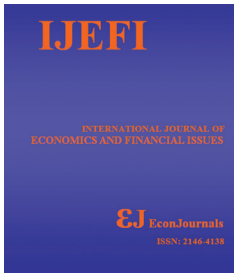

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Financial Markets Integration: Appraising the Developed and Emerging Markets Nexus

Adegbemi Babatunde Onakoya[1]*, Adedotun Victor Seyingbo[2]

[1]Department of Economics, Banking and Finance, Babcock University, Ilishan Remo, Nigeria, [2]Development Agenda for Western Nigeria (DAWN) Commission, Nigeria. *Email: adegbemionakoya@yahoo.com

ABSTRACT

While many economists see financial globalization (financial markets integration) as critical to the development and strengthening of middle-income emerging markets, many have opined that financial integration carries huge risk that far outweighs potential benefits for most middle-income countries. This study therefore investigated the interdependence between emerging markets and developed markets. The study deployed the Diebold and Yilmaz methodological approach to investigate spill-over between markets. The research concluded that there exists interdependence between developed markets and emerging markets. The net benefits argument of financial markets held. Given increasing globalization none of the markets, whether developed or emerging is immune from the dynamics of global markets with consequential beneficial and deleterious impacts. The study recommended that emerging markets should institute reforms capable of enhancing a beneficial involvement in the global integration of financial markets. Macroeconomic reform is crucial if economies will benefit from financial markets integration. Exchange rate, inflation, fiscal deficits policies must be such that communicates macroeconomic stability, as this in turn suggests an investible territory to investors.

Keywords: Financial Markets Integration, Stock Market Spill Overs, Spill Over Index, VAR, Volatility Transmission
JEL Classifications: C13, C23, C81 E44, N20

1. INTRODUCTION

The importance of the emerging markets is becoming interesting especially as it stands as a platform for bridging global inequality gap (Hellebrandt and Mauro, 2015). While some authors see financial globalization (financial markets integration) as critically beneficial to the development and strengthening of middle-income emerging markets, some others argue that financial integration carries huge risks that far outweigh potential benefits for most middle-income countries (Basu et al., 2006; Mishkin, 2007; Stiglitz, 2002 in Kose et al., 2009).

Some other studies examine the impact of financial liberalization, perceived to be an element of financial integration (Bakaert et al., 2001; Westermann and Martinez, 2003). The analytical review by Agenor and Montiel (2008) argue for international financial integration and suggests net benefits from it. The mixed consequences of financial integration on the development of developing and transition economies in a global environment motivated series of studies (Bhattacharya et al., 2013; Schmukler, 2004; Martin and Rey, 2002). Indeed, some studies have ascribed the high vulnerabilities of emerging markets to financial markets disturbance to the prevalent weak financial, economic infrastructure and systems (Ozkhan and Unsal, 2012).

Financial markets integration appears to be the new normal and a current global reality, which cannot be jettisoned or trivialized. It will be interesting to examine if a scenario of big sharks (developed markets) swallowing small and growing sharks (emerging markets) is not playing out in the name of globalization. However, the study by Rejeb and Boughrara (2015) reports that emerging markets are both transmitters and receivers of volatility.

The question of interest to be answered is whether the emerging countries are net beneficiaries or otherwise of this phenomenon. It would also be interesting to explore the spill over returns between these markets. Indeed, the issue arises as to the greater beneficiary

during financial crises. Indeed, are the globalization risks are important enough to outweigh the benefits.

Recent episodes of financial crises following the global liberalization of financial markets make it imperative for this study to be, conducted. This study therefore examines the interdependence between emerging markets and developed markets by investigating the stock market asset class of some countries. These are seven emerging countries (Brazil, China, South Africa, Chile, Indonesia, India and Turkey) and five developed markets (United States, Canada, Japan, Australia and Switzerland). The study, which utilized monthly data, covers a 17-year period from 2003 to 2015. This period incorporates the latest global financial crisis of 2009.

To achieve this objective, the paper is organized thus: The first part of this paper dealt with introduction. Section two covers the theoretical underpinning of the study and the review of existing literature. Section three presents the methodology. The empirical findings and discussion thereon are covered in section four. The final section contains the conclusions drawn and the proffered recommendations.

2. LITERATURE REVIEW

This section is in two parts: The theoretical underpinning of the study and the review of relevant prior works.

2.1. Theoretical Underpinning

There are quite a number of theories underlining the concept of financial markets integration. They cover the interdependence between the markets and basis of the interactions of market within and beyond national boundaries. A short exposition on two complementary theories is presented: The Neo classical growth framework and the international risk diversification theory.

The theoretical framework for analyzing increased investment (domestic and foreign) which engenders financial integration is, hinged on the neoclassical growth theory, which is, also predicated on the relationship between growth, capital and labor. In this respect the capital arbitrage theory propounded by Samuelson (1948) encourages Foreign Direct Investments (FDI) since international ventures seek higher profit across the clime. Indeed, Lucas (1988) accentuates the prediction of neoclassical framework that capital should flow from industrialized to developed countries given the lower marginal labor productivity, lower wages and a higher marginal product of capital in the developing countries.

The proposition of Frey and Volz (2011) states that differences in marginal product of capital across regions is due in part to the spatial differentials in quantity and quality of capital stock. This in a way explains the evolvement of financial markets integration and the transmission of benefits therefrom. This however, is not restricted to capital, but also applies to the quality of labor. Although, the theory indirectly establishes the desirability of financial markets integration, literature shows that there are cases of departure in theoretical expectations. This is captured by Frey and Volz (2011) and Kose et al. (2009) as threshold conditions. They contend that a certain "threshold" levels of financial and institutional development is required before an economy can obtain the full benefits and lessen the risks of dilution of its capital account.

Mishkin (2007) addresses the nature of the influence of financial integration on growth by. He posits that financial integration directly and indirectly propels macroeconomic growth. On the direct influence of financial integration, Frey and Volz (2011) advanced four direct benefits: Increased domestic investment, spill-over effects of FDI, consumption smoothing and international risk sharing. In the discourse on financial globalization. Kose et al. (2011) are of the opinion that the impact dynamics of the financial integration on an economy derives from the neoclassical tradition. This theoretical exposition aligns with the consumption smoothing theory, and indeed fuels agitation for financial markets integration. This is in concert with the international risk diversification theory.

Classical portfolio theory assumes a typical investor is risk-averse. This means that although an average investor may be willing to accept some form of risk, he may not want to bear unnecessary risk. In effect, an investor may find the need to diversify risk as much as possible including investing in foreign markets. The case for international diversification is bifurcated. These are the potential risk reduction gains of holding international assets, and the potential additional foreign exchange risk. This, as propounded by Markowitz (1952) is in line with the standard mean-variance theory, a mathematical framework for assembling a portfolio of assets to achieve maximum expected returns for a given risk level. The international diversification in the opinion of Basu et al. (2006) should therefore produce benefits for an investor due to the reduction in the potential risk as evidenced by low correlations between stock markets in different countries. The internalization of portfolio investment is, however bedevilled by other risks including currency risk and portfolio (beta) risk.

The consequential essence of the theories, as identified by Sullivan and Sheffrin (2003) is diversification effect. The allocation of capital lessens the exposure to any one particular asset risk. It also reduces the volatility level by financing a variety of assets. The diversified investment portfolio will, if the assets prices do not change symmetrically result in less variance than the weighted average variance of its constituent assets. This should result in less volatility than the least volatile of its constituents.

2.2. Review of Empirical Literature

There are conflicting conclusions drawn up in the literature on the net benefit case for financial integration by emerging countries. Potential welfare gains and growth possibilities emanating from international risk sharing was found by Obstfeld (1994) to be large and sometimes permanent. This has been ascribed to the access to world capital markets, which allows countries to borrow from rich countries in order to smoothing consumption in the face of unfavorable shocks. However, Agenor (2003) presented contrarian evidence to the effect that international financial integration during the 1980s and 1990s followed by an increase in consumption volatility relative to output volatility. Another angle was presented by Albuquerque (2003), who contends that FDI as against portfolio

investment flows tend to be less volatile. Evidence of a positive link between the index of capital account openness and growth, was provided by Edison et al. (2002), using various empirical measures to gauge the presence of controls on capital account transactions and the liberalization of equity markets for middle-income countries. This however was not to be applicable to the poor countries.

In determining the linkages between developed and emerging markets, empirical findings on financial markets integration Kharchenko and Tzvetkov (2013) estimate volatilities and spill-over effects between developed and emerging market economies, using a generalized Autoregressive Conditional Heteroskedasticity (C-GARCH) (1,1) model. This method which distinguishes between short term (transitory) and long term (permanent) conditional variance and find evidence that volatility moves in a uni-directional way from the developed to emerging markets. The finding is in consonance with the result obtained by Al-Zeaud and Alshbiel (2012) who submit that that conditional variances and returns of other regional markets are in fact, influenced by happenings in matured markets.

The spill-over effect from dominant market to smaller market was also of interest in the literature. Hamao et al. (1990) used daily and intraday data from Japan (Nikkei 225), UK (FTSE 100) and USA (S and P 500) for 3 years (from April 1985 to March 1988) and reports significant effect from USA and UK capital market to Japan. No significant spill-over effect from Japan capital market to USA and UK was however found. Similar result was, reported by Abou-Zaid (2011) on the international transmission of daily stock index volatility from U.S. and U.K to selected MENA emerging markets. By employing a Multivariate GARCH model (M-GARCH) in mean technique, the research concludes that the U.S. stock market significantly influenced the Bourses in Egypt and Israel, but had no impact on Turkey. In the same vein, Le and Kakinaka (2010) using daily data from January 2005 to December 2007, report the transmission of mean return and volatility from US, Japan, and China stock market in the direction of Indonesia and Malaysia stock markets by adopting the GARCH model.

In establishing whether correlations among markets vary based on tranquil or crises periods, Kenourgious et al. (2007) examines the relationships between the developed markets of the US and UK with the emerging Brazil, Russia, Indonesia and China (BRIC) markets. The research reports an increase in the correlations and volatilities during crises periods relative to tranquil periods. This implies that countries with weak financial structure are penalized more during crises than their counterparts in mature markets. Using a GARCH model and multivariate co-integration tests Rejeb and Boughrara (2015) examine the volatility relationship between emerging and development markets in normal times and times of financial crises and report the existence of volatility transmission across emerging markets and their developed counterparts.

The research by Rejeb and Boughrara (2015) included the geographical proximity dimension to the amplification of the spill-over effect. A spatial dimension to financial spill-over was introduced by Edwards and Susmel (2003) who employ a multivariate SWARCH model to analyze interest rates volatility in selected emerging markets. The result concludes that volatility transmission tends to be similar in geographically separated regions. Similar results were reported by Beirne et al. (2009) who deploy tri-variate GARCH-BEKK models of returns in mature, regional emerging and local emerging covering 41 emerging markets economies to measure the volatility spill-over from mature to emerging stock markets.

The study by Borensztein et al. (1998); Berthelemy and Demurger, (2000) supports the pro benefit argument. They aver that financial markets integration provoke positive spill-over, which in turn impacts on the skills of host country's human capital. Other advantages include lower cost and introduction of new varieties of capital (Borensztein et al., 1998; Frey and Volz, 2011). However, Schmulker (2004) is careful to point out that in the long run, volatility (resulting from financial markets integration) tends to decrease following liberalization and integration with world markets. Potential volatility tends to occur in the short run, in most cases after liberalization.

To sum up, empirical literature reviewed supports the existence of interdependence between most emerging markets and that of developed countries. The direction of benefit is however not consistent.

3. METHODOLOGY

3.1. Data and Data Sources

As submitted by Gatfaoui (2012) and Kharchenko and Tzvetkov (2013), stock indices are strong market indicators and their subsequent returns can show direction of markets. This study analyzed data on monthly returns and volatilities of 12 stock markets, 7 from emerging countries and 5 from developed economies. The major national index as presented in the World Federation of Exchanges (WFE) was chosen to represent each country. The list of exchanges and their respective broad market indices is presented in Appendix Table 1.

Monthly data of the stock indices were taken from the WFE database. Volatility and returns data were computed using the formulae in equation 2 and 3. The total number of observations in the period covered in the study is 155 for each index, making it 1860 observations in total. The sample period covers January 2003 to November 2015.

3.2. Model Specification

The framework for measuring volatility spill-overs is the vector autoregressive (VAR) and its variants including vector error correction model, structural VAR and structural error correction, multivariate GARCH and VARMAR-GARCH models. These have been employed by researchers; Diebold and Yilmaz (2009; 2012), Manex (2011), Conefrey and Cronin (2013), Louzis (2013). Indeed, Salisu and Isah (2015) applied the VARMA-AMGARCH method, a variant of VAR models which allows for the joint estimation of returns and volatility spill-overs shocks.

Specifically, the study employs the method developed by Diebold and Yilmaz (2012), an extension of the Diebold and Yilmaz (2009) model which version allows for the measurement of directional spill-overs in a generalized VAR framework. The new approach, Diebold and Yilmaz (2012), has the advantage of allowing for the computation of net pairwise spill-overs which is more suitable for examining the net benefit of financial integration to emerging markets. The variance decompositions also allows for the aggregation of spill-over effects across markets, thereby compacting a wealth of information into a single spill-over measure.

In measuring volatility, Diebold and Yilmaz (2012) proposes:

$$\sigma_t^2 = 0.361[\ln(P_t^{max}) - \ln(P_t^{min})]^2 \quad (1)$$

Where,

σ_t^2 = volatility

$\ln P_t^{max}$ = Natural log of minimum securities prices

$\ln P_t^{min}$ =Natural log of minimum securities prices

However, due to the bleak likelihood of obtaining high and low values for the data, the general GARCH measure (in equation 2) should suffice and will be adopted as a measure of volatility:

$$\sigma_t^2 = \omega + \alpha\beta_{t-1}^2 + \rho\sigma_{t-1}^2 \quad (2)$$

Returns will be measured using the formula below:

$$r_t = 100^* \Delta\ln(P_t)$$
$$=100^* \ln(P_t) - \ln(P_{t-1})$$
$$=100^* \ln(P_t/P_{t-1}) \quad (3)$$

Where,

r = returns on security
P = price of security

3.3. Model Estimation Procedure

The study employs multi-prong procedural steps. The pre-estimation phase, using E-views software consists of the preliminary evaluation of the data using the descriptive statistics method in order to help show, describe and summarize the data in a meaningful way. This also affords the opportunity to know if the data are normally distributed and the trend of direction.

The second step of the pre-estimation phase is the conduct of unit root test in order to test for stationarity of the series. There are quite a few number of panel data unit root tests based on the auto regressive AR(1) process: γ that lend themselves to veritable use, these are: Maddala and Wu (1999), Choi (2001), Edison et al. (2002), and Im et al. (2003). These tests are generally

$$\propto_{it} = \delta_i + \beta_{it} + \theta_i\gamma_{it-1} + \mu_{it} \quad (4)$$

Where,

t = 1,…, T is the number of periods and i =1,…, N = number of countries.
β_i is an individual trend.
δ_i is the country specific fixed effect.
θ_i is an autoregressive coefficient.
μ_{it} is the error term.

The test of the existence of a unit root in γ_{it} is if/θ_i/=1. Panel unit root tests are, classified broadly into two based on their assumptions concerning whether θ_i is constant or varying.

In the estimation phase, the first step is the calculation of the returns and volatilities. The final step being the computation of spill-over indices (total, directional, net pairwise) using RATs software. The final exercise is the post estimation phase where the robustness and validity of the results are determined.

4. EMPIRICAL RESULTS

4.1. Descriptive Statistics

The summary of the statistics used in the study is presented in Table 1. The notable difference between the mean value and the maximum value across all countries suggests some form of volatility in returns.

The standard deviation of returns in the Table 1 also explains that volatility experience amongst markets surveyed is similar, except for Japan with a standard deviation of 51.55. The least was recorded by Chile, with 37.18. On average, returns from stock market as shown in the Table 1 do not appear to be volatile.

On average, given the standard deviation in Table 2 all the markets experienced great volatility as depicted in the graphs (Appendixes Figures 1 and 2) in 2014 and 2015. There are signs of volatility experience by most countries in the 2008-2009 period, reflecting countries' experience during the global financial crises

Table 1: Descriptive statistics- stock market returns

Variables	AUS	BRA	CAN	CHL	CHN	INA	IND	JPN	RSA	SWI	TKY	US
Mean	0.37	0.92	0.47	0.84	0.25	1.58	1.44	0.46	1.13	0.69	1.25	0.49
Median	1.20	0.77	1.06	0.60	0.70	2.56	1.61	0.73	1.39	1.18	1.36	1.19
Maximum	366	341	359	341	345	361	364	385	346	327	350	353
Minimum	−174	−170	−175	−172	−176	−181	−178	−181	−169	−171	−172	−173
SD	42.37	38.82	39.33	37.18	48.17	44.07	41.78	51.55	39.83	39.00	42.41	39.19
Skewness	4.31	3.96	4.13	4.00	3.50	4.00	3.93	4.11	3.81	3.50	3.83	4.13
Kurtosis	44.97	45.64	51.02	51.68	33.89	40.20	44.02	38.42	43.46	39.76	39.09	49.22

Source: Author's Computation, AUS: Australia, BRA: Brazil, CAN: Canada, CHI: Chile, CHN: China, INA: Indonesia, IND: India, JPN: Japan, RSA: South Africa, SWI: Switzerland, TKY: Turkey, US: United States of America

of 2007-2008. Turkey, Brazil, United States, South Africa, India, Chile, Switzerland and Canada all show evidence of volatility all through the period considered in the study.

Both the stock market returns and market volatility for all the countries considered (developed and emerging) are positively skewed, indicating that their tails are longer of fatter on the right side of the probability density function. The kurtosis values for the returns and volatilities of all indices follow the leptokurtic distribution as they shows values far above the threshold of three. The deduction from these properties (Skewness and kurtosis) is that the data are not normally distributed.

4.2. Unit Root Test

As discussed in the preceding section, in order to determine the stationary of the series, the Augmented Dickey-Fuller (DF) and Elliot-Rothenberg-Stock DF-GLS are employed in this study. The result of the unit root test is presented in Table 3.

The nature of the series (computed returns and logged volatilities) suggests that the series are stationary. The result shows that the computed returns and volatilities series are stationary at levels. The implication of this is that the series exhibit mean-reversion tendencies and are thereby suitable for analysis.

4.3. Estimation Results

The results of the estimation are presented in two broad parts: (a) Market returns and (b) market volatility. These are each further decomposed into and reported in the subsequent sub-sections as (i) total spill-over, (ii) directional spill-over and (iii) net spill-over matrix.

4.3.1. Estimation results of market returns

The result of the full sample of total spill over matrix for stock returns is presented in Table 4. The spill-over table provides an approximate "input-output" decomposition of the total spill-over.

4.3.1.1. Total spill-over of market returns

From the result, the total returns spill-over index amongst the twelve countries is the value 89.60%. In effect, about 90% of the total variance of the forecast errors during the sample is explained by shocks across countries. The idiosyncratic shocks amounted to only 11.40%.

4.3.1.2. Directional spill-over of market returns

The pairwise directional market return spill-over is captured by the off-diagonal elements in the upper-left 12 × 12 sub-matrix. The highest pairwise returns spill-over of 11.3% run from China

Table 2: Descriptive statistics - stock market volatility

Variables	AUS	IND	CAN	CHL	RSA	BRA
Mean	2,769.14	2,235.89	2,695.03	5,052.63	2,894.96	3,217.35
Median	402.47	360.47	239	60.91	36.99	74.24
Maximum	123,683	100,264	174,349	387,083	187,586	225,859
Minimum	390	336	10	6	10	13
SD	12,242.40	9,494.36	14,997.10	33,251.50	16,615.80	20,066.70
Skewness	7.48	8.02	10.09	10.28	9.45	9.52
Kurtosis	67.19	77.65	114.03	116.14	102.1	102.08
Variables	**TKY**	**INA**	**JPN**	**USA**	**SWI**	**CHN**
Mean	2,039.07	2,752.99	4,267.84	2,053.22	3,129.39	29,834.40
Median	933.55	546.49	1,136.72	214.83	506.53	548.94
Maximum	65,650.10	90,500.20	137,356.00	108,335.00	158,848.00	1,369,504.00
Minimum	10.44	439.95	1,115.52	207.08	2.8	40.43
SD	6,519.55	10,143.00	15,952.90	9,889.13	14,470.60	157,637.00
Skewness	8.17	6.16	6.53	8.71	8.77	7.42
Kurtosis	73.32	45.23	47.46	89.76	90.41	60.34

Source: Author's Computation, AUS: Australia, BRA: Brazil, CAN: Canada, CHI: Chile, CHN: China, INA: Indonesia, IND: India, JPN: Japan, RSA: South Africa, SWI: Switzerland, TKY: Turkey, US: United States of America

Table 3: Unit root test for returns and volatilities variables

Returns variables			Volatilities variables		
Variables	**DF-GFS (levels)**	**Decision**	**Variables**	**DF-GLS (levels)**	**Decision**
RBRA_Ibovespa	−7.14***	I (0)	VOL_BRA_Ibovespa	−2.65***	I (0)
RUS_NYSE	−15.68***	I (0)	VOL_US_NYSE	−7.98***	I (0)
RCAN_SP_TSX	−9.80***	I (0)	VOL_CAN_SP_TSX	−5.85***	I (0)
RAUS_Ord	−14.41***	I (0)	VOL_AUS_Ord	−7.50***	I (0)
RIND_BSE	−8.86***	I (0)	VOL_IND_BSE	−7.65***	I (0)
RINA_JSX	−8.73***	I (0)	VOL_INA_JSX	−6.57***	I (0)
RCHL_IGPA	−16.34***	I (0)	VOL_CHL_IGPA	−5.39***	I (0)
RJPN_Main	−12.18***	I (0)	VOL_JPN_Main	−7.57***	I (0)
RCHN_SSE	−9.62***	I (0)	VOL_CHN_SSE	−10.47***	I (0)
RTKY_ISE	−7.83***	I (0)	VOL_TKY_ISE	−5.05***	I (0)
RRSA_FTSE	−15.59***	I (0)	VOL_RSA_FTSE	−4.89***	I (0)
RSWI_SMI	−14.84***	I (0)	VOL_SWI_SMI	−5.52***	I (0)

Source: Author's Computation, ***denotes significance at 1% level of significance

to Japan and from South Africa to Turkey. This is followed by the spill-over returns from Japan to China (11.2%) while Turkey to South Africa stood at 9.3%.

Reviewing the directional spill-over of returns from the matured market of the United States of America, the average to most emerging countries averaged of 9.5%. Whereas India and Indonesia receiving the highest of spill-over of 9.6%, Turkey receiving the lowest impact of 8.8%. Next to the USA, is Canada with contagious spilling of returns over to the emerging countries under study. South Africa recorded the highest at 9.8%, followed by Brazil and Chile at 9.7%. The least of market returns spill-over from Canada was received by China.

The geographical proximity dimension of the spill-over effect as reported by Rejeb and Boughrara (2015) was corroborated by this study. Australia impacted countries in the Australian-Asian sphere more intensely as depicted by: Indonesia (10.1%), China (10.8%) and India (9.4%). Amongst the developed markets, USA and Canada spilled the most of returns to others (103 points), with more emerging countries receiving more. Japan distributed the least of returns to others (78 points), Australia and Switzerland (100 points). As for the directional spill-over received from others, 8 countries (USA, Canada, India, Indonesia, Chile, Australia, South Africa and Switzerland) got the highest at 90 points, with 4 of them in the category of emerging countries covered in the study. China, Japan and Turkey received the least at 88 points.

4.3.1.3. Net spill-over matrix of market returns

The result of the net benefit of financial integration with regards to stock markets returns is presented in the last row in the table. Most of the developed markets were net transmitters of stock market returns to other countries: United States (13 points), Canada (13 points), Australia (10 points) Switzerland (10 points). Japan (−10 points) was the only exception. The result for emerging countries was mixed. Indonesia (8 points), Chile (7 points) and India (12 points) were net transmitters. The others were net receivers of stock market returns: Brazil (−18 points), China (−10 points), Turkey (−24 points), and South Africa (−9 points).

4.3.2. Estimation result of market volatility (shocks)

The result of the estimation result of market volatility (shocks) is presented in Table 5.

4.3.2.1. Total spill-over of market volatility (shocks)

The full sample of total spill over matrix for market volatility shows that 86.9% represents the total volatility spill-over index was amongst the twelve countries under study. In effect, only 13.10% were accounted for by idiosyncratic shocks.

4.3.2.2. Directional market volatility spill-over

The pairwise directional spill-over (the off-diagonal elements of the upper-left 12 × 12 sub-matrix) explains the bi-directional contribution of volatilities among markets. As shown in the Table 5, the highest observed pairwise volatility spill-over was from South Africa to Brazil (20.3%) and Turkey (19.8). This is followed closely by the volatility measure from Brazil to Turkey (18.1%) and to South Africa (16.3%). The least of volatility spill-over is recorded from Brazil to Japan (0.2%).

A review of the relationship between developed and emerging markets, all the developed markets generate the most of volatility as a bloc - Canada (107 points), United States (106 points), Switzerland (106 points), Australia (105 points) and Japan (103 points). Half of the six emerging markets studied generate low spill-over (Turkey, 61 points, Brazil, 89 points and South Africa, 98 points). The other half Chile, Indonesia, India and China ranks amongst top volatility spillers with 114, 104, 103 and 103 respectively.

With respect to the impact of developed market to the emerging ones, Indonesia and China received the highest of volatility from the United States stock market (10.9%), while both countries

Table 4: Spill-over matrix: Stock market returns January 2003-November 2015

	BRA	USA	CAN	AUS	IND	INA	CHL	JPN	CHN	TKY	RSA	SWI	Directional from others
BRA	10.7	9	9.7	7.4	8.7	6.9	10.1	4.3	4.5	10.1	10.8	7.8	89
USA	6.5	9.7	9.6	9.3	9.5	9	9.1	7.4	7.4	5.8	7.5	9.3	90
CAN	7.1	9.6	9.7	9	9.3	8.7	9.3	6.8	6.8	6.5	8	9.1	90
AUS	5.2	9.6	9.3	10	9.6	9.7	8.5	8.7	8.7	4.5	6.3	9.8	90
IND	6.3	9.6	9.5	9.4	9.9	9.2	8.9	7.6	7.5	5.8	7.2	9.3	90
INA	4.9	9.6	9.2	10.1	9.7	10.2	8.3	9.1	9	4.2	5.9	9.8	90
CHL	7.9	9.5	9.7	8.6	9.2	8.2	9.8	6.1	6.2	7.3	8.7	8.9	90
JPN	3.1	9.5	8.6	10.9	9.7	11.1	7.3	11.7	11.3	2.5	4.1	10.4	88
CHN	3.3	9.5	8.6	10.8	9.5	10.8	7.4	11.2	11.6	2.6	4.4	10.3	88
TKY	11	8.8	9.6	7	8.7	6.5	10.1	3.9	4	11.5	11.3	7.5	88
RSA	9.7	9.2	9.8	7.8	8.9	7.3	10	4.7	4.9	9.3	10.5	8.1	90
SWI	5.6	9.6	9.4	9.7	9.5	9.4	8.7	8.2	8.2	5	6.7	9.9	90
Directional to others	71	103	103	100	102	97	98	78	78	64	81	100	Total spill-over index
Directional including own	81	113	113	110	112	107	108	90	90	75	91	110	89.60
Net directional spill-over	−18	13	13	10	12	7	8	−10	−10	−24	−9	10	

Source: Author's Computation, AUS: Australia, BRA: Brazil, CAN: Canada, CHI: Chile, CHN: China, INA: Indonesia, IND: India, JPN: Japan, RSA: South Africa, SWI: Switzerland, TKY: Turkey, US: United States of America. (i) The off diagonal column sums labeled "directional to others" or the row sums labeled "directional from others," are the "to" and "from" directional spill-over, (ii) the with the "from minus to" differences computed as the net spill-over, (iii) the total spill-over index appears in the lower right corner of the spill-over table

Table 5: Spill-over table, stock market volatilities January 2003 - November 2015

	BRA	USA	CAN	AUS	IND	INA	CHL	JPN	CHN	TKY	RSA	SWI	Directional from others
BRA	18.5	4.9	8.2	2.9	3.1	2.7	17.9	2.8	2.7	12.4	20.3	3.5	81
USA	4	10.1	9.2	10.5	10.4	10.5	6.9	10.3	10.4	2.8	4.4	10.5	90
CAN	8.6	8.7	9.4	7.9	8.1	7.7	11	7.4	7.5	5.9	9.5	8.3	91
AUS	1.5	10.7	8.9	12	11.6	12.1	4.6	12.1	12.1	1.1	1.6	11.7	88
IND	2.3	10.5	9	11.5	11.2	11.6	5.3	11.5	11.6	1.6	2.5	11.3	89
INA	0.7	10.9	8.7	12.5	12	12.6	3.7	12.7	12.7	0.6	0.8	12.1	87
CHL	14.5	7.5	10.8	4.3	5	3.6	17.4	2.7	3	9.9	15.9	5.4	83
JPN	0.2	10.8	8.2	12.9	12.3	13.2	2.7	13.6	13.5	0.1	0.2	12.3	86
CHN	0.7	10.9	8.7	12.5	12	12.7	3.7	12.8	12.8	0.5	0.8	12.1	87
TKY	18.1	4.5	7.2	3.4	3.3	3.4	16.6	3.9	3.6	12.6	19.8	3.7	87
RSA	16.3	6.1	9.2	3.8	4.1	3.4	17.3	3.1	3.2	11	17.9	4.7	82
SWI	4.1	10.1	9.3	10.4	10.3	10.4	7.2	10.1	10.2	2.8	4.5	10.4	90
Directional to others	71	96	97	93	92	91	97	90	91	49	80	96	Total spill-over index
Directional to others including own	89	106	107	105	103	104	114	103	103	61	98	106	86.80
Net directional spill-over	−10	6	6	5	3	4	14	4	4	−38	−2	6	

Source: Author's Computation, AUS: Australia, BRA: Brazil, CAN: Canada, CHI: Chile, CHN: China, INA: Indonesia, IND: India, JPN: Japan, RSA: South Africa, SWI: Switzerland, TKY: Turkey, US: United States of America

transmitted (10.4%) in return. The least receiver from United States is Turkey (4.5%). The result shows that volatility shocks in emerging markets upset Canadian stock markets more, while shocks in the Canadian market explain shocks in countries in the emerging markets more, explaining the state of markets integration between Canada and emerging markets.

The geographical proximity effect is also manifested in the high volatility spill-over between Chile and Brazil, both in the American continent. Japan received the highest of volatility spill-over from China (13.5%), Indonesia (13.2%) and India (12.3%). Australia (a developed market) contributed more to the volatility of stock markets in Japan (12.9%), China and Indonesia (12.5%) and India (11.5%). This is however contradicted by the reported values of directional volatility spill-over from Japan to Indonesia and China is (12.7%), to India (11.5%) and Turkey (3.9%).

On average, other emerging countries covered in the study received volatility spill-over around (8.5%). The extent of exposure of most emerging markets to shocks from others is within range of about 82-89 points. Chile receives the least of shocks transmitted from other markets (82 points) in the category of countries studied.

4.3.2.3. Net spill-over of market volatility

The net benefit of financial integration with regards to stock markets returns as calculated is presented in the last row of the Table. All the developed markets were transmitters of net profit benefits with United States, Canada, and Switzerland recording the highest 6 points each.

The net benefit transmission is not confined to the developed market. Chile recorded (14 point) to lead the whole pack. Other net transmitters of stock market volatilities were Indonesia, China and India (3 points each). However, the rest of the emerging markets were net receivers of stock market volatilities: Brazil (−10 points), Turkey (−38 points), and South Africa (−2 points).

4.4. Discussions of Findings

The result presented above (Table 4) explains that returns spill-over are generated from developed markets more than they are in emerging markets. While the transmission of shocks between developed and emerging markets appears to be generated and suffered evenly by both markets, for example, Canada generates about (107 points) - directional spill-over measurement index, while it receives the highest of 91 points from other markets, with emerging markets spilling more volatilities into the market. With respect to stock markets returns spill-over, United States is found to generate more than it contributes volatility of shocks to other countries, same was observed in the case of Canada, whereas, countries like Indonesia contributed less returns to stock markets in other countries than they generated volatilities spill-over to other countries.

Interestingly, the result also found high integration among Asian markets – India, Japan, China, Indonesia and their immediate neighbor continent, Australia. This is quite interesting as it also reveals that countries in the Asian continent – China, Indonesia, India and Japan contributed the most of volatilities spill-over to other countries in the focus of this study. The fact that the Asian economy plays host to two of the BRIC nations and has the most emerging nations looks to justify this scenario. This corroborates the finding of by Rejeb and Boughrara (2015). Indeed, the findings of Yarovaya et al. (2016) who contended that financial markets are more susceptible to domestic and region-specific volatility shocks than to inter-regional contagion gives fillip to this position.

With respect to net benefit argument, apart from Japan - the only developed market reported to be a net-transmitter of returns spill-over to other countries, four of the emerging markets - Turkey, South Africa, China and Brazil are reported to be net receivers of returns. This is quite instructive, and supports the argument of the net-benefit of financial markets integration. Indeed, more returns are generated from developed markets, which are then

spilled into emerging markets. The event of flow of capital from developed markets into emerging markets better captures this argument. The beneficial consequence arising from capital inflow to emerging markets was that businesses were empowered with greater capacity to expand their businesses, make more profit, thereby leading them to declare more dividends. This upholds the neo classical growth framework as earlier explained by Frey and Volz (2011).

This study also finds the extent and nature of openness of the markets appears to have a positive effect in support of the findings of Niroomand et al. (2014). The countries in the emerging markets category which are net-receivers of shocks and volatilities from other markets - Brazil, Turkey and South Africa, leaving out Chile, India and China appears to be more open.

The findings from the result of this study also reveal that emerging markets are more susceptible to the dynamics in developed markets, why developed markets are less susceptible to dynamics in emerging markets. Also is the fact that during the period of volatility, emerging markets suffer more than developed markets, an occurrence that in fact communicates the need to design and devise shocks-absorbing or shocks-fencing models or designs for emerging markets. Indeed, emerging markets receive more volatilities than developed markets during bad times, with the exception of the three Asian markets studied. This is in line with the findings of Kenourgious et al. (2007) which examines the relationships between the developed markets of the US and UK with the emerging BRIC markets.

This study is also in consonance with the conclusions drawn by Prasad et al. (2015) that the larger stock markets from the advanced western economies, particularly the US, dominate volatility transmission to other markets. However, this research departs from the position taken by Prasad et al. (2007) that emerging markets such as China, India and Brazil are still relatively isolated since India and China ranks amongst top volatility spillers.

In summary therefore, the net-benefit proposition of financial markets integration is affirmed in this study, but conditional on the existence of solid financial market infrastructure and openness. The net directional spill-over index between emerging markets and developed markets provide insight to the net-benefit proposition of financial integration. If indeed, develop markets contribute more returns to emerging markets during good times, then financial markets integration is beneficial. The study finds this to be in the affirmative.

5. CONCLUSION

Literature reviewed in the study establishes the rather inconclusive nature of the argument in regarding the integration of the financial markets in both the developing and emerging economies. The theoretical underpinnings of the study and the empirical review of previous studies are suggestive of the inherent benefits and deleterious nature of the financial markets. Recent episodes of financial crisis following the global liberalization of financial markets explains the imperative for this study.

The study, using the methodological approach developed by Diebold and Yilmaz (2012) to investigate the spill-over between the markets attempted to further explain the net benefits argument of financial markets integration for emerging markets. This approach permits the computation of the total spill-over index, directional and net-directional spill-over index.

The research concludes that there exists interdependence between developed and emerging markets due to the increasingly globalized economies. Indeed, none of the markets, whether developed or emerging is immune from the dynamics in either markets. The implication of this being that good and bad news in one market has a potential to affect activity in another market.

Emerging markets lose more in period of bad news (shocks) than developed markets. This in a way aligns with consensus that developing and emerging markets will benefit more if their financial infrastructure and system are more matured to handle booms and burst in global markets. Developed markets, though less susceptible to volatility spill-over share less in the returns spill-over in the financial markets integration arrangement. This conclusion explains why more researchers believe that financial markets integration benefits the emerging markets more.

Furthermore, given the relatively greater incidence of shocks arising from financial crises, the Asian markets have become more matured and become more immune from possible global shocks or volatilities. Another possible explanation for the performance of the Asian markets is the high level of financial integration similar to the Canadian and the United States markets. This in our opinion accounts for why none of the markets is reported to be a net-receiver of volatility spill-over.

The next industrializing countries - BRICS (Brazil, Russia, India, China and South Africa) arrangement may not be an effective platform for organizing markets integration. The supposition in some quarters is that the extent of relationship among the BRICS nations should lead to high level of integration among their markets. This hypothesis is not supported by the findings if this research. This is borne out of the fact that U.S.A stock market, which is globally well integrated, continues to dominate the global market with other markets. It is by accident of timing and geography the last of the daily markets. By this, the New York Stock Exchange for example, serves as the world anchor between the end of the day's market business and the beginning of the next day in Asia. The Brazilian Bourse, which is in the same time zone is not sophisticated integrated and matured enough to play this role.

The study recommends that emerging markets should institute reforms capable of enhancing a beneficial involvement in the global integration of financial markets. Due to the non-sticky nature of portfolio flows, which could expose emerging countries to crises, there is need for the authorities in the emerging markets to encourage more of "mortar and bricks" investment in form of FDI in concert with portfolio investment. This will help insulate emerging markets from the tendencies of capital flow reversals.

Furthermore, macroeconomic reform is crucial if economies will benefit from financial markets integration - exchange rate, inflation, fiscal deficits policies must be such that communicates macroeconomic stability. This in turn suggests an investible territory to investors. Indeed, while financial markets integration arrangement presents some exciting opportunities for economies, it predisposes developing and emerging economies alike to possible contagion and herding effect. To curtail this, efforts towards enhancing local production and higher level of local contents in the exportable materials should intensified and strengthened. Managers of economies should also exercise caution in their financial openness activities with economies observed to be capable of transmitting more shocks or volatilities than they receive, like China, Japan, India and Indonesia.

Finally, regional organizations and arrangements should work more towards creating incentives and policy directions capable of promoting regional financial integration. The Asian experience, which facilitated the surge of great economies in the continent, appears to be a workable model for other regional arrangements, and is recommended for the sub-Saharan Africa region.

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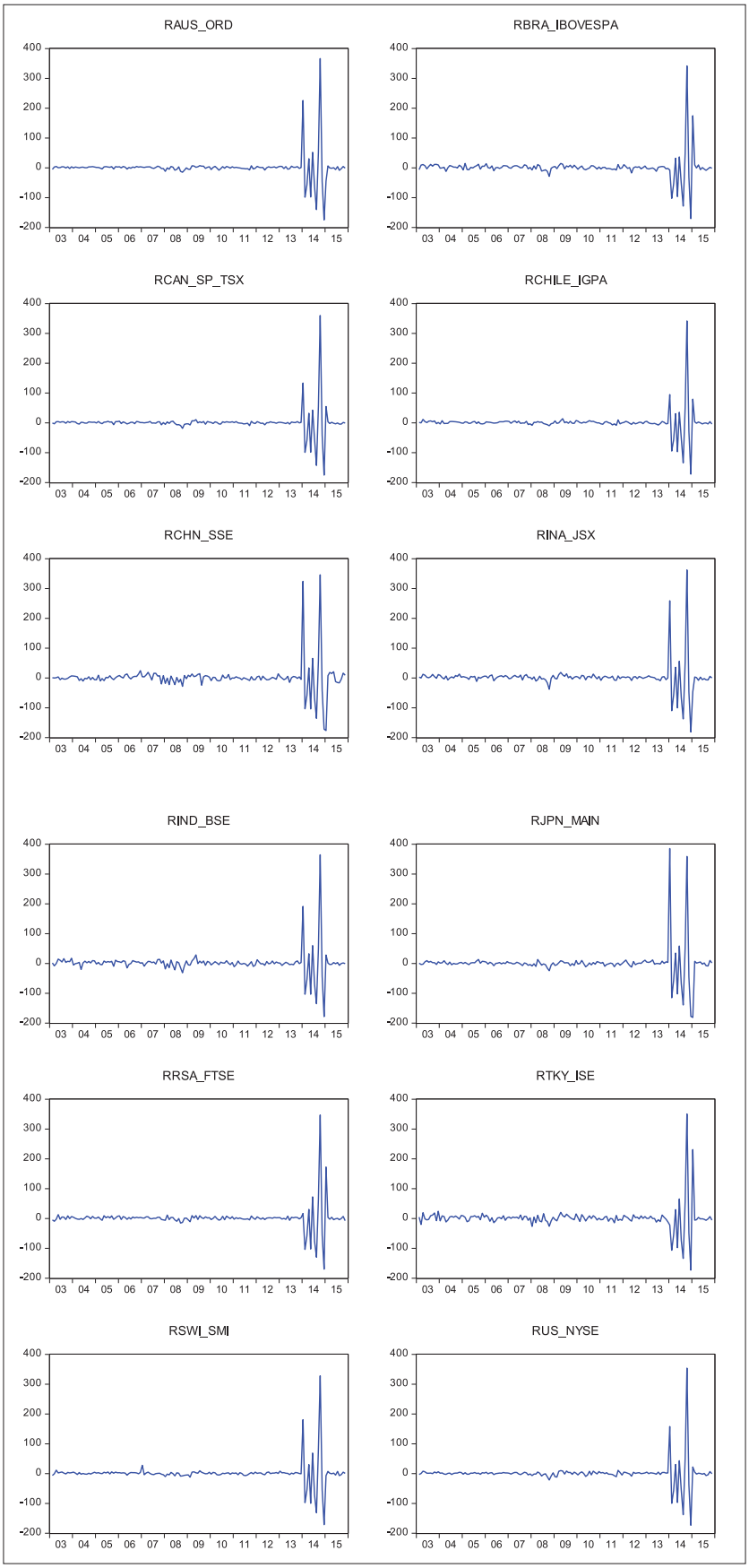
APPENDIX

Appendix Table 1: List of exchanges and their respective broad market indices used in the study

Country	Exchange	Name of index
Brazil	BM and FBOVESPA	Ibovespa
China	Shanghai stock exchange	SSE composite index
Chile	Bolsa de Comercio de Santiago	IGPA
Indonesia	Indonesia stock exchange	JSX composite index
India	BSE India Limited	S and P BSE 500
South Africa	Johannesburg stock exchange	FTSE/JSE all share
Turkey	Borsa Istanbul	ISE 100 index
The United States	NYSE	Composite
Australia	Australian securities exchange	All ordinary price
Canada	TMX group	S and P/TSX composite
Japan	Japan exchange group	Main market
Switzerland	SIX Swiss exchange	SMI

Source: Author's Compilation

Appendix Figure 1: Stock market returns of studied markets



Appendix Figure 2: Stock market volatility of studied markets