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DYNAMIC FINANCIAL LINKAGES AMONG SELECTED OIC COUNTRIES

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This study examines financial integration among eight stock markets of Organization of the Islamic Conference (OIC) countries. Of these stock markets, four are from Middle East and North Africa (MENA) region i.e., Turkey, Egypt, Oman and Kuwait, and the rest four are from the Asian region i.e., Malaysia, Indonesia, Bangladesh and Pakistan. The study also explores the integration between these stock markets and the three largest stock markets in the world, US, Japan and UK. By employing cointegration analysis, the evidence of the existence of integration among OIC stock markets is found only among four Asian-OIC stock markets (Malaysia, Indonesia, Bangladesh and Pakistan), while no evidence of integration is found among the MENA stock markets. However, the OIC stock markets are found to be cointegrated with the US, Japanese and UK stock markets. These findings seem to indicate that the OIC stock market are segmented regionally and integrated internationally. This implies that investors can gain long-run risk reduction through portfolio diversifying in the MENA region, but not in the Asian region and developed stock markets. Finally, variance decompositions show that the OIC stock markets in the Asian region respond more to the shocks in the Japanese stock market, while the MENA stock markets respond more to the shocks in the UK market.

1. Introduction

The integration of global financial markets has been a focus of much research over the last decades. The October 1987 stock market crash has spurred the interests of academicians, investors as well as policy makers

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on this issue. The interests have obviously been intensified since the 1997 Asian financial crisis which happened a decade later (Janakiramanan and Asjeet, 1998). Most studies documented that the world capital markets have increasingly integrated and co-movements among them are also rising [Goldstein and Michael (1993); Blackman et al. (1994); Corhay et al. (1995); Masih and Masih (1997); and Ghosh et al. (1999)].

The term international market integration represents a broad area of research in financial economics that encompasses many different aspects of the interrelationships across stock markets. The market integration has been defined by many studies either based on asset pricing or statistical perspectives. The perfectly integrated markets, based on the asset pricing view are by definition obeying the "law of one price" (Klemeier and Harald, 2000). The generally accepted definition of market integration is that if two or more markets are integrated, then identical securities should be priced identically in these markets (Naranjo and Aris, 1997). This is because it has the same risk characteristics regardless of the location in which they are traded (Akdogan, 1991 and Cheng, 2000). This implies that in a perfect financial integration, there are no barriers (no capital controls and other institutional barriers) that prevent investors from changing their portfolios instantaneously (Lemmen, 1998), thus it provides no arbitraging opportunities for international investors. Once the markets become integrated, the arbitrage profits should tend to disappear (Akdogan, 1991). Meanwhile, based on the statistical perspective, the markets are integrated if prices in national stock markets share a long-run equilibrium relationship. This means that prices in national markets have a tendency to move together in the long-run (Cheng, 2000). Therefore, this study adopts the statistical view in measuring the stock market integration.

Many studies on stock market integration in developed and emerging economies have been examined. For example, in a study on the markets integration among five major markets (UK, Germany, Netherlands, Japan and the US), Taylor and Tonk (1989) record that the UK market is cointegrated with other major stock markets after the abolition of foreign exchange control in 1979, but not before. Blackman et al. (1994) in their study on 17 world's stock markets, including developed and emerging markets find that the cointegrating vectors in the 1980's are more than in

the 1970's, suggesting an increasing degree of integration over the period covered in the study. Finally, the integrated market between the two largest markets in the world, US and Japan is also documented by Campbell and Hamao's (1992) multi-factor asset pricing.

For emerging economies, Hung and Cheung (1995) examine the linkages among the stock markets of Hong Kong, Korea, Malaysia, Singapore and Taiwan from 1981 to 1991. They find at least three cointegrating vectors when all indices are denominated in US dollars. By using a simple correlation approach on the stock markets of US and Hong Kong, Malaysia, Singapore and the Philippines, Aggarwal and Pietra (1998) document that there are significant tendencies towards day-to-day linkages between stock price behavior in the US and stock prices behavior in Hong Kong, Singapore, the Philippines and Malaysia. Cha and Sekyung (2000) investigate market integration among Hong Kong, South Korea, Singapore, Taiwan, and the two largest stock markets in the world, US and Japan) from 1980 to 1998. They document that the links between the two largest equity markets and the Asian emerging markets begin to increase after the stock market crash in 1987 and have significantly intensified since the outbreak of the Asian financial crisis in July 1997. In their study on Asian stock markets (Thailand, Indonesia, Korea, Japan Hong Kong, Singapore, and Taiwan), Jang and Sul (2002) find that the co-movement among Asian stock markets around the 1997 financial crisis has indeed increased, and the co-movement remains strong even after the crisis. Finally, Abd. Majid (2005) examines interrelationships among the ASEAN, Japanese and US stock markets using two-step estimation, cointegration and GMM. He finds that the stock markets in the region are moving towards a greater integration either among them or with the Japanese and US stock markets.

Comparing to the enormous researches on the developed countries in this area of study, the documentation of stock market integration among the OIC countries and their interrelationships with developed markets seems still inadequate. The empirical studies on market integration among the OIC countries have been focused more on the markets either individually or regionally, but very limited studies have investigated the OIC markets collectively. Unlike the studies on the OIC markets in the Asian region, there have been fewer studies concentrated on the MENA region. Wang et al. (2003), for example, examine short- and long-run relationships among five largest emerging African stock markets, including South

Africa, Egypt, Morocco, Nigeria, Zimbabwe and the US market. They find that interdependence between the African markets and the influence of the US on these markets was limited during the period of the study, 1996-2002. Sabri (2002) investigates the issue of cross listing and correlation of stocks between Amman and Amsterdam stock markets. Using simple Spearman correlation analysis, he finds that there is no significant positive correlation between the markets, based on two financial indicators including price earning ratios and performance growth in the index shares. On MENA stock market, one earliest studies conducted by Darrat et al. (2000). By using Johansen-Juselius' (1990) cointegration approach, they find that the sample of the studies, Egypt, Morocco and Jordan are linked among themselves and with international stock markets. Neaime (2002) uses Engle-Granger (1987) cointegration approach, investigates seven MENA stock markets (Bahrain, Egypt, Jordan, Kuwait, Morocco, Saudi Arabia and Turkey) and three developed stock markets, Paris, UK and US during the period of nineties. The results indicate a weak integration among the markets of Morocco, Egypt, Jordan and Turkey, but having strong linkages between these markets and the developed markets. Maghyereh (2003) explores market integration among the four emerging markets in the MENA region, Jordan, Morocco, Egypt and Turkey over the period November 1997 to December 2002. The findings of the study show weak linkages among the four markets. Using an ARDL approach to cointegration, Marashdeh (2005) investigates integration among the four MENA markets (Egypt, Jordan, Marocco, and Turkey) and there developed markets, the US, UK and Germany. His study finds the integration among the MENA stock markets, but not between the MENA and developed markets.

There few studies on market integration among the OIC countries. For example, Zeinelabdin (1991) does a survey, highlighting the characteristics and performances of selected OIC countries (Bangladesh, Egypt, Indonesia, Jordan, Kuwait, Malaysia, Morocco and Pakistan), and no testing on market integration is performed. Hassan (2003) explores the characteristics of portfolio investment of ten OIC countries (Malaysia, Indonesia, Bangladesh, Pakistan, Morocco, Turkey, Tunisia, Jordan, Nigeria and Egypt) over 1970-1996. In this study—he only tests cointegration and provides no dynamic linkages analysis, finds that the only collective cointegration is found among the four Asian stock

markets, Malaysia, Indonesia, Bangladesh and Pakistan. Finally, Ceylan and Doğan (2004) examines market integration among the selected OIC countries, namely Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Pakistan and Turkey using bivariate cointegration analysis over the period December 1999 to February 2004. Among the 28 pair-wise relations of the selected stock market indices tested in their study, only Turkey-Egypt and Lebanon-Kuwait are found to be cointegrated. They also document that the cointegration relations among these markets have become stronger after September 11, 2001 incident.

The motivation behind the present study is to examine the dynamic financial linkages among eight OIC stock markets (Malaysia, Indonesia, Bangladesh, Pakistan, Turkey, Egypt, Oman and Kuwait) and their dynamic linkages with developed markets, the US, UK, and Japan. Cointegration technique, vector error correction model (VECM) and variance decomposition analysis are adopted here to check for the strength of the linkages among the OIC markets and their linkages with the world markets. The results of this study will indicate whether the OIC stock markets are segmented or whether the international investors can enjoy diversification benefits when allocating their investments across these markets? If stock markets share a long-run equilibrium relationship, which implies that they have a tendency to move together towards the same direction in the long-run, then these markets are integrated and provide no portfolio diversification benefits. On the other hand, if the stock markets have no tendency to move together in the long-run, then the markets are segmented and provide ample room for diversification benefits. Therefore, having knowledge on market integration is one of key determinant of success for investors, fund management houses and other institutional investors both at national and international levels who are seeking to diversify their investments and make capital budgeting decisions. In short, the results of this study have great importance in assisting financial analysts making investment decisions and providing recent empirical evidence on the OIC stock market and their interrelationships with the three largest markets in the world, the US, Japan and UK.

The rest of this study is organized as follows: Section 2 provides an overview of the OIC stock markets. Section 3 describes the data used in the study. Methodology on which our analysis is based is then presented

in Section 4. Section 5 in turns discusses the empirical results and some implications of the study. Finally, Section 6 concludes the study.

2. An Overview of The OIC Stock Markets

The oldest stock market in OIC countries goes back to 1933 when the Egyptian Stock Exchange was established. The most recent one is the Istanbul Stock Exchange of Turkey established in 1986. In between these periods, Pakistan established its Karachi Stock Exchange in 1947 (the Lahore one in 1971), Malaysia in 1960, Morocco in 1967, Kuwait in 1972, Indonesia in 1976 and Jordan in 1978 (Zeinelabdin, 1991).

The selected OIC stock markets analyzed in this study are mainly situated in the Asian and Middle East-North Africa (MENA) regions. Unlike the OIC stock markets in the Asian region, the MENA stock markets have been disappointing during the last decade. Particularly, the GCC (Gulf Corporation Council) markets have remained relatively small and did not grow by as much as in its Asian and MENA counterparts. This scenario is quite different at the remaining MENA stock markets. This could be partly due to the massive privatization plans introduced in other MENA countries; the extensive sale of government assets to private firms; and the considerable efforts devoted recently towards enhancing efficiency, depth and liquidity of those stock markets (Neaime, 2002).

During the period 1990-2003, the market capitalization of the OIC countries shows high rates of increases in comparison with the totals of the World, Middle Income Countries (MICs) and European Monetary Union Area (EMU) (Ceylan and Doğan, 2004). These rapid increases are indicated by an increasing trend in the percentage shares of market capitalization to GDP. For instance, of the selected 8 OIC stock markets, the Egyptian market recorded jumps in this regard while the increases in Turkey, Oman and Pakistan remained relatively moderate, though their achievements were also satisfactory. Table 1 report the percentage of the OIC market capitalization to GDP in Million USD. Among the OIC stock markets, Malaysia is recorded as the country having the highest percentage of market capitalization to GDP, followed by Kuwait, Egypt, Turkey, Pakistan, Indonesia, Oman, and Bangladesh.

Table 1: The Market Capitalizations of the OIC and Developed Markets (% of GDP)

Country	2000	2004
Bangladesh	2.61	5.86
Egypt	28.12	48.88
Indonesia	16.26	28.43
Kuwait	56.33	65.43
Malaysia	129.47	160.59
Oman	17.43	26.05
Pakistan	8.98	30.17
Turkey	34.96	32.46
United Kingdom	179.17	132.55
United States	154.68	139.38
Japan	66.52	79.57

Source: World Development Indicators, World Bank (2004).

3. Data Description

The data for stock indices for eight OIC countries (Malaysia, Indonesia, Bangladesh, Pakistan, Turkey, Egypt, Oman and Kuwait) and three developed markets (US, Japan, and UK) are obtained from Bloomberg Database. For each stock market, data on daily market indices, measured in local currency terms, were obtained for the period January 1, 2002 to May 31, 2006. The stock market indices used in the study are the Kuala Lumpur Composite Index (KLCI) for Malaysia, Jakarta Composite Index (JCI) for Indonesia, Dhaka Stock Exchange Index (DSEI) for Bangladesh, Karachi 100 Index (KSE100) for Pakistan, ISE National Index 100 (ISENI100) for Turkey, HERMES Index (HERMESI) for Egypt, MSM30 Index (MSM30) for Oman, Kuwait Exchange Stock Index (KWSEI) for Kuwait, S&P 500 Index for the US, Nikkei 225 for Japan, and FTSE 100 for the UK. The study also constructs six regional stock indices measured in the dollar terms based on equally weighted price indices. ASEAN (Association of South East Asian Nations)[2] Index is an index constructed for Malaysia and Indonesia; SAARC (South

[2] ASEAN was established at the meeting of the Foreign Ministers of the five founding Member States, Indonesia, Malaysia, Philippines, Singapore, and Thailand, with the signing of the Bangkok Declaration on 8 August 1967. Brunei Darussalam joined the ASEAN on 8 January 1984 and Vietnam on 28 July 1995.

Asian Association for Regional Cooperation)[3] Index is for Bangladesh and Pakistan, T&E Index is for Turkey and Egypt, and GCC (Gulf Corporation Council)[4] Index is for Oman and Kuwait. Finally, ASIAN and MENA[5] Indices are constructed for Asian countries (Malaysia, Indonesia, Bangladesh and Pakistan) and for Middle-East and North Africa (Turkey, Egypt, Oman and Kuwait), respectively.

There are at least two problems arise in examining integration of different stock markets. The first problem lies in the missing observations due to different stock market holidays. Since the study extensively incorporates lags in the regressions, missing data is particularly troublesome.[6] Thus, it is desirable to fill in estimate-based information from an adjacent day. Rather than using a sophisticated interpolation, this study follows the studies of Jeon and Von Furstenberg (1990) and Hirayama and Tsutsui (1998) by adopting the method of Occam's razor (just by filling in the previous day's price).[7] The second one is the differences in trading hours among the international stock markets. For the purpose of our present paper, we adjust for the different trading hours, e.g., regressing today's ASIAN Index with yesterday's (lag = 1) S&P 500.

4. Empirical Framework

Our empirical approach is based on the recent standard methods of cointegration and vector autoregression (VAR). Several studies in both

[3] SAARC was established at the First Meeting of the Heads of State and Government in Dhaka, Bangladesh, on 8 December 1985, amongst Bangladesh, Bhutan, Maldives, Nepal, Pakistan, and Sri Lanka.

[4] Six Gulf States signed the Charter of the GCC on 25 May 1981: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

[5] The members of MENA countries include: Algeria, Bahrain, Comoros, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, Turkey, United Arab Emirates and Yemen. In this paper the MENA countries are Turkey, Egypt, Oman, and Kuwait due to the lack of data for the rest of the countries. For a more detailed on regional economic groupings of the OIC countries, refer to SESRTCIC (2000).

[6] For example, if a regression equation contains six lags; one missing observation would additionally cause six subsequent observations to be dropped.

[7] Simplistic as it may be, this study justifies this method on the premise that a closed stock exchange does not produce any information on bank holidays. Since no new information is revealed, the previous day's information is carried over to the subsequent day.

economics and finance literature employ this technique in addition to the standard methods of integration and cointegration (Hassan et al., 2001; Ibrahim, 2003; Ahmed and Tongzon, 1998). The study adopts this approach for various reasons: The method is simple where one does not have to worry about making a priori distinction between exogeneous and endogenous variables. According to Sim (1980), the distinction is often subjective and therefore it is wise to treat them on an equal footing. Moreover, this technique sets no restrictions on the structural relationships of the economic variables and hence, misspecification problems may be avoided. Finally, the variance decomposition derived from VAR allows us to assess the strength of variables in the system.

Our analysis starts with uncovering the integration and cointegration properties of the variables before working with an unrestricted vector autoregression (VAR) model (all variables in this VAR system become endogeneous and therefore specifies a relatively unrestricted dynamic process). The results from cointegration tests enable us to model short run dynamic interactions among the variables within our VAR system. If the variables are found to be non-stationary and non-cointegrated, the dynamic interactions among the variables are assessed according to the standard VAR model with variables expressed in first difference. Conversely, if the variables are found to be cointegrated, error correction models should be employed and accordingly this justifies the use of VAR model in levels.

5. Integration Tests

We begin the analysis by examining the stationarity properties of the data series. Thomas (1997) stresses that classical regression techniques become invalid if applied to variables that do not meet the definition of stationarity.[8] This study employs the standard Augmented Dickey Fuller tests (ADF) and Phillips-Peron tests (PP) unit root tests (Dickey and Fuller, 1979 and 1981; Phillips and Perron, 1988) with constant and time trend model to test for stationarity. The tests will be based on the following:

$$\Delta X_t = \propto + \beta T + \rho X_{t-1} + \sum_{i=1}^{m} \lambda_i \Delta X_{t-1} + e_t \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

[8] The assumption of stationary simply means that for every series, the mean, variance and covariance does not change over time.

where X_t is the variable under consideration, T = time trend, Δ is difference operator and e_t = i.i.d. disturbance with mean 0 and variance σ^2, that is $\left[e_t \sim N\left(0, \sigma^2\right)\right]$

This requires us to test whether the estimated value for ρ is significantly less than 0. If the finding rejects the hypothesis that $\rho = 0$, the series is said to be stationary. The PP test for unit roots will be conducted in a similar manner using the above analysis without the lagged first differenced terms. The test statistics also correct for some serial correlation and heteroskedasticity in the residuals. If however, the variables are found to be non-stationary, in conventional regression models, one would typically difference non-stationary variables before utilizing them in their further analysis.

6. Cointegration Tests

Having established that each of the series is non-stationary, we will then proceed to examine whether there exists some long run equilibrium relationships among the OIC stock indices and their interrelationships with US, UK and Japan. Formally stated, a set of variables is said to be cointegrated if they are individually non-stationary and integrated of the same order, and yet their linear combination is stationary. If two or more of stationary time series share a common trend, then they are said to be cointegrated. In statistics, the presence of cointegration rules out non-causality among the variables examined. In econometrics, this suggests error correction models and Granger causality tests to capture both the short run dynamics and the long run equilibrium in the regression (Engle and Granger, 1987).

The two most widely used tests for cointegration are the Engle-Granger (1987) two-step estimator and the Johansen (1988) and Johansen Juselius (1990) maximum likelihood estimator. Both tests are then shortly called EG and JJ. Compared to EG two-step approach, the JJ procedure poses many advantages in testing for cointegration.[9] This

[9] Among the superiorities of the JJ procedures over EG two-step approach are: the JJ test does not assume a priori that the existence of at most a single cointegrating vector and instead, it explicitly tests for the number of cointegrating relationships; and the JJ

study therefore employs maximum likelihood approach of Johansen and Juselius (1990) to test for cointegration.

7. Multivariate Causality Tests

To examine the causal-nexus among the OIC stock markets and their causal-nexus with the most developed markets, US, UK and Japan, the vector error correction model (VECM) is employed. These causal-nexus is examined based on multivariate frameworks with eight models (three models is to examine integration among the OIC stock markets, while five models is to examine market integration between the OIC and developed stock markets). The models are a follows:

(a) Model 1 (Asian stock markets): Malaysia, Indonesia, Bangladesh and Pakistan.
(b) Model 2 (MENA stock markets): Turkey, Egypt, Oman, and Kuwait.
(c) Model 3 (all OIC stock markets: ASEAN Index (Malaysia and Indonesia), SAARC Index (Bangladesh and Pakistan), T&E Index (Turkey and Egypt), and GCC Index (Oman and Kuwait).
(d) Model 4 (ASEAN & World markets): Malaysia, Indonesia, US, UK, and Japan.
(e) Model 5 (SAARC & World markets): Bangladesh, Pakistan, US, UK, and Japan.
(f) Model 6 (T&E & World markets: Turkey, Egypt, US, UK, and Japan.
(g) Model 7 (GCC & World markets): Oman, Kuwait, US, UK, and Japan.
(h) Model 8 (OIC & World markets): ASIAN Index, MENA Index, US, UK, and Japan.

Following the studies of Kasa (1992), Heinesen (1995) and Cheng (2000), the multivariate causality test is therefore formulated as follows:

$$\Delta Y_t = \delta + \Gamma_i \Delta Y_{t-1} + \ldots\ldots + \Gamma_k \Delta Y_{t-k} + \Pi Y_{t-k} + \varepsilon_t \ldots\ldots\ldots (2)$$

test is not sensitive to the choice of dependent variables as it assumes all variables are endogeneous (Masih and Masih, 1997).

where Y_t is an *n x 1* vector of variables and δ is an *n x 1* vector of constant, respectively. Γ is an *n x n* matrix (coefficients of the short run dynamics), $\Pi = \alpha\beta'$ where α is an *n x 1* column vector (the matrix of loadings) represents the speed of short run adjustment to disequilibrium and β' is an *1 x n* cointegrating row vector (the matrix of cointegrating vectors) indicates the matrix of long run coefficients such that Y_t converge in their long run equilibrium. Finally, ε_t is an *n x 1* vector of white noise error term and *k* is the order of autoregression. As our study investigates market integration among the eight members of the OIC countries and their interrelationships with the three largest stock markets in the world, US, UK and Japan, therefore *n* is equal to eleven.

From the equations (2), two channels of causation may be observed. The first channel is the standard Granger tests, examining the joint significance of the coefficients of the lagged independent variables. Whereas, the second channel of causation is the adjustment of the dependent variable to the lagged deviations from the long run equilibrium path, represented by the error correction term (ECT). If the ECT is found to be significant, it substantiates the presence of cointegration as established in the system earlier and at the same time; it tells us that the dependent variable adjusts towards its long run level.

8. Variance Decompositions

The multivariate causality of the dependent variable within the sample period in VECM framework does not only provide an indication of the dynamic properties of the system but it also enables us to capture the relative strength of the causality among the variables beyond the sample period. Variance decomposition therefore allows us to examine the out-of sample causality among the variables in the VAR system. The VAR model is a system of reduced form dynamic linear equations in which each variable is expressed as a function of a serially uncorrelated errors and an equal number of lags of all variables in the system (Abdullah, 1998; Enders, 1995). This VAR model assumes that the contemporaneous correlations of errors across equations are non-zero and therefore there are no contemporaneous explanatory variables in the model. The error terms (also referred to as innovations) can provide a potential source of new information about the movements in a variable during a current period. In order to interpret economic implications from

the VAR model, we use Sim's (1980) innovation accounting procedure. This procedure involves the decomposition of forecast error variance of each variable into components attributable to its own innovations and to shocks of other variables in the system.

9. Empirical Analysis

As mentioned earlier, we seek to analyze the daily stock market returns based on the VAR model proposed by Sim (1980) which allows us to examine the market movements among the OIC stock markets and their comovements with the developed markets. This method requires that the time series analyzed are stationary. In Table 2, we report the unit root tests based on the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) procedure. The lag length for each variable is also presented for both stock market indices as well as the stock market returns based on Akaike Information Criteria (AIC).

The results from Table 2 indicate that based on ADF test at log-level, all series contain unit roots, with the exception of Turkey and T&E Index. Meanwhile based on PP test, all series contain unit root at log-level. This means that the null hypothesis of the presence of unit root cannot be rejected even at 10 percent significance level. However, PP test consistently suggest that all data are stationary at first differenced and therefore indicating that all the variables are $I(1)$.

Table 2: Unit Root Test Results

Variable	Log-Level		First-Difference	
	ADF	PP	ADF	PP
Malaysia	-1.903 (3)	-1.901 (12)	-20.806* (2)	-37.720* (11)
Indonesia	-1.853 (3)	-1.889 (14)	-21.253* (2)	-37.819* (13)
Bangladesh	-0.428 (23)	-0.225 (1)	-6.917* (22)	-56.779* (7)
Pakistan	-2.130 (5)	-2.297 (12)	-17.046* (4)	-40.187* (11)
Turkey	-3.459** (14)	-3.073 (8)	-	-41.874* (7)
Egypt	-2.215 (5)	-2.110 (12)	-16.639* (4)	-39.380* (11)
Oman	-1.775 (13)	-1.280 (19)	-12.474* (6)	-35.067* (18)
Kuwait	-0.856 (7)	-0.551 (17)	-14.146* (5)	-35.833* (16)
Japan	-2.546 (3)	-2.410 (8)	-20.284* (3)	-42.024* (7)
US	-2.879	-2.822	-43.625*	-43.721*
UK	-2.431 (1)	-2.687 (8)	-8.464* (0)	-44.730* (7)
ASEAN Index	-2.005 (3)	-2.008 (13)	-20.611* (2)	-38.001* (12)
SAARC Index	-1.826 (7)	-1.825 (13)	-13.382* (6)	-40.956* (13)
ASIAN Index	-1.988 (3)	-1.994 (13)	-20.591* (2)	-38.032* (13)
T&E Index	-3.251*** (14)	-38.032 (11)	-	-42.347* (10)
GCC Index	-0.845 (7)	-0.4846 (20)	-12.021* (6)	-36.302* (20)
MENA Index	-1.221 (7)	0.975 (21)	-11.994* (6)	-36.444* (20)

Note: *, ** and *** denote significance at the 1%, 5% and 10% levels, respectively. The numbers in the parenthesis show the optimal lag length incorporated in the model based on the Akaike Information Criteria (AIC). The tests of ADF (Augmented Dickey-Fuller) and PP (Phillips-Perron) are based on model with constant and trend. ASEAN Index is an index constructed for Malaysia and Indonesia, SAARC Index is for Bangladesh and Pakistan, T&E Index is for Turkey and Egypt, and GCC index is for Oman and Kuwait. ASIAN and MENA indices are for Asian countries (Malaysia, Indonesia, Bangladesh and Pakistan) and for Middle-East and North –Africa (Turkey, Egypt, Oman and Kuwait), respectively. The indices are constructed based on equally weighted price index and all in dollar denomination.

10. Cointegration Analysis

Having concluded that each of the series is stationary at first differenced, we proceed to examine whether there exists a long-run equilibrium among the OIC stock markets (three models: Models 1, 2 and 3) and between the OIC and developed markets (five models: Models 4, 5, 6, 7 and 8). Table 3 presents the Johansen cointegration tests at the chosen lag-lengths for all the sub-periods.

As may be observed from Max-Eigen and Trace tests in Table 3, Models 1, 4, 6 and 8 indicate that there exists a unique cointegrating vector at least at 5 percent significance level. This suggests that there are long-run comovements among: (i) Malaysia, Indonesia, Bangladesh and Pakistan (Model 1); (ii) Malaysia, Indonesia, US, UK and Japan (Model 4); (iii) Turkey, Egypt, US, UK and Japan (Model 6); and (iv) ASIAN Index, MENA Index, US, UK and Japan (Model 8). Our findings seem to indicate the OIC stock markets in the Asian region are found to be integrated either regionally or internationally, while Bangladesh and Pakistan seems to be regionally and internationally segmented. The strong market integration is found between Malaysia-Indonesia, and between Malaysia-Indonesia and developed markets (Models 1 and 4), and no integration is found between Bangladesh-Pakistan and Bangladesh-Pakistan and developed markets (Models 1 and 5). Our finding of integration among the four OIC markets in the Asian region is consistent with the finding of Hassan (2003).

Table 3: Cointegration Test Results

No.	Model:	Hypothesis		Test Statistics	
		Null	Alternative	Trace	Max-Eigen
1	**ASIAN:** Malaysia, Indonesia, Bangladesh, Pakistan (5)	$r \leq 0$	$r = 1$	39.609	27.543*
		$r \leq 1$	$r = 2$	12.065	6.317
		$r \leq 2$	$r = 3$	5.748	4.971
		$r \leq 3$	$r = 4$	0.778	0.777
2	**MENA:** Turkey, Egypt, Oman, Kuwait (4)	$r \leq 0$	$r = 1$	43.792	16.698
		$r \leq 1$	$r = 2$	27.094	13.989
		$r \leq 2$	$r = 3$	13.105	9.685
		$r \leq 3$	$r = 4$	3.421	3.421
3	**OIC:** ASEAN, SAARC, T&E, GCC (2)	$r \leq 0$	$r = 1$	58.718	28.718
		$r \leq 1$	$r = 2$	30.000	16.957
		$r \leq 2$	$r = 3$	13.043	8.028
		$r \leq 3$	$r = 4$	5.0155	5.015
4	**ASEAN & World:** Malaysia, Indonesia, US, UK, Japan (5)	$r \leq 0$	$r = 1$	96.779**	40.855**
		$r \leq 1$	$r = 2$	55.923**	28.308*
		$r \leq 2$	$r = 3$	27.615	16.767
		$r \leq 3$	$r = 4$	10.848	10.691
		$r \leq 4$	$r = 5$	0.156	0.156
5	**SAARC & World:** Bangladesh, Pakistan, US, UK, Japan (5)	$r \leq 0$	$r = 1$	64.943	25.694
		$r \leq 1$	$r = 2$	39.249	20.045
		$r \leq 2$	$r = 3$	19.204	13.282
		$r \leq 3$	$r = 4$	5.922	5.408
		$r \leq 4$	$r = 5$	0.514	0.514
6	**Turkey, Egypt & World:** Turkey, Egypt, US, UK, Japan (4)	$r \leq 0$	$r = 1$	75.589*	30.980
		$r \leq 1$	$r = 2$	44.609	18.270
		$r \leq 2$	$r = 3$	26.339	15.258
		$r \leq 3$	$r = 4$	11.081	11.053
		$r \leq 4$	$r = 5$	0.027	0.027
7	**GCC & World:** Oman, Kuwait, US, UK, Japan (4)	$r \leq 0$	$r = 1$	83.620	30.194
		$r \leq 1$	$r = 2$	53.425	24.647
		$r \leq 2$	$r = 3$	28.778	14.836
		$r \leq 3$	$r = 4$	13.942	10.823
		$r \leq 4$	$r = 5$	3.118	3.118
8	**OIC & World:** ASIAN, MENA, US, UK, Japan (4)	$r \leq 0$	$r = 1$	100.985**	37.599*
		$r \leq 1$	$r = 2$	63.386*	26.248
		$r \leq 2$	$r = 3$	37.137	23.021
		$r \leq 3$	$r = 4$	14.116	8.870
		$r \leq 4$	$r = 5$	5.246	5.246

Note: * and ** denote significance at the 1% and 5% levels. The number s in the parenthesis show the optimal lag length incorporated in the model based on the Akaike Information Criteria (AIC).

The study finds no evidence of integration among the four OIC stock markets in the MENA region (Model 2). The only integration is found between Turkey-Egypt and between Turkey-Egypt and developed markets. These markets seem to be regionally and internationally integrated (Models 2 and 6). Meanwhile, no integrations seem to be found between the GCC stock markets, Oman-Kuwait and between GCC and developed markets (Models 2 and 7). These markets seem to be neither regionally nor internationally integrated. The study also finds no evidence of integration among the eight OIC stock markets (Models 3). However, the eight OIC stock markets are found to be internationally integrated (Model 8). The integration between the OIC and developed markets seems to be contributed by the integration between the stock market of Malaysia-Indonesia and Turkey and Egypt.[10] Generally, our findings on MENA stock markets are in harmony with the findings of Neaime (2002), but contradictory to Marashdeh (2005). Neamie (2002) finds integration neither among GCC nor among MENA countries. The only integration is found between MENA and developed stock markets. By using a monthly data from the period 1994 to 2004, he finds evidence of integration among four MENA markets (Turkey, Egypt, Jordan and Morocco), but not between the MENA and developed markets. In addition, the findings on segmented two GCC and eight OIC stock markets are in line with what has been said by Barus (1997). According to him, a social, political and economic cooperation does not guarantee integrated capital markets among the members; therefore the benefit of portfolio diversification within them may be understated.

Our findings imply that there is still an ample room available for investors to gain risk-reduction benefits through diversifying their portfolio in the OIC stock markets, particularly in the GCC and SAARC countries. However, there is no long-run benefits diversification available in the OIC countries, particularly in the ASEAN, Turkey and Egypt markets. Only a limited gain in risk reduction is seemed could be gained by diversifying their investments internationally. How each integrated OIC stock market are causal-nexus with the others?; and how

[10] The study also finds evidence of integration among the developed market, US, UK and Japan. Since the integration among the developed markets is not the focus of the study, therefore we did not report the results here. However, it's available upon request.

their causal-nexus with the developed markets is? These questions are answered by the multivariate-causality VECM.

11. Multivariate-Causality VECM Analysis

This section builds upon the previous cointegration tests to precisely estimate the dynamic interactions among the OIC stock markets and their interactions with the developed stock markets. The VECM adopted in this study allows us to distinguish between the short-run and long-run forms of causality. When the variables are cointegrated, in the short run, deviations from this equilibrium will feed back on the changes in the dependent variable in order to force movements towards long run equilibrium. If the dependent variable is driven directly by this long run equilibrium error, then it is responding to this feedback. Otherwise, it is only responding to short term shocks to the stochastic environment.

This study therefore focuses its analysis only on cointegrated stock markets by employing the VECM for Models 1, 4, 6 and 8. Since in these models we find evidence of cointegration among the stock markets, thereby rejects the non-causality among them. This means that at least one of the markets reacts to deviations from the long-run relationship. We then need to investigate whether the co-movements among the stock markets correct for disequilibrium.

Table 4: Multivariate Causality Results
(Model 1: Malaysia, Indonesia, Bangladesh and Pakistan)

Model No:	Dependent Variables	Independent Variables (Lag length = 4)				
		[F-statistics]				(t-statistics)
		ΔMalaysia	**ΔIndonesia**	**ΔBangladesh**	**ΔPakistan**	**ECT_{t-1}**
1	**Δ**Malaysia	-	32.406* [0.000]	0.6244 [0.645]	0.749 [0.587]	-0.012* (-3.092)
	ΔIndonesia	32.810* [0.000]	-	0.907 [0.476]	1.341 [0.244]	0.016 (0.778)
	ΔBangladesh	0.504 [0.773]	1.124 [0.345]	-	1.440 [0.207]	0.029 (0.543)
	ΔPakistan	0.711 [0.585]	0.660 [0.654]	0.610 [0.692]	-	-0.007 (-0.479)

Note: ECT_t is derived by normalizing the cointegrating vectors on natural logarithm of the dependent variables, producing residual *r*. By imposing restriction on the coefficients of each variable and conducting Wald test, we obtain *F*-statistics for each coefficient in all equations. *, ** and *** represent significance at the 1%, 5% and 10% levels, respectively. Figures in the (.) and [.] represent *t*-statistics and probabilities for *F*-statistics, respectively.

Table 5: Multivariate Causality Results
(Model 4: Malaysia, Indonesia, US, UK and Japan)

Model No:	Dependent Variables	Independent Variables (Lag length = 4)					
		[F-statistics]					(t-statistics)
		ΔMalaysia	**ΔIndonesia**	**ΔUS**	**ΔUK**	**ΔJapan**	**ECT_{t-1}**
2	**Δ**Malaysia	-	17.045* [0.000]	5.728* [0.000]	1.584 [0.161]	12.636* [0.000]	-0.016* (-4.082)
	ΔIndonesia	18.556* [0.000]	-	1.345 [0.243]	3.058* [0.009]	8.406* [0.000]	-0.010 (-1.303)
	ΔUS	2.502** [0.029]	3.029* [0.010]	-	73.506* [0.000]	1.873*** [0.096]	0.000 (0.060)
	ΔUK	3.146* [0.008]	4.932* [0.000]	98.557* [0.000]	-	5.468* [0.000]	-0.003 (-0.464)
	ΔJapan	12.490* [0.000]	8.120* [0.000]	8.436* [0.000]	5.185* [0.000]	-	0.013 (1.570)

Note: ECT_t is derived by normalizing the cointegrating vectors on natural logarithm of the dependent variables, producing residual *r*. By imposing restriction on the coefficients of each variable and conducting Wald test, we obtain *F*-statistics for each coefficient in all equations. *, ** and *** represent significance at the 1%, 5% and 10% levels, respectively. Figures in the (.) and [.] represent *t*-statistics and probabilities for *F*-statistics, respectively.

The estimated coefficients for the above Models 1, 4, 6 and 8 are respectively reported in Tables 4 to 7. These tables present the findings both short- and long-run causal-nexus between the OIC and developed stock markets. Based on Table 4, the short-run causalities are only observed between Malaysia-Indonesia. This finding is supported by Model 4 (Table 5). At the 1 percent significance level, there seems to a bi-directional relationship running from the Malaysian and Indonesia stock markets and vice versa. Table 5 reports that the Malaysia stock market influenced by the US and Japanese stock markets. The stock market of Indonesia however is affected by the UK and Japanese stock markets. Both the Malaysian and Indonesian seem to affect all developed markets. Table 6 reports that the stock market of Turkey is independent of Egypt, but dependent on the UK and Japanese stock markets. Meanwhile, the Egyptian market depends only on the Turkey and UK markets.

Table 6: Multivariate Causality Results
(Model 6: Turkey, Egypt, US, UK and Japan)

Model No:	Dependent Variables	Independent Variables (Lag length = 3)					
		[F-statistics]					(t-statistics)
		ΔTurkey	**ΔEgypt**	**ΔUS**	**ΔUK**	**ΔJapan**	**ECT_{t-1}**
6	**Δ**Turkey	-	1.209 [0.305]	0.714 [0.582]	14.328* [0.000]	5.076* [0.000]	-0.020* (-3.752)
	ΔEgypt	2.129*** [0.075]	-	1.277 [0.277]	2.076*** [0.082]	0.859 [0.488]	0.005 (1.590)
	ΔUS	1.141 [0.335]	0.622 [0.646]	-	85.354* [0.000]	1.494 [0.201]	0.004 (0.588)
	ΔUK	15.588 [0.000]	1.548 [0.186]	122.017* [0.000]	-	8.125* [0.000]	0.002 (1.325)
	ΔJapan	4.504* [0.001]	2.097*** [0.079]	14.684* [0.000]	9.800* [0.000]	-	0.000 (0.153)

Note: ECTt is derived by normalizing the cointegrating vectors on natural logarithm of the dependent variables, producing residual r. By imposing restriction on the coefficients of each variable and conducting Wald test, we obtain F-statistics for each coefficient in all equations. *, ** and *** represent significance at the 1%, 5% and 10% levels, respectively. Figures in the (.) and [.] represent t-statistics and probabilities for F-statistics, respectively.

Table 7: Multivariate Causality Results
(Model 8: ASIAN, MENA, US, UK and Japan)

Model No:	Dependent Variables	Independent Variables (Lag length = 3)					
		[F-statistics]					(t-statistics)
		ΔASIAN	**ΔMENA**	**ΔUS**	**ΔUK**	**ΔJapan**	**ECT_{t-1}**
8	**Δ**ASIAN	-	0.120 [0.975]	8.644* [0.000]	3.420* [0.009]	21.696* [0.000]	-0.021* (-4.925)
	ΔMENA	0.871 [0.481]	-	0.840 [0.500]	4.985* [0.000]	4.186* [0.002]	-0.007 (-1.333)
	ΔUS	4.030* [0.003]	1.191 [0.313]	-	93.454* [0.000]	2.362*** [0.051]	-0.002 (-0.346)
	ΔUK	4.674* [0.000]	6.540* [0.000]	128.315* [0.000]	-	6.500* [0.000]	0.009 (1.359)
	ΔJapan	21.793* [0.000]	4.805* [0.000]	10.550* [0.000]	7.963* [0.000]	-	0.015 (1.651)

Note: ECT_t is derived by normalizing the cointegrating vectors on natural logarithm of the dependent variables, producing residual *r*. By imposing restriction on the coefficients of each variable and conducting Wald test, we obtain *F*-statistics for each coefficient in all equations. *, ** and *** represent significance at the 1%, 5% and 10% levels, respectively. Figures in the (.) and [.] represent *t*-statistics and probabilities for *F*-statistics, respectively.

Finally, the study finds that the OIC stock markets in the Asian region are independent from MENA, but they are affected by all developed markets. The OIC stock market in the MENA region is affected only by the UK and Japanese stock markets (Table 7). It seems that the distance or geographical factor from one stock market to another contributes to the market integration. Janakiramanan and Asjeet (1998) provide empirical evidence that the geographically and economically close countries should exhibit higher levels of market integration.

The nature of the relationship between national stock markets can be explained by both trade as well as finance factors (Ibrahim, 2003). Therefore, the stronger the bilateral trade ties between Malaysia-Indonesia and Turkey-Egypt, the higher the degree of co-movements should be between them This is also consistent with the finding of Masih and Masih (1999) which opine that the higher intra-regional stock

dependency among the Asian markets is perhaps due partly to the growing share of intra-regional trade and investment in the recent years. The non integration among the OIC countries could be partly due to less intensified trading among the OIC markets as compared to the rest of the world. For example, Abdullah (2000) finds that the proportion of trade among the OIC countries has even decreased from 14 percent to 12 percent of their trade during the nineties.

Nevertheless, the importance of finance factor tends to depend more on the perceptions of financial investors. Investors will diversify their investments across the countries if more benefits can be gained than by diversifying locally. It seems that during the study period, the financial investors in the Asian markets were inclined to diversify their investments regionally and international; thereby there were no significant flows of portfolio investments across continents. The reverse trend seems to prevail for the rest OIC markets; they seem to diversify their investment locally.

According to Bracker et al., 1999; and Pretorius, 2002; apart from trade bilateral dependencies, the geographic distance between different stock markets can also be an important factor contributing to a greater extent of market integration. In the case of Malaysia, Indonesia, Japanese stock markets the greater degree of integration during the period of analysis could also be due to the geographic distance as compared to the US stock market. Our finding of no integration among MENA stock markets is line with Barus's (1997) study. He finds in his study that a social, political and economic cooperation does not guarantee integrated capital markets among the members.

Finally, from Tables 4 to 7, we find that for all models all the markets under the study are statistically endogenous, with the exception of Bangladesh and Pakistan (Model 1). The stock markets of Bangladesh and Pakistan are exogenous, indicated by insignificant of both short-run (F-Statistics) and long-run causal influences (t-statistics, ECT). The ECTs in Models 1, 4, 6 and 8, are negatively significant. The values of ECTs for these models are -0.012, -0.016, -0.020, and -0.021 respectively suggesting that the last period disequilibrium is corrected by 1.2 to 2.1 percents in the following day. According to Masih and Masih (1997 and 1999), the markets that have significant ECTs, i.e., Malaysia for Models 1 and 4, Turkey for Model 6 and ASIAN Index for Model 8

will bear the brunt of short run adjustment to long run equilibrium for each respective models.

12. Variance Decompositions Analysis

The cointegration analysis so far only suggests that the long run association among the stock markets in the analysis. Since, we also intend to examine the relative strength of each variable in explaining the changes in the dependent variable; therefore variance decompositions analysis generated from VAR model is conducted. The orderings of the models is based on the size of the market capitalization, as reported in Tables 8 to 10 for the horizons of 1, 3, 6 and 12 days. As may be noted from these variance decompositions, we can then conclude that the variations in the Malaysian and Indonesian stock markets respond more to shocks in either market as compared to the other Asian markets (accounting for about 6 and 9 percents of the forecast errors variance after 12 days). The variations in the Pakistani market respond more to shock in Bangladesh, while the variations in Bangladesh respond more to shock in the Malaysian market.

Table 8: Cholesky Variance Decompositions Results (Model 6 Malaysia, Indonesia, Bangladesh and Pakistan)

Days	Percentage of Forecast Variance Explained by Innovations in:				
		ΔMalaysia	**ΔIndonesia**	**ΔBangladesh**	**ΔPakistan**
	Relative Variance				
1	**Δ**Malaysia	100.00	0.000	0.000	0.000
3		99.306	0.410	0.108	0.176
6		99.045	0.626	0.198	0.131
12		99.038	0.632	0.198	0.132
1	**Δ**Indonesia	8.605	91.395	0.000	0.00
3		8.637	91.163	0.195	0.005
6		9.189	90.284	0.344	0.183
12		9.201	90.255	0.345	0.198
1	**Δ**Bangladesh	0.363	0.167	99.470	0.00
3		0.390	0.200	99.301	0.109
6		0.423	0.208	99.207	0.162
12		0.424	0.208	99.198	0.170
1	**Δ**Pakistan	0.001	0.122	0.007	99.870
3		0.011	0.374	0.345	99.270
6		0.173	0.408	0.586	98.832
12		0.187	0.412	0.615	98.784

Table 9: Cholesky Variance Decompositions Results [(Model 4: Malaysia, Indonesia, US, UK & Japan) and (Model 6: Turkey, Egypt, US, UK & Japan)]

Days	Percentage of Forecast Variance Explained by Innovations in:					
		ΔUS	**ΔJapan**	**ΔUK**	**ΔMalaysia**	**ΔIndonesia**
	Relative Variance in:					
1	ΔMalaysia	0.010	5.847	0.736	93.407	0.000
3		4.305	5.716	0.837	88.776	0.366
6		4.967	6.060	0.867	87.524	0.581
12		4.980	6.058	0.886	87.485	0.591
1	ΔIndonesia	0.160	4.530	1.101	4.560	89.649
3		2.662	4.589	1.293	4.615	86.841
6		2.986	4.752	1.395	5.012	85.854
12		2.995	4.756	1.409	5.020	85.820
1	ΔTurkey	0.770	1.578	3.081	94.570	0.000
3		1.508	1.639	3.206	93.632	0.014
6		1.544	1.920	3.195	93.313	0.028
12		1.549	1.921	3.195	93.306	0.029
1	ΔEgypt	0.037	0.044	0.033	0.161	99.724
3		0.290	0.377	0.567	0.565	98.200
6		0.389	0.375	0.599	0.603	98.034
12		0.394	0.375	0.599	0.604	98.027

When the developed stock markets are incorporated in the models, the variations in the Malaysian market respond more to the shock in the Japanese stock market, followed by the US, UK and Indonesia. Any variations in the Indonesian market are still more affected by the shocks in the stock markets of Malaysia, followed by Japan, US and UK (Table 9). Turkey is more responded to the shock in the UK markets as compared to its regional market (Egypt) and other developed markets. Meanwhile, the stock market of Egypt is more responded to the shocks in the stock markets of Turkey, followed by the shocks in UK, US and Japan (Table 9). Overall, the variations of OIC stock markets in the Asian region is more responded to the shock in the market of Japan, while the MENA stock market variations is more responded to the UK market (Table 10).

Table 10: Cholesky Variance Decompositions Results (Model 8: ASIAN, MENA, US, UK & Japan)

Days	Percentage of Forecast Variance Explained by Innovations in:					
		ΔUS	**ΔJapan**	**ΔUK**	**ΔASIA**	**ΔMENA**
	Relative Variance in:					
1	ΔASIAN	0.056	5.639	0.664	93.641	0.000
3		4.674	5.455	0.833	88.997	0.041
6		5.405	5.671	0.829	88.027	0.068
12		5.415	5.670	0.829	88.015	0.071
1	ΔMENA	0.033	1.106	1.216	0.002	97.641
3		0.558	1.119	1.252	0.040	97.031
6		0.631	1.143	1.626	0.201	96.398
12		0.643	1.143	1.630	0.205	96.379

13. Conclusion

This paper attempts to investigate the dynamic linkages among the OIC stock markets (Malaysia, Indonesia, Bangladesh, Pakistan, Turkey, Egypt, Oman, and Kuwait) and their linkages with three largest developed stock markets in the world, the US, UK and Japan. Based on the cointegration analysis, the study finds that the OIC stock markets in the Asian region seem to be integrated either regionally or internationally. The international integration is only found between the stock markets of Malaysia-Indonesia and the developed markets, and no integration is found between Bangladesh-Pakistan and the developed markets. For the OIC stock markets in the MENA region, the study finds no evidence of integration among them. However, the integration in the region is found between Turkey-Egypt and developed markets. Unlike the Turkey and Egypt that seem to be regionally and internationally integrated, the stock markets of Oman and Kuwait seem to be neither regionally nor internationally integrated. Overall, the study finds no evidence of integration among the eight OIC stock markets, but finds evidence of integration between the eight OIC stock markets and three largest markets in the worlds.

In addition, based on the variance decompositions analysis, the study finds that the variations in the Malaysian market respond more to shocks in the Indonesian market regionally, and vice versa. Regionally, the variations in the Pakistani market respond more to shocks in Bangladesh,

while the variations in Bangladesh respond more to shocks in the Malaysian market. However, when the developed stock markets are incorporated in the models, the variations of OIC stock markets in the Asian region respond more to the shocks in the market of Japan, while the MENA stock market variations respond more to the shocks in the UK market.

In response to the increased competition prevailing in the international financial markets and to move towards a greater integration among the OIC stock markets, several attempts should be made in order to upgrade the cooperation and improve integration among the OIC markets. Those attempts includes in the form of coalitions, common trading platforms, mergers, associations, federations and unions. The OIC markets also needs for harmonising their physical, institutional and legal frameworks and policies and sharing their investor base. In addition, the OIC markets have also to intensify their efforts to promote cooperation among their stock markets with a view to developing and consolidating a mechanism for a possible form of integration among themselves (see SESRTCIC, 2006).

Our findings also imply that there is still an ample room available for investors to gain risk-reduction benefits through diversifying their portfolio across the OIC stock markets, particularly in the GCC and SAARC countries. However, there is no long-run benefits diversification available in the OIC countries, particularly in the markets of ASEAN, Turkey and Egypt. Only a limited gain risk-reduction is seemed could be gained by diversifying their investments internationally. The interdependent of the OIC stock market on the world markets implies that in designing any policies pertaining to the stock markets, the OIC policy makers has to take into consideration any development and shock in the developed markets. The opposite also seems to be true.

Further empirical studies on the issue can cover broader areas of market integration, use more advanced techniques of estimation and utilized a more representative data set to add further to the existing literatures on market integration among the OIC countries.

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