank. Example is the application of the European single currency euro and the establishment of European Central Bank (ECB). Fiscal union imposes tax harmonization and fiscal sovereignty is limited in some cases already implemented in the EU. Fifth is the political integration or political union in which the effective and democratic body at the supranational level. Until now there does not exist out of a political integration project.

The sequence of integration does not necessarily have to be gradual from one type to another. The establishment of any of these types depends on the agreement among the participating country. However, the formation of EMU in the EU shows that European countries follow the stages of economic integration that is linear and consistent (Jovanovic, 2008). The EU has successfully reached the peak stage of economic integration that form the EMU and implement a single currency euro means it comply with what is called the optimum currency area (OCA). The following is an explanation of the OCA theory.

The Theory of Optimum Currency Area
The core of economic integration theory is based on the optimum currency area (OCA) theory. OCA is based on the seminal contributions of Mundell (1961), McKinnon (1963) and Kenen (1969). Mundell (1961) views factor mobility as the key criterion in the choice or against the

currency union. He argued that while the cost of valuation and money changing were lower within the currency area, fixing the rate of exchange rates across regions by forming a currency union was costly in the face of asymmetric disturbances and price rigidities. Nevertheless, these costs could be alleviated if a high level of factor mobility existed between regions. This placed factor mobility as a key determinant for or against the currency union as according to Mundell. McKinnon (1961) on the other hand stresses that openness to external trade another important criterion. He argued that if an economy was very open, which is measured by ratio of traded good over total domestic good, a flexible exchange rate would be relatively ineffective, since changes in the exchange rate would destabilize the internal price level and have few beneficial effects on real wages or the terms of trade. Hence, a country where traded goods are high, production of total domestic output can profitably participate in a currency area, while it had better adopt to flexible exchange rate in the opposite case. Additionally, Kenen (1969) adds that product diversification as criterion of OCA. According to Kenen (1969), regions with high product diversification would better be able to maintain a currency union than those with low diversification since latter are subject to layer disturbances. The three have been the basic theory of OCA which underpinned the subsequent studies and recent empirical works.

According Tavlas (1993) and Mongelli (2002), the OCA criteria can be divided into non-economic and economic factors. The non-economic factors consist of politics, history and language aspects, meanwhile economic criterion are business cycle, trade linkages and financial integration. Business cycle aspects are similarity of shock and inflation; the degree of factor mobility; the openness and size the economy; price and wage flexibility and fiscal integration. Similarity of shock and inflation is closely related to monetary mechanism transmission. Trade linkages aspect share the degree of commodity diversification, and the degree of goods market integration. Financial market aspect is financial market condition and integration that consist of stock, credit growth and money market.

There are two approaches in assessing the possibility of an optimum currency area. First approach is the Generalized Purchasing Power Parity (G-PPP) introduced by Enders and Hurn (1994, 1997). The spirit of G-PPP is a cointegrating relationship among a group of real exchange rates which indicates the existence of common trends in their macroeconomic fundamentals, and hence satisfies one of the necessary conditions for an optimum currency area. G-PPP holds if sum of cointegrating value among the countries observed are zero. Enders and Hurn (1997) find G-PPP holds for G-7 countries (Canada, France, Germany, Italy, Japan, UK, USA) and G-3 countries (Germany, Japan and USA). There has been a growing interest in determining possible links between G-PPP and an optimum currency area, among others Choudhry (2005), Ogawa and Kawasaki (2006) and Ahn, C., Kim, H. B., and Chang, D., (2006). Choudhry (2005) finds G-PPP holds for countries of ASEAN 4 (Thailand, Malaysia, Indonesia, the Philippines) and South Korea, while Ogawa and Kawasaki (2006) find evidence of G-PPP holds in ASEAN 5 plus Korea and China. Additionally, Ahn, et al (2206) also positively identified the existence of G-PPP in ASEAN 4 (Indonesia, Malaysia, Singapore, and Thailand) and four Northeast Asian Economies (Hong Kong SAR, Japan, Korea, and Taiwan).

Second, some researchers like Bayoumi and Eichengreen (1994) and Ramayandi (2005) using the output correlation between countries as to indicate that between the countries have relationship and opportunity to make the economic integration. The methods employed in using the VAR method as has been done by Blanchard and Quah (1989). Bayoumi and Eichengreen (1994) conclude that based on the structural shock similarities, there is a case for an OCA in the Southeast Asia region. The candidate participants include Indonesia, Malaysia, Singapore and Hong Kong plus the possibility of Thailand. Under this method, Ramayandi also found that the ASEAN 5 also has a strong correlation output, it is feasible to implement economic integration.

Meanwhile, to explore the macroeconomic pattern of D-8 will use a model developed by Frankel and Romer (1996) and in essence, looking at the effect of trade openness rate divided by the total trade and output variables that describe the specifications for each country as the population of each density. For this study we added two additional variables: the financial sector deepening and exchange rates.

Methodology

G-PPP

Following the G-PPP model, a group of $m + 1$ countries in an n country world constitutes a currency area, in this study m represents the ASEAN 5 countries consists of Indonesia, Malaysia, the Philippines, Singapore and Thailand. Therefore, there will be only m independent real effective exchange rates within the group of $m + 1$ countries. The reduced-form solution for the m independent real effective exchange rates can them be expressed as:

$$Q_t = AX_t \qquad \text{......... } eq(1)$$

where Q_t is the $m \times 1$ vector of real exchange rates, A is $m \times (m + 1)$ parameter matrix, and X_t is the $(m + 1) \times 1$ vector of real fundamentals such as output levels. The real exchange rates will be stationary and hence PPP will hold if all the elements of X_t are stationary. Since the elements of X_t represent real shocks, each of them is assumed nonstationary. Then, X_t can be expressed using the common trends representation as follows:

$$X_t = \Psi\Phi_t \qquad \text{......... } eq(2)$$

where Ψ is the $(m + 1)$ x $(m + 1)$ matrix of the parameters, and Φ_t is the $(m + 1)$ x 1 vector of the nonstationary stochastic trends. Therefore, the behavior of the real exchange rates Q_t can be determined the following:

$$Q_t = A\Psi\Phi_t \qquad \text{......... } eq(3)$$

The behavior of real macroeconomic shocks and thus that of real exchange rates depend on the rank of the matrix Ψ. As long as the *rank* $(\Psi) < m$, it is always possible to premultiply Q_t by m x m matrix Φ to obtain at least one cointegrating vector of the real exchange rates as follows:

$$\Phi(A\Psi) = 0 \qquad \text{......... } eq(4)$$

Equations 3 and 4 imply $\beta Q_t = 0$. If the rank $(\Psi) = 1$, all the elements of X_t share a single common trend and hence there must exist $m - 1$ linear combinations of the real exchange rates, which are stationary. On the other hand, if the rank $(\Psi) = m - 1$, all the elements of X_t share m − 1 common trends and hence there will be a unique cointegrating vector of the real exchange rates. In this case, $\beta Q = 0$ can be rewritten as follows:

$$\beta_1 q_{11t} + \beta_2 q_{12t} + \beta_3 q_{13t} + \beta_4 q_{14t} + \ldots + \beta_{m+1} Q_{1m+1t} = 0 \qquad \text{......... } eq(5)$$

Where q_{1it} are the log of real effective exchange rates country 1 (in time period t), β_i are the parameters of the co-integrating vector. The weights β_i are functions of parameters in matrix A that represent linkages among the economies. If all the fundamentals (or shocks) are highly interrelated within these countries then these countries can be good candidates for an optimum currency area. Furthermore, in the case where β_{it}'s are equal to zero then relationship is the strict (absolute) PPP relationship.

Panel Data and VAR

In general, the standard model used in this studies above is to follow the model developed by Frankel and Romer (1996) are as follows:

$$Y_{it} = \alpha_0 + \alpha_1 T_{it} + \alpha_1 P_{it} + \alpha_1 M_{it} + \alpha_1 E_{it} + \varepsilon_{it} \quad i=1,2\ldots N,\ t=1,2\ldots T \ldots\ldots\ldots eq(6)$$

Where Y_t is riel GDP, T is level of openness trade, P is population density, M is financial development, and E is exchange rate. The formula above is used to estimate the Panel data methods. To explore the relationship between variables in each country VAR method used to estimate variables that consist of output (Y), the level of openness (T), the depth of the financial sector (M), and exchange rates (E).

The data used in this study are real GDP (Y) and the level of openness trade (T) proxy of total trade/ GDP, the financial deepening (M) is broad money (M2) divide real GDP, E is exchange rate and P is population per density. The data used is annually since 1967 to 2010 were taken from World Bank.

Results

G-PPP

Based on the unit root test, we established that the variable in estimating the model are integrated of level one or stationary in difference. This allowed us to proceed with the Johansen's co-integration analysis. Based on the arbitrary normalization suggested that the real exchange rate (RER) of the D-8 of OIC countries are tied together by a unique long-run equilibrium relationship. The long-run relationship before any is:

- 0.00001 Indonesia + 0.026 Malaysia - 0.002 Pakistan + 0.001 Bangladesh +

0.00005 Iran + 0.07 Turkey + 0.001 Egypt - 0.0004 Nigeria = 0

According to Enders and Hurn (1997) the equilibrium relationship among a group of RERs indicate that the total of β_{it} are equal to zero. The coefficient of β or arbitrary normalization reflect the interrelationships among many exchanges rate. Total arbitrary normalization of D-8 is equal to zero, this indicates that in the long run G-PPP for D-8 5 is hold.

Output Correlation

Based on the results show that the correlation output from the eight countries, most of the correlated output above 0.9. There are below this value at about 0.8 indicated by the correlation to the Iran to Bangladesh, Egypt and Pakistan. It seems that from the eight countries is largely have a relatively strong base to build a more intensive economic cooperation. The results of the correlation test appear in table (1).

Table 1: Output Correlation of D-8

	Y_BNG	Y_EGP	Y_INA	Y_IRN	Y_MAL	Y_NGR	Y_PAK	Y_TKY
Y_BNG	1.000000	-	-	-	-	-	-	-
Y_EGP	0.958374	1.000000	-	-	-	-	-	-
Y_INA	0.943813	0.992351	1.000000	-	-	-	-	-
Y_IRN	0.892958	0.896669	0.901388	1.000000	-	-	-	-
Y_MAL	0.965764	0.992107	0.995021	0.916871	1.000000	-	-	-
Y_NGR	0.918279	0.921452	0.928915	0.974791	0.939177	1.000000	-	-
Y_PAK	0.965274	0.996081	0.994730	0.896856	0.994819	0.926622	1.000000	-
Y_TKY	0.967200	0.989195	0.989700	0.929200	0.994081	0.948560	0.993340	1.000000

Panel Data

In the analysis of panel data we have compared the results from fixed and random effect models using the Hausman test in order to differentiate between the two models, if test results significantly, then the model used is a fixed effects model. Based on the Hausman test, fixed effect was selected as an analysis model. The results of Hausman test appear in table (2).

Table 2: Hausman Test

Correlated Random Effects - Hausman Test			
Pool: FIXED			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	331.619986	4	0.0000

The results from the fixed effect model indicate that effect of T, M and P to Y is positive, but E to Y is negative. The finding indicate that the levels of trade openness, financial sector conditions and the population have a positive effect on economic growth, but rather the exchange rate has a negative impact. The output of the fixed effect model appears in table (3), while the output of the random effect model appears in table (4).

Table 3: Fixed Effect Panel Data of D-8

Dependent Variable: Y?				
Method: Pooled Least Squares				
Date: 06/14/12 Time: 06:25				
Sample: 1967 2010				
Included observations: 44				
Number of cross-sections used: 8				
Total panel (unbalanced) observations: 338				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
T?	0.001967	0.000553	3.556321	0.0004
E?	-0.001265	0.000516	-2.451954	0.0147
M?	0.007544	0.000797	9.470041	0.0000
P?	1.614903	0.051120	31.59056	0.0000
Fixed Effects				
_INA--C	17.59124			
_MAL--C	17.11820			
_PAK--C	16.24331			
_BNG--C	13.19269			
_IRN--C	19.34805			
_TKY--C	18.80595			
_EGP--C	17.69288			
_NGR--C	16.58511			
R-squared	0.957121	Mean dependent var		24.80488
Adjusted R-squared	0.955674	S.D. dependent var		0.790736
S.E. of regression	0.166480	Sum squared resid		9.035264
Log likelihood	132.5017	F-statistic		661.5217
Durbin-Watson stat	0.148474	Prob(F-statistic)		0.000000

Table 4: Random Effect Panel Data of D-8

Dependent Variable: Y?				
Method: GLS (Variance Components)				
Date: 06/14/12 Time: 07:29				
Sample: 1967 2010				
Included observations: 44				
Number of cross-sections used: 8				
Total panel (unbalanced) observations: 338				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.43230	0.277889	66.32980	0.0000
T?	0.002973	0.000742	4.004376	0.0001
E?	0.000228	0.000690	0.330319	0.7414
M?	0.009708	0.001056	9.196282	0.0000
P?	1.290238	0.061990	20.81353	0.0000
Random Effects				
_INA--C	0.515852			
_MAL--C	-0.366973			
_PAK--C	-0.757540			
_BNG--C	-3.174549			
_IRN--C	1.886101			
_TKY--C	1.632090			
_EGP--C	0.349374			
_NGR--C	-0.497777			
GLS Transformed Regression				
R-squared	0.917798	Mean dependent var		24.80488
Adjusted R-squared	0.916810	S.D. dependent var		0.790736
S.E. of regression	0.228069	Sum squared resid		17.32116
Durbin-Watson stat	0.101277			
R-squared	0.951348	Mean dependent var		24.80488
Adjusted R-squared	0.950764	S.D. dependent var		0.790736
S.E. of regression	0.175458	Sum squared resid		10.25159
Durbin-Watson stat	0.171119			

VAR Model

Based on VAR results shows that:

1- In general for all the levels of trade openness of the most powerful and positive effect on output, except for Iran where at about 1990 until now, it has a negative impact.

2- The second strongest influence on output is the exchange rate and the latter is the influence of the depth of the financial sector.

Conclusion

The objective of this research is to explore the possibility of D-8 economic integration as well as to identify the macroeconomics conditions that would support the existence of such economic integration. In order to meet this objective, several techniques are employed in the analysis. Johansen cointegration technique is used to estimate the G-PPP model. Panel data analysis and Vector Autoregression (VAR) is employed to analysis macroeconomic condition in D-8. The study found several significant findings in the D-8 economic cooperation:

- The first finding is based on the G-PPP and output correlation suggests that the D-8 has great prospects for continued cooperation is more intensive.

- Second, countries belonging to the D-8 have a similarity of patterns such as trade openness, financial sector growth and stability of the exchange rate which is the initial condition necessary to build a stronger economic cooperation.

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