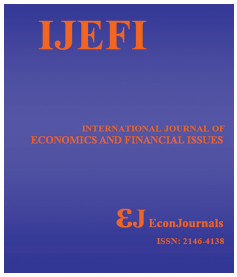

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Egyptian Equity Market between International Integration and Segregation

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ABSTRACT

The purpose of this paper is to investigate the degree to which the Egyptian capital market is integrated to the international markets approximated by the U.S. market. The study used Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests that considers possible structural fracture and trend in the time series Empirical results deduced from the Johansen-Juselius (JJ) efficient approach shows that the Egyptian market in the Long-run is segmented internationally. This gives a signal to the international portfolio managers that the Egyptian capital market represents a good opportunity for international diversification. Especially with a growing evidence of the integration of the international markets. Results indicated that there is no long run of short run causal relationship between the two indices under investigation. The researches have studied the Egyptian capital market after 2011 revolution which represents a milestone in the Egyptian history, resulted in a large economic and social changes. Specially that the relationship between the capital markets is dynamic.

Keywords: Emerging Economies, Stock Market, Co-integration
JEL Classification: G10

1. INTRODUCTION

Theoretically, "law of one price" indicates that assets should hold the same prices across countries after adjusting for transactions costs. Capital controls and technological level variation make capital markets across countries leads to different levels of integration (Darrat et al., 2000, Bekaert et al., 2009). In addition, the literature shows evidence that international financial integration is not showing continuous stronger signs over time, it may even shows reverse direction in some periods (Bekaert and Harvey, 1995, Rose and Wieladek, 2014).

The capital markets integration represents important impact on the international investment decisions, as it have direct impact on the possible benefit of international diversification (Freimann, 1998, Bowe and Mylonidis, 1999). Though some Empirical evidence suggests a week linkage among emerging markets and other developed markets (Korajczyk, 1996, Hakim and Andary, 1997, Bekaert and Harvey, 1997); more recent researches depict a growing evidence of growing integration between the emerging markets and the developed markets. Mulyadi (2009) indicated that US capital market has one directional impact on the Indonesian market and a bidirectional volatility spillover between Indonesia and Japan.

Syriopoulos (2007) depicts that Central European emerging markets tend to display increasing integration with their mature counterparts. Worthington and Higgs (2004) used multivariate GARCH analysis to study the spillover between volatility spillover between the Three Asian developed markets (Hong Kong, Japan and Singapore) and six emerging markets (Indonesia, Korea, Malaysia, the Philippines, Taiwan and Thailand). The results generally indicate the presence of large and predominantly positive mean and volatility spillovers. The paper studies the position of

the Egyptian capital market integration with international capital markets. The analysis gain importance due to drastic fluctuation in the Egyptian economy after 2011 revolution. The Egyptian economy has shown resilience in the face of 2008 international financial crises of with an average of economic growth of 5.6% compared to 1.49% worldwide for the period 2008-2010 (World-Bank, 2016). This performance was interrupted by the political unrest in in 2011. Vast demonstrations took over the country resulted in ending 30 years of former president Hosni Mubarak presidency. During the Period between 2011-2015, the Egyptian economy faced hard challenges translated in week growth increase in unemployment and deterioration in the value of Egyptian pound (World-Bank, 2017, World-Bank, 2016), the performance of the Egyptian stock market was no exception.

The Egyptian Exchange (EGX) history goes dates back to 1883 when the first exchange was established in the second largest city Alexandria followed by Cairo Exchange which was established in 1903 (Wilson, 2013). The Egyptian exchanges were ranked fifth in terms of capitalization by the end of Forties of the past century. This remarkable performance did not protect the two exchanges from the winds of socialism. The two exchanges folded up in July 1961 following the state-sanctioned demise of Egypt's private sector. It was not before 1972, when serious attempts were made to incarnate the stock exchange. However, the real progress was not before the early nineties as a direct result of the Economic Reform and Structural Adjustment program run with collaboration with the IMF.

During this phase the Egyptian stock market went through revival due to government liberalization policies. In addition to the change of legal structure of the Egyptian capital market. The stock market was supported though the intensive privatization 90s program. By the middle of 2002 189 public companies were privatized 52 of them though IPOs on the stock exchange. The Egyptian exchange won the attention of the International Finance Corporations in January 1997 when it was included in the emerging markets investable indexes. On 2001 The Egyptian stock market was added to the Morang Stanley Capital International (MSCI) emerging markets free index. The Egyptian Exchange was hit hard by January 25, 2011 revolution. The primary index decreased by 6.25% on January 25th, 2011. On the 27th of the same month EGX30 (the primary index) plunged 16%. Due to the unrest the exchange closed for 8 weeks. However, it commenced its operations on March 23rd with a new plunge of 8.9%. The market capitalization slashed to EGP 294 billion at the end of the 2011, going down form EGP 488 billion in 2010. The Egyptian stock has to wait until year 2014 for strong recovery, when the market capitalization reached EGP 500 billion. The market capitalization jumped to EGP 601 Billion in 2016 which can be partially attributed to the floating of the Egyptian pound, which resulted in sharp decline against the American dollar.

Abdel (2002) stated that, when comparing emerging stock markets Egypt, was the first in ranking. In 2001, Egyptian stock market surpassed other emerging economies like Greece, Morocco, Mexico, Poland, China, etc. At that time, Egypt had a very attractive equity evaluation, which made the Egyptian stock market very attractive as a good equity investment opportunity. The events that occurred in the 1990s, like the Gulf War, the waning influence of OPEC, the staggering peace process between Israel and the remaining Middle Eastern countries, in addition to the recent and continuous modernization efforts in the Egyptian Exchange market that is carried out by the public and private sector, all paved the way for Egypt to be the leading financial center in the Middle East and North Africa. The author added that the strategic location of Egypt, in addition to the demographics and market volume, and Cairo (the Egyptian capital) being at the center of North Africa and the Middle East played a large part in the advancement of the stock market in Egypt compared to other markets in the region. Further, it made other markets in the region unable to keep up with the development in the Egyptian stock market.

One of the things that had a negative impact on stock prices and increased uncertainty leading to panic in the investment community in the Egyptian stock market was the revolution that started in January 2011. Stock market index of Egypt has shown a rapid decline following the revolution. Some argue that this was not the impact of the revolution as much as it was the decisions of the Egyptian government that had worsen the situation. Around January 2012, which means after 1 year of the revolution, the political movement in Egypt was slow with the military controlling the government, which did not help in the stock market performance. However, investors renewed their confidence in the stock market after the parliamentary elections. The Arab Spring had a more significant impact on the Egyptian stock market than other stock markets in the region (African-Development-Bank, 2012).

The paper explores the position of Egyptian Exchange between segmentation and integration with developed capital markets, specialty after the changes that has taken place to the Egyptian Economy after 2011 revolution. It explores how did these drastic economic changes affect the link between the Egyptian capital market and international markets. The study employs a monthly end of the period value of the stock market indices EGX 30 (the primary index of the Egyptian stock market) and the Standard and Poor 500 of New York exchange. It uses cointegration and causality test, to capture the short-run adjustments, and long run effects of the Standard and Poor 500 over EGX 30.

The rest of the paper is structured as follows: Section 2 depicts the contribution of the literature, descriptive statistics regarding the two indices will be presented in section 3. Methodology and empirical results is presented in Section 4. Finally section 5 presents the conclusion of the research.

2. LITERATURE REVIEW

The regional integration between capital markets has drew the attention of the researchers. The body literature addressing the degree of integration between financial markets can be divided into two main groups. The first one studied the regional integration between different regions in the world, and the second analysed the international integration.

(Boako and Alagidede, 2017) argued that African emerging market should be considered as a separate class of assets; despite the fact that its correlation with international markets has increased over time. The African capital markets counties have shown a level of fragmentation (Farid, 2013) supported this view. The study have shown a level of fragmentation between the African capital markets. The empirical results shows that South Africa, Kenya and Nigeria are totally isolated to each other, while North African countries region have shown higher level of integration. This expected due to the economic and cultural links between the Arab North African countries (Saleem, 2013).

The European equity marketing have drawn the attention of the researchers. Lucey et al. (2004) and Syriopoulos (2007) examined the integration of the European equity markets for the period 1995-2002 the study showed that the efforts to establish the European Union did not reflect strongly on the European equity market until 1997-1998, when the markets deemed that European integration would in fact occur. More specifically, upon the establishment of EMU and the ECB (Mylonidis and Kollias, 2010, Kim et al., 2005, Syriopoulos, 2007). Salma (2015) has examined the volatility spill over between the US, Japan and European stock market using VARGARCH model. The study concluded that there is an existence of shocks and volatility transmission between only US and EMU.

Miyakoshi (2003) study has concluded that the regional effect in has more impact on the Asian markets than the interactional markets effect represented by the U.S. market. The analysis of the relationship between the Chinese market and Hong Market has shown expectedly a more financial integration between the two markets. However, the HK and Chinese markets have shown no immunity toward the chocks of the U.S. markets. In addition HK market have shown more vulnerability toward the U.S. markets chocks reflecting the position of HK as an international financial center (Sun and Zhang, 2009). Sedik and Williams (2011) have analysed the GCC equity markets to explore the regional and international integration of equity markets in the GCC region. The study found a high level of integration between the equity markets of the region. On the hand, the study shows a high level of integration between the GCC and the US equity markets.

Gagnon et al. (2016) talked the question of international integration through the analysis of risk. The study analysed 5 major markets, namely, United States (Standard and Poor 500) and its European version for Germany (DAX), Great Britain (FTSE), France (CAC40), and Switzerland (SMI). The results shows financial cointegration between the markets of study. Several studies advocate the same results (Bessler and Yang, 2003, Darrat and Zhong, 2005).

As the body of research have shown an increasing evidence of integration between the international markets, emerging markets were subject for extensive research to explore its validity as tools for diversification.

GDP and market capitalization of emerging markets has shown growth in the past decades. According to MSCI the emerging capital markets represents 10.8% of the capital market capitalization worldwide. However, it still shows week signs of international integration. Bekaert and Harvey (2017) and Majdoub and Mansour (2014) found no solid evidence of spill over between the US markets and the Islamic emerging markets (the study included Turkey, Indonesia, Pakistan, Qatar, and Malaysia). Similar results were found regrading other emerging markets in the Middle East as markets seems to be fragmented globally and integrated regionally (Ali et al., 2000). A study by Odier et al. (1995) of the Swiss pension fund asset allocation, suggests that adding stocks form emerging markets would have increased the return to 28% compared to 11.5% if invested only in the Swiss capital market.

As a part of the emerging markets Egypt has drawn the attention of the researcher. Egyptian capital market plays a role of dominant force in the MENA region (Darrat et al., 2000). This increases the importance of analyzing Egyptian stock market international integration. Our study used long term relationship between time series by applying co-integration test developed by (Johansen and Juselius, 1990). Granger causality will be carried out through vector auto regressive to establish the short run dynamics. The study used U.S. stock market (Standard and Poor 500) to represent the world market in view of the growing evidence that assigns considerable weight to the U.S. market in the global capital market (see, for example, (Eun and Shim, 1989, Phylaktis, 1997, Majdoub and Mansour, 2014, Zhong et al., 2004).

3. DATA USED AND THEIR STOCHASTIC PROPERTIES

The paper employed monthly time series for both EGX30, and SP500. The data was obtained from Morgan Stanley Capital International (MSCI). The data covers the longest period possible between January 1998 and October 2017. This covers a period of 238 months. The political unrest in 2011 caused a missing data for the Egyptian stock market index for February and March 2011 which were predicted using linear interpolation. Based on wide spectrum of literature we use variables logarithmic form (Gunasekarage et al., 2004, Adam and Tweneboah, 2008, Vejzagic and Zarafat, 2013).

Table 1 shows the stochastic properties of the two-time series. The data exhibits variation in terms of means, standard deviations as well as minimums and maximums. The observed frequency distribution of two indices are not normal as the probability of Jarque-Bera is less than 5%, which means that the null hypothesis that the data is normal is rejected. The non-normality is expected given the nature of the variables, and the output of the previous work (Adam and Tweneboah, 2008, Talla, 2013, Beer and Hebein, 2008, Ali, 2011, Kumar and Puja, 2012, Goudarzi and Ramanarayanan, 2011, Pal and Mittal, 2011, Gunasekarage et al., 2004).

4. METHODOLOGY

Primarily, natural logarithms of data have been taken before passing to the analysis process. Then, stationarity analysis has been performed. Given the results from the unit root tests discussed in the preceding section the study used Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1979) and Phillips-Perron (PP) (Phillips and

Perron, 1988) tests that considers possible structural fracture and trend in the time series. A long term relationship between time series will be tested by applying co-integration test developed by Johansen and Juselius (1990). Both vector auto-regression and granger causality model are carried out to establish the short run dynamics.

Data must be tested for cointegration before granger causal test could be carried out, in other words data have a long run relationship which means over time the error term pushes the variables to move together in the long run when they move away from each other over time (Barakat et al., 2016). However, if the data are not cointegration a short run relationship can be verified using vector auto-regression (Rahman and Uddin, 2009).

4.1. Unit Root Test

The unit root test is used to examine if the indices under study are stationary or not. The study examined the stationarity of the data applying The Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests. Where the null hypothesis is that there is a unit root in the index under study, against the alternative that there is no unit root in the index under study.

The results depicted in Table 2 shows that both EGX and SP500 indices are having unit root at level but they become stationary at the first difference, which null hypothesis were accepted at level I(0) and rejected when integrated at first order I(1).

Table 1: Descriptive statistics of monthly stock returns of the Standard and Poor 500 and EGX30 sample period: January 1997 - October 2017

Descriptive statistics	LSP500	LEGX30
Mean	7.210178	8.072159
Median	7.168834	8.562525
Maximum	7.856292	9.570669
Minimum	6.599993	6.104793
Standard Deviation	0.270505	1.076442
Skewness	0.479791	−0.569906
Kurtosis	2.626019	1.736436
Jarque-Bera	10.51819	28.71635
Probability	0.005200	0.000001

Source: Data compiled and computed by the researcher

Table 2: Augmented Dickey Fuller (ADF) unit root test

Variables	ADF		PP	
EGX	At level	0.862	At level	0.841
	First difference	0.000	First difference	0.000
SP500	At level	0.597	At level	0.509
	First difference	0.000	First difference	0.000

4.2. Lag Selection

In order to continue with the tests a required lag length must be chosen. Vector auto regression model will be conducted to derive the optimal lag length criteria. The study applies lag order selection based on the LR test and information criteria such as akaike information criterion (AIC), final prediction error (FPE), Schwarz criterion (SC), and Hannan and Quinn Criterion (HQ). The lag length must be selected to ensure the goodness fit of the estimated statistical model (Nishat et al., 2004, Geetha et al., 2011, Agrawal et al., 2010, Kumar and Puja, 2012, Kalyanaraman and Tuwajri, 2014). Table 3 shows the results of the Lag length selected by different criteria, were LR, SC and HQ the lag length chosen were 1, however, lag length 2 where chosen by FPE and AIC.

Since (Gutierrez et al., 2009) argued that AIC criteria is the most appropriate for time series that has 100 to 200 observations. In addition other researchers used AIC criterion such as (Barakat et al., 2016). Thus, this research will proceed the subsequent analysis based on 2 lag.

4.3. Co Integration Test

The non-stationary time series Yt are cointegrated if there is a linear combination of them is stationary. If some elements are equal to zero then only the subset of the time series in Yt with non-zero coefficients is co integrated. Since that co-integrating variables may deviate from their relationship in the short-run, but their association would return to equilibrium in the long run.

Table 4 below shows the results of Johansen Co Integration Test to examine the if there is a long-term relationship between the variables under study. The results show that both indices under study accept the absence of cointegration. This proves that a long run relationship does not exist between EGX and SP500.

4.4. VAR and Short Run Causality

Since the long run relationship was rejected, granger causality test can be tested using VAR Granger Causality to estimate the short run relationship between the two indices. Tables 5 and 6 shows the results of VAR and granger causality respectively, it can be concluded that there is no short run causal relationship running from SP500 to EGX30 or form EGX30 to SP500 since the P value is >5%. Finally in Table 7 VAR residual serial correlation LM is carried out to test serial correlation at lag order selected, the P value on the table shows that the null hypothesis no serial correlation at lag order h is accepted.

Table 3: VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	−323.9112	NA	0.058324	2.834011	2.863907	2.846070
1	596.3719	1816.559*	2.02e-05	−5.133669	−5.043980*	−5.097490*
2	600.4851	8.047454	2.02e-05*	−5.134653*	−4.985171	−5.074355
3	602.8806	4.645266	2.05e-05	−5.120701	−4.911427	-5.036284
4	607.1027	8.113662	2.04e-05	−5.122632	−4.853565	−5.014096
5	609.1106	3.823873	2.08e-05	−5.105310	−4.776450	−4.972654
6	610.6306	2.868174	2.12e-05	−5.083745	−4.695092	−4.926970
7	611.9204	2.411304	2.18e-05	−5.060177	−4.611732	−4.879284
8	612.4834	1.042805	2.24e-05	−5.030291	−4.522053	−4.825278

* Indicates lag order selected by the criterion. LR: Sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

Table 4: Co Integration between indices of the study

Unrestricted cointegration rank test (trace)				
Hypothesized		Trace	0.05	P**
No. of CE(s)	Eigenvalue	Statistic	Critical value	
None	0.012439	3.388830	15.49471	0.9465
At most 1	0.001840	0.434699	3.841466	0.5097

Trace test indicates no cointegration at the 0.05 level
*Denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) P-values

Unrestricted cointegration rank test (maximum eigenvalue)				
Hypothesized		Max-Eigen	0.05	P**
No. of CE(s)	Eigenvalue	Statistic	Critical value	
None	0.012439	2.954131	14.26460	0.9498
At most 1	0.001840	0.434699	3.841466	0.5097

ax-eigenvalue test indicates no cointegration at the 0.05 level
*Denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) P-values

Table 5: Vector autoregression estimates

VAR	Equation 1	Equation 2
	LSP500	LEGX30
LSP500(-1)	1.064205	0.140549
Standard errors	(0.06803)	(0.13413)
t-statistics	[15.6437]	[1.04790]
Probability	0.0000	0.2952
LSP500(-2)	−0.088496	−0.152378
Standard errors	(0.06801)	(0.13410)
t-statistics	[−1.30112]	[−1.13631]
Probability	0.1939	0.2564
LEGX30(-1)	0.037215	1.127301
Standard errors	(0.03440)	(0.06783)
t-statistics	[1.08175]	[16.6199]
Probability	0.2799	0.0000
LEGX30(-2)	−0.033772	−0.129267
Standard errors	(0.03447)	(0.06797)
t-statistics	[−0.97969]	[−1.90193]
Probability	0.3278	0.0578
C	0.149221	0.110895
Standard errors	(0.08970)	(0.17685)
t-statistics	[1.66365]	[0.62708]
Probability	0.0969	0.5309

Table 6: VAR granger causality/block exogeneity wald tests

Dependent variable: LSP500			
Excluded	Chi-square	df	Prob.
LEGX30	2.032318	2	0.3620
All	2.032318	2	0.3620
Dependent variable: LEGX30			
Excluded	Chi-square	df	Prob.
LSP500	1.383997	2	0.5006
All	1.383997	2	0.5006

Table 7: VAR residual serial correlation LM tests

Lags	LM-Stat	Prob.
1	0.110437	0.9985
2	5.493395	0.2403

5. CONCLUSION

The purpose of this paper is to investigate the degree to which the Egyptian capital market is integrated to the international markets approximated by the U.S. market. The study used (ADF) and (PP) tests that considers possible structural fracture and trend in the time series. Empirical results shows that the Egyptian market in the Long-run is segmented internationally.

By shedding light on this relationship, the results have contributed theoretically to literature. Furthermore, several practical implications can be derived from these results. First, the results have proven that the relationship between stock markets differs from one economy to another. Second, this will help investors accurately select a well-diversified portfolio. It is important to understand the relationship between stock markets as it will help in efficiently diversity international portfolio. Since Egyptian stock market is not directly affected by the fluctuations in Standard and Poor 500, it can be a signal to international portfolio managers that the Egyptian capital market represents a good opportunity for international diversification especially with a growing evidence of the integration of the international markets.

The results of this research is supported by the data collected form the (World-Bank, 2016) as the negative impact of the financial crisis which was described former president of the United Stated Barak Obama as the Great Depression (Schwert, 2011). Keeping in mind the results of this research and the high resilience of the Egyptian stock market during the financial crisis, it will be a great addition to any international portfolio.

It is not enough that the Egyptian stock market is not affected by international markets to attract investors, Barakat et al. (2016) argued that Egyptian government also needs to regulate the stock market efficiently as this will attract foreign investment and enhance the local currency value. The authors added that there are other factors that affect Egyptian stock market fluctuation such as macroeconomic variables and other stock markets in the region, further investigation regarding the Egyptian stock market and other markets will further enhance portfolio returns.

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