

Economic Integration and Stock Market Comovement: An Empirical Study Pairing Pakistan's Stock Exchange with 21 other Markets

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Abstract: Using daily stock returns from 2004 to 2014 for 21 countries paired with Pakistan, and using the Geweke methodology, the paper investigates the degree to which these stock markets are integrated with the Pakistani stock market. The paper also explores the factors that have an effect on the level of economic integration by applying fixed effect model. The result demonstrates statistically significant and high percentage of contemporaneous association between the 21 economies of the world and Pakistan. Greater comovement was observed between the equity markets during the period when Pakistani capital market and economy experience performance but less comovement was noted when Pakistan Stock Markets were under crises.

Keywords: Economic integration, Geweke methodology, Pakistani Stock Exchange, comovement.

1. INTRODUCTION

A circumpolar change can be witnessed after the first half of the twentieth century in all state of affairs including technology, politics, culture and economics. To safeguard their political and social interests both developing and developed countries continue to strive for economic strength. This drift has changed the economic and political scene of the globe. Thriving economic integration arrangements like EU in 1993, a resolute Abuja Treaty to integrate every square millimeter of African Continent by 2027 and a need felt by US for regional grouping by teaming up Canada and Mexico to form NAFTA are all parts of this struggle. Developing countries are not inactive in this regard either. Most of them have opted to be a member of some regional unions (like GCC, ECO, AMU, D-8 etc.) or another. However these cooperative arrangements between developing countries have so far not shown signs of any particular success. Poor industrialization policies, political instability, lack of infrastructure, lack of well developed institutions and low technological developments are considered as some of the root causes for low economic integration among developing countries (Raimi & Mobolaji, 2008). An imperative goal of all these regional unions is to boost the integration of economic markets of the member countries along with acquiring a more liberal share of international trade.

However, it is also argued that greater economic integration leads to augment comovement among the markets (Ciner, 2006)

We found several studies on linkages between stock markets (Awokuse, Chopra, & Bessler, 2009; Rua & Nunes, 2009). Despite presence of large volume of literature on international market comovement, virtually no work seems to have been done to investigate stock markets comovement with respect to Pakistan. This paper aims to determine the degree to which equity markets of Pakistan is integrated with equity markets of large economies of the world. The paper next looks at the level to which macroeconomic variables that are generally linked with economic integration explicate the adjustments in the degree of stock market integration between the paired countries. In other words, we aim to verify whether or not the economic integration and stock market integration go side by side.

The globalization of financial markets has an imperative impact on the performance of international portfolios and risk management. Investors are concerned with international diversification of risks. However, if financial markets are more closely associated during times of crisis, it will give rise to a greater need for diversification but comovement can curtail the opportunities for cross-border diversification. For supervisory bodies of financial markets, it is principally important to be aware of such associations because of the apparent increase in comovement among world financial markets.

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2. LITERATURE REVIEW

The topic of economic integration and comovement of stock markets has become an area of growing interest in recent times. Interest in stock market integration is based on the fact that a regionally integrated stock market is considered more efficient than individual country's capital market (Karim & Majid, 2010). With the help of supplementary cross country flows of funds, trading in individual securities can increase which can in turn enhance the liquidity at stock markets. Consequently, this can lower the cost of capital for companies looking for expansion and also decrease the transaction costs incurred by the investors. These views support a more optimal allocation of capital within the region (Click & Plummer, 2005).

Policy makers are concerned about comovements among equity markets because of their implications for the stability of the international financial system. Owing to the ripple effects from shocks at equity markets that disturb the international financial scene, the preparation of monetary policy is also influenced by international stock market developments. The global trend towards a bigger role of the stock market in the economy has made this sort of spillover more important (Berben & Jansen, 2005). Although comovement of stock markets is of fundamental importance for international investors, as they aspire for investing in a well diversified portfolio but finding a well diversified global portfolio is problematic because of the stylized verity that the international comovement of stock markets is not stable over time (Kizys & Pierdzioch, 2009). Lee and Jeong (2014) have indicated that the level of market integration between Europe and other global stock markets had temporally increased during the global financial crisis, however, the level returned to its pre-crisis level in the post-crisis era.

Likewise, economic integration provides an opportunity to investors, financial market regulators and portfolio managers to apportion capital to various locations to optimize their returns. The removal of cross border restrictions provides an opportunity to investors to take benefit of high returns and to minimize the portfolio risk with the help of international diversification. In addition to that, stock market development also picks up the pace with economic integration (Torre, Gozzi, & Schmukler, 2007). Economic integration is also used as a tool to stimulate economic growth (Moshirian, 2007). Some critics argue that economic integration may cause excess volatility in

the underlying stock market (Baea, Chanb, & Ngb, 2004; Jaleel & Samarakoon, 2009). But there is no consensus on this belief. Study by Umutlu, Akdeniz, & Salih (2010) shows that volatility is inversely related to level of economic integration. The results uphold even after controlling for liquidity, market development and country crises effects. Brooks & Negro (2004) propose that diversification atwart countries may not offer greater risk reduction as weigh against diversification across industries. From these findings it can be inferred that economic integration is bolstering the importance of global industry effects at the cost of country specific factors.

Globalization of trade and economic integration has both favorable and adverse effects on investors. The constructive side of globalization is the chance to diversify their assets globally, i.e. investors can trade their assets in a large number of stock markets with minimal inconvenience. In turn this facilitates them to take hold of interesting opportunities and hence augment their long run investment returns. However, in terms of risk management, the effect of economic integration is not so palpable. In fact, the impact in terms of diversification will be beneficial only to the level that globalization does not lead to an increase in the degree of comovement between international stock markets. This is so because of the reason that higher comovement implies lesser benefits from diversification (Brockman, Liebenberg, & Schutte, 2010). This is particularly true if liberalization has a propensity to increase stock market comovement during periods of financial downturn, exactly when the positive effects of diversification are most desired (Beine, Cosma, & Vermeulen, 2010).

3. METHODOLOGY

The paper examines the degree to which stock markets in the world are integrated with Pakistan's stock market. The paper also explores the intensity to which macroeconomic variables that are normally associated with economic integration elucidate the variation in the level of stock market integration. Since the strength of economic integration fluctuates over time for a given pair of countries, it is expected that equity market integration will also vary systematically. Methodology used by Johnson & Soenen (2002) and Johnson & Soenen (2003) is adopted in this paper.

To find integration of world's equity market with Pakistani Stock Exchange, Gweke measures of feedback are computed, by investigating data of

national equity markets for 21 countries (Australia, Austria, Belgium, Canada, China, Denmark, France, Germany, Hungary, India, Indonesia, Japan, Malaysia, Netherlands, Singapore, Korea, Spain, Sri Lanka, Switzerland, UK and US) paired with Pakistan. Time span for the analysis is 11 years, from January 2004 to December 2014. Closing stock prices on daily frequency are used, providing 62,876 observations. Geweke approach permits us to examine the degree of dependence. According to Geweke, the linear dependence of causality between two variables, say p and q can be measured as the sum of linear causality from p to q, linear causality from q to p and contemporaneous linear causality between p and q. Geweke's directional feedback measures are an extension of (Granger, 1969) definition of causality, but the contemporaneous component is a specialty introduced by Geweke's technique.

The model as proposed by Johnson & Soenen (2002) and Johnson & Soenen (2003) to calculate Geweke measures of feedback is given below.

GCMF $p \leftrightarrow q = (n) \ln \left[\frac{\sigma_{\mu p}^2 + \sigma_{\mu q}^2}{|Y|} \right]$ is distributed approximately χ^2 with 1 degree of freedom

GCMF $p \rightarrow q = (n) \ln \left(\frac{\sigma_{\mu q}^2}{\sigma_{\varepsilon q}^2} \right)$ is distributed approximately χ^2 with 5 degrees of freedom

GCMF $q \rightarrow p = (n) \ln \left(\frac{\sigma_{\mu p}^2}{\sigma_{\varepsilon p}^2} \right)$ is distributed approximately χ^2 with 5 degrees of freedom

Whereas GCMF $p \leftrightarrow q$ is a contemporaneous Geweke measure of feedback between country p and country q. Here p is used for Pakistan and q for other countries, n is the sample size. $\sigma_{\mu p}^2$ and $\sigma_{\mu q}^2$ are the variances of the residuals of the equations (1) and (2) respectively.

$$R_{pt} = \alpha'_o + \sum_{k=1}^{10} F'_k R_{pt-k} + \mu_{pt}; \text{Var}(\mu_{pt}) = \sigma_{\mu p}^2 \quad (1)$$

and

$$R_{qt} = \beta'_o + \sum_{k=1}^{10} H'_k R_{qt-k} + \mu_{qt}; \text{var}(\mu_{qt}) = \sigma_{\mu q}^2 \quad (2)$$

$|Y| =$ Determinant of covariance matrix. $Y = \text{Cov}(\varepsilon_{pt}, \varepsilon_{qt})$

$\text{Cov}(\varepsilon_{pt}, \varepsilon_{qt})$ is the covariance of the residual of equations given below

$$R_{pt} = \alpha'_o + \sum_{k=1}^5 E'_k R_{pt-k} + \sum_{k=1}^{10} F'_k R_{pt-k} + \varepsilon_{pt}; \text{var}(\varepsilon_{pt}) = \sigma_{\varepsilon p}^2$$

and

$$R_{qt} = \beta'_o + \sum_{k=1}^5 G'_k R_{qt-k} + \sum_{k=1}^{10} H'_k R_{qt-k} + \varepsilon_{qt}; \text{var}(\varepsilon_{qt}) = \sigma_{\varepsilon q}^2$$

Whereas $\sigma_{\varepsilon p}^2$ and $\sigma_{\varepsilon q}^2$ are the variances of the residuals of the above equations respectively. Daily stock returns in one country are treated as a function of the lagged return in another country's market and its own past returns. GCMF $p \rightarrow q$ is a unidirectional feedback measure from Pakistan to other countries and GCMF $q \rightarrow p$ is a unidirectional feedback measure from other countries to Pakistan.

Geweke (1982) developed measures of feedback based on log likelihood ratio statistics, which offer a basic measure of the degree of comovement. A rise (drop) in a Geweke measure, from time to time, reflects the extent to which there is an increase (decrease) in stock market integration for a given pair of countries. The Geweke Measures of Feedback (GMF) provide a more appropriate framework than the vector autoregression (VAR) model. The VAR approach is deficient in its failure to incorporate potential long-term relations and, therefore, may suffer from specification bias (Mukherjee & Naka, 1995). Geweke measures are cardinal measures of comovement that allow us to determine the economic causes of greater comovement in stock market returns in two countries.

Subsequently to find possible determinants of international integration following variables are used.

$$\frac{Ex_{qp}}{Ex_q} = \text{Exports from country q to country p (Pakistan)}$$

as a %age of q's total exports

$$\frac{Ex_{pq}}{Ex_p} = \text{Exports from country p to country q, as a %age}$$

of p's total exports

$$\frac{Im_{qp}}{Im_q} = \text{Imports of country q from country p as a %age}$$

of q's total imports

$$\frac{Im_{pq}}{Im_p} = \text{Imports of country p from country q as a %age}$$

of p's total imports

$I\Delta_{qp}$ = Difference in inflation between markets of country q and country p

InD_{qp} = Difference in Interest rates between markets of country q and country p

Vex_{qp} = Volatility in the bilateral exchange rate of currency q in terms of p (Pakistani Rupees)

Cex_{qp} = %age Change in the bilateral exchange rate of currency q in terms of p (Pakistani Rupees)

4. RESULTS AND DISCUSSION

Geweke measures of contemporaneous feedback are reported in Table 1. To calculate GMF_{p^*q} , we make use of daily stock market indices of 21 economies paired with Pakistan. Stock market returns are computed by using formula $(P_n/P_{n-1})-1$.

Results suggest that 57% of GMF_{p^*q} are significant. Out of these 57%, 28% are found to be significant at 1% level, 16% at 5% level and 13% at 10% level of confidence. Overall the data revealed that the degree of comovement is far above the average when Pakistani stock market performs better. In 2006-2007, Karachi stock exchange (KSE) outperformed virtually all the paired countries. On December 26, 2007, the KSE 100 Index broke all previous records, reaching its maximum value closing at 14841.85 points. The comovement of Pakistani stock market with other equity markets for the years 2004, 2006 and 2007 accounts for 42% of total stock market comovements. On the contrary, in period of crises i.e. year 2008 the degree of commovement declined. During this year Pakistani stock market underwent a substantial deal of recession partially due to global financial crises and to some extent on account of domestic troubles and it remained suspended in excess of 4 months. The returns for these four months are excluded from the dataset because during this period Pakistani stock market cannot commove with other markets as it was partially closed.

Our analysis further point out that there is strong interlink between Indian and Pakistan stock market as 91% of GMF_{p^*q} are found to be significant for Indian stock market paired with Pakistan. Researchers have found that culture can affect economics and finance and same cultural values can in turn influence financial decision making (Jong & Semenov, 2002). As both Pakistan and India share almost the same culture (Lucey & Zhang, 2010) that may be one of the reasons

for a high degree of comovement. Mukherjee & Mishra (2010) also found a strong comovement between India and Pakistani markets. Wang, Gunasekarage, & Power (2005) have studied the return and volatility spillover from United States and Japan to three South Asian capital markets including Pakistan, India and Sri Lanka. Their results establish a return spillover from US and Japan to all the three markets. Diagnostics of Table 1 depict that Sri Lankan capital market is least interlinked with that of Pakistani stock market. Elyasiana, Pererab, & Puria (1998) have investigated the interdependence and dynamic linkages between the emerging capital markets of Sri Lanka with the markets of its major trading partners and have found no significant interdependence.

Table 2 contains the Geweke unidirectional feedback measures from Pakistan to the other economies (q). These measures trace the degree of the association between changes in Pakistani daily stock returns and daily stock returns in each of the other markets of the world, one to five days later. In general, the measures are small and only seven out of the 231 measures are significant. Out of these seven, six measures are significant for the year 2006 & 2007 and interestingly all the countries with which the Pakistani market commove are European countries including France, Germany, Hungary, Netherland, Switzerland and UK. These are the years when Pakistani stock market performed better and KSE 100 index broke all the previous records of reaching its maximum level. Foreign buying interest had been very active on the KSE in 2006 and continued in 2007. According to estimates from the State Bank of Pakistan, foreign investment in capital markets totaled about US\$523 Million in this period.

Table 3 contains the Geweke unidirectional feedback measures from the other economies of the world to Pakistan. These measures reflect the magnitude of association between changes in the daily equity returns in each of the world economy and Pakistani daily equity returns one to five days later. The measures tend to be small and none of the 231 measures is significant. In broad terms, the hypothesis of no lagged effect from the Pakistani market to the other countries markets and vice versa cannot be rejected.

We now wrap up the first phase of our analysis and move to the second phase of our study. The purpose of second stage is to explore the reason(s) why strength of economic integration varies over time for a given pair

Table 1: Geweke Contemporaneous Feedback Measures between Pakistan and other Economies of the World

	AI	Au	Be	Cn	Ch	De	Fr	Ge	Hu	In	Io
2004	8.69***	10.10***	3.76*	5.22**	4.30**	8.99***	8.07***	6.67***	2.65	3.00*	5.38**
2005	3.07*	2.24	0.22	1.40	3.46*	1.32	3.44*	2.43	5.74**	7.20***	1.07
2006	5.85**	5.10**	10.64***	6.84***	3.60*	9.70***	11.80***	12.68***	6.50**	24.52***	17.63***
2007	4.85**	7.34***	12.60***	7.26***	5.07**	9.48***	13.29***	11.31***	14.24***	11.06***	5.11**
2008	2.39	2.85*	0.53	4.69**	5.03**	2.20	0.90	0.76	2.41	2.82*	5.10**
2009	4.03**	4.50**	1.50	1.44	3.50*	0.75	1.62	1.34	0.57	1.83	5.30**
2010	3.47*	1.79	1.54	0.75	3.81*	0.80	1.85	1.00	1.18	4.18**	12.60***
2011	16.05***	3.52*	2.33	2.39	0.91	4.40**	2.65	3.13*	0.91	6.39**	0.69
2012	11.00***	1.65	0.14	0.33	6.72***	3.70*	3.27*	5.06**	7.00***	10.04***	7.12***
2013	0.64	2.05	2.21	4.96**	2.64	0.46	2.26	2.05	2.46	9.57***	2.19
2014	3.73*	1.84	4.86**	6.60**	3.80*	11.36***	9.11***	10.24***	2.61	5.12**	3.15*

	Jp	Ml	Ne	Si	Sk	Sp	Sk	Sw	Uk	US
2004	5.17**	1.75	8.13***	6.37**	6.32**	9.14***	2.39	5.27**	8.16***	2.90*
2005	1.46	1.34	1.96	0.59	1.96	3.18*	1.28	3.57*	2.28	0.71
2006	8.41***	10.75***	14.37***	11.82***	2.27	7.48***	1.02	12.55***	11.17***	3.49*
2007	1.95	10.75***	13.69***	7.59***	6.82***	8.57***	1.81	9.00***	9.96***	10.80***
2008	6.32**	2.62	0.63	1.09	2.54	0.29	1.98	4.01**	0.58	1.47
2009	3.15*	2.30	0.58	1.57	5.34**	1.66	0.26	0.98	2.03	1.63
2010	2.38	0.13	1.63	1.24	10.80***	0.37	1.83	1.92	0.58	0.25
2011	6.72***	1.01	5.66**	6.76***	2.32	3.95**	2.00	7.65***	5.39***	0.17
2012	3.67*	2.91*	5.31**	14.12***	10.15***	3.30*	5.11**	7.23***	1.57	2.25
2013	2.04	6.57**	2.37	3.92**	2.70	2.51	2.04	2.91*	3.73*	4.62***
2014	3.10*	2.56	11.04***	9.21***	14.88***	7.93***	2.47	7.60***	8.63***	3.74*

This table demonstrates the Geweke measures of contemporaneous feedback, representing likelihood ratio test statistics of the null hypothesis that there is no contemporaneous relation between the daily stock market returns in country q and Pakistan, where q represents Australia (AI), Austria(Au), Belgium(Be), Canada(Cn), China(Ch), Denmark(De), France(Fr), Germany(Ge), Hungry(Hu), India(In), Indonesia(Io), Japan(Jp), Malaysia(Ml), Netherlands(Ne), Singapore(Si), Srilanka(Sk), Spain(Sp), South Korea(Sk), Switzerland(Sw), United Kingdom(Uk) and United States(US). Each statistic has an approximate χ^2 distribution with 1 degree of freedom under the null hypothesis of no contemporaneous relationship.

*** Significant at 1% level ** Significant at 5% level * Significant at 10% level.

Table 2: Geweke Unidirectional Feedback Measure from Pakistan to other Markets, 1-5 Days Later

	AI	Au	Be	Cn	Ch	De	Fr	Ge	Hu	In	Io
2004	3.18	1.17	0.47	0.01	2.71	0.32	0.61	0.69	0.61	1.68	0.11
2005	0.52	0.50	0.15	0.31	0.72	0.26	2.42	2.09	3.42	0.53	0.16
2006	0.28	3.18	9.97	1.00	1.42	5.44	9.61*	11.67**	3.16	2.51	0.63
2007	2.27	1.29	3.33	2.27	0.05	2.76	4.00	3.96	10.78*	4.97	1.33
2008	0.07	0.54	0.14	0.13	0.17	1.10	0.67	0.58	0.01	-0.01	0.21
2009	1.13	1.29	0.03	0.26	0.62	0.24	0.05	0.23	0.42	0.08	1.89
2010	0.24	0.02	0.76	0.30	0.56	0.40	0.78	0.60	0.16	0.72	2.83
2011	14.95**	0.19	1.17	1.68	0.11	3.05	0.02	2.49	0.06	1.36	0.24
2012	2.73	-0.01	0.06	0.05	4.32	0.78	0.59	-0.01	0.68	0.00	0.40
2013	0.33	2.01	1.53	2.51	0.33	0.44	1.45	0.97	0.02	2.72	0.04
2014	0.14	0.16	0.33	4.94	0.30	2.92	0.86	0.83	0.56	-0.02	0.01

(Table 2). Continued.

	Jp	MI	Ne	Si	Sk	Sp	Sk	Sw	Uk	US
2004	1.65	0.16	1.05	1.58	0.17	0.41	0.91	0.68	0.43	2.13
2005	-0.30	0.04	1.25	0.21	-1.57	2.58	0.87	1.42	0.78	0.18
2006	3.24	0.04	11.61**	0.16	0.86	6.40	0.59	11.69**	9.42*	1.87
2007	0.01	0.78	3.84	1.35	4.37	2.58	0.58	4.12	1.69	4.69
2008	1.10	1.30	0.16	0.07	0.01	0.24	0.07	2.10	0.39	0.92
2009	0.08	0.56	0.01	0.58	0.64	0.70	0.03	0.95	0.27	0.37
2010	0.16	0.08	1.12	0.67	2.62	0.10	0.53	0.19	0.27	0.01
2011	2.01	0.85	3.26	5.33	1.09	1.92	0.74	6.52	1.37	0.10
2012	0.63	0.10	0.54	0.00	0.48	0.22	1.45	0.31	0.08	2.13
2013	0.05	0.10	2.01	0.74	0.46	0.87	0.32	2.66	3.51	1.38
2014	0.19	0.20	0.53	0.76	0.37	1.55	0.10	0.90	0.21	0.02

This table demonstrates the Geweke measures of unidirectional feedback from Pakistan to other economies of the world, representing likelihood ratio test statistics of the null hypothesis that there is no unidirectional feedback between daily stock market returns in Pakistan and country q , 1-5 days later, where q represents Australia (Al), Austria(Au), Belgium(Be), Canada(Cn), China(Ch), Denmark(De), France(Fr), Germany(Ge), Hungary(Hu),India(In), Indonesia(lo), Japan(Jp), Malaysia(MI), Netherlands(Ne), Singapore(Si), Srilanka(Sk), Spain(Sp), South Korea(Sk), Switzerland(Sw), United Kingdom(Uk) and United States(US). Each statistic has an approximate χ^2 distribution with 5 degree of freedom under the null hypothesis that Pakistani Market does not lead other economies over a period of 1-5 days.

*** Significant at 1% level ** Significant at 5% level * Significant at 10% level.

Table 3: Geweke Unidirectional Feedback Measure from other Economies of the World to Pakistan, 1-5 Days Later

	Al	Au	Be	Cn	Ch	De	Fr	Ge	Hu	In	lo
2004	0.80	1.10	0.26	1.82	0.43	0.11	0.30	0.25	0.11	-0.01	2.21
2005	2.22	1.11	0.07	0.55	2.71	1.00	1.00	0.30	2.25	2.89	0.32
2006	2.51	0.00	0.19	1.78	0.86	1.72	0.36	0.42	0.45	8.59	0.88
2007	1.63	0.85	0.68	2.26	5.00	0.83	1.05	2.20	0.35	3.13	1.81
2008	0.86	2.23	0.04	0.89	4.86	0.11	0.20	0.16	1.65	0.04	4.79
2009	2.52	2.23	0.50	1.04	0.31	0.02	0.00	0.04	0.06	0.21	0.03
2010	0.08	1.61	0.66	0.38	1.99	0.36	1.02	0.39	0.84	0.01	4.00
2011	0.99	2.60	0.83	0.71	0.65	1.01	0.23	0.07	0.79	4.07	-0.01
2012	2.17	1.48	0.04	0.23	1.21	0.36	0.08	0.05	2.17	3.06	0.58
2013	0.13	0.03	0.24	0.31	1.61	0.00	0.69	1.05	2.43	0.13	1.95
2014	1.00	1.61	3.32	1.26	1.07	3.10	5.92	7.88	1.00	1.31	1.02

	Jp	MI	Ne	Si	Sk	Sp	Sk	Sw	Uk	US
2004	0.45	1.10	-0.01	0.03	4.74	0.01	1.45	0.12	1.31	0.00
2005	1.54	0.50	0.38	-0.01	1.29	0.58	0.38	2.11	0.96	0.44
2006	2.82	2.27	1.18	0.35	0.02	0.02	0.11	0.23	0.13	0.34
2007	0.26	0.91	1.73	1.07	1.22	0.77	0.17	0.10	0.63	0.50
2008	0.63	0.51	0.27	0.43	0.65	0.05	1.32	0.68	0.19	-0.01
2009	0.11	0.13	0.01	0.02	3.21	0.09	0.00	0.01	0.11	1.25
2010	-0.02	-0.01	0.46	0.32	0.04	0.23	0.21	1.45	0.23	0.23
2011	4.71	0.08	1.25	1.30	0.04	0.42	0.80	0.92	1.93	0.07
2012	2.86	0.07	0.02	4.83	0.45	0.01	0.02	0.55	0.00	0.09
2013	1.88	5.26	0.30	1.63	1.99	0.01	1.71	0.10	0.21	1.59
2014	1.81	1.64	5.56	2.32	1.21	4.35	1.60	4.73	5.28	3.71

This table presents the Geweke measures of unidirectional feedback, representing likelihood ratio test statistics of the null hypothesis that there is no unidirectional feedback between the daily stock market returns in each of the other economy of the world and Pakistan, one to five days later, where q represents Australia (Al), Austria(Au), Belgium(Be), Canada(Cn),China(Ch), Denmark(De), France(Fr), Germany(Ge), Hungary(Hu),India(In), Indonesia(lo), Japan(Jp), Malaysia(MI), Netherlands(Ne), Singapore(Si), Srilanka(Sk), Spain(Sp), South Korea(Sk), Switzerland(Sw), United Kingdom(Uk) and United States(US).Each statistic has an approximate χ^2 distribution with 5 degrees of freedom under the hypothesis that other economies do not lead Pakistan's market over a period of one to five days.

*** Significant at 1% level ** Significant at 5% level * Significant at 10% level.

of countries. The financial literature reports empirical evidence supporting the association between changes in stock prices and measures of real economic activity (Chen, Roll, & Ross, 1986; Elton, Gruber, & Blake, 1995; Mukherjee & Naka, 1995).

In our analysis we have observed multiple cases (countries) at different time periods (2004 to 2014) so panel data tests will be appropriate. We have 21 cases, over 11 time periods, for a total of 231 observations. Analysis was conducted in stata which need the data in long form. To choose between fixed and random effect model we use Hausman Specification Test, proposed by Hausman (1978), based on difference between the random effects and fixed effects estimates. The Hausman Test checks a more efficient model against a less efficient but consistent model to make sure that the more efficient model also gives consistent results. Results of Hausman Test are reported in Table 4. The null hypotheses for the Hausman test is that the group specific random effects and the Regressors are not correlated and thus if the Hausman Test shows a probability value of more than 0.05 then it would mean that fixed effects model is inefficient and random effects model is better. From the Table 4 it can be observed that $Prob > \chi^2 = 0.00$ which is less than 0.05 thus we reject null hypothesis and conclude that Fixed effect model is appropriate for use in this case.

Table 4: Hausman Specification Test

	Fe	Re	Fe-Re	S.E
Ex_{qp} / Ex_q	2.695	2.695	0.00	0.00
Ex_{pq} / Ex_p	-0.045	-0.045	0.00	0.00
Im_{qp} / Im_q	-3.314	-3.314	0.00	0.00
Im_{pq} / Im_p	-0.102	-0.102	0.00	0.00
Vex_{qp}	0.000	0.000	0.00	0.00
Cex_{qp}	0.004	0.004	0.00	0.00
IjD_{qp}	-0.221	-0.221	0.00	0.00
InD_{qp}	0.125	0.125	0.00	0.00
$\chi^2(8)$	8.620			
$Prob > \chi^2$	0.00			

Table 5 shows the outcome of fixed effect model for panel data over eleven years sample period and twenty one country pairs. The model explains 17% of the variation in contemporaneous comovement between

different economies of the world and Pakistani stock market. The variables in the model are jointly significant at 1% level, and three out of the eight variables in the model are individually significant, IjD_{qp} i.e difference in inflation between markets of country q and country p is found to be the most significant. During years 2008 to 2010, Pakistan faces a very high inflation rate as compared to its trading partners. In general, a greater differential in inflation rates, have a negative effect on stock market comovements between country pairs. Variables Ex_{qp} / Ex_q and Vex_{qp} both are found to be significant at 5% level of confidence. Increased export share by economies of the world to Pakistan contributes to greater comovement. Our results provide evidence consistent with Asperm (1989) who studied ten European countries from 1968 to 1984 and shows that employment, imports, inflation are inversely related to stock prices. In a similar study, Bracker, Docking, & Koch (1999) find bilateral import dependence, among other factors, to be significantly associated with the extent of stock market integration over time.

Table 5: Results of Fixed Effect Model

	Coeff	Std.Err	t-Statistics	p-vlaue
Ex_{qp} / Ex_q	6.198	3.055	2.03	0.044
Ex_{pq} / Ex_p	-0.494	0.318	-1.55	0.123
Im_{qp} / Im_q	-0.101	3.068	-0.03	0.974
Im_{pq} / Im_p	0.095	0.258	0.37	0.713
Vex_{qp}	0.000	0.000	2.45	0.015
Cex_{qp}	0.003	0.012	0.30	0.766
IjD_{qp}	-0.220	0.059	-3.69	0.000
InD_{qp}	0.069	0.113	0.61	0.544
Intercept	5.403	1.154	4.68	0.000
$R^2(\text{Within})$	0.1765			
F Statistics	5.41			
$Prob > F$	0.000			

5. CONCLUSION

We examine the degree of cross-country return comovement for twenty one stock markets of the world with Pakistani stock market. First, using Geweke Measures of Feedback (GMF), we find a high percentage (57%) of contemporaneous association between the other stock markets of the world paired with Pakistan. The same-day inter-market responses

are significant for all the countries included in the sample (Australia, Austria, Belgium, Canada, China, Denmark, France, Germany, Hungary, India, Indonesia, Japan, Malaysia, Netherland, Singapore, Korea, Spain, Sri Lanka, Switzerland, UK and US). This result suggests a high degree of both market integration and market efficiency, as these pairs of markets interact significantly on the same day. Findings also suggest that Pakistani stock market strongly commoves with Indian stock market but the comovement is least with Sri Lankan stock market. There is only seven significant figures when unidirectional GMF are calculated which means there are very less comovements if cross market adjustments take place beyond one day. Further, the degree of contemporaneous comovement between other stock markets and Pakistan market increases when Pakistani stock market is performing better but decreases in times of crises at the Pakistani stock market. So this is providing a good opportunity to diversify the risk when the diversification is most needed. Results further demonstrate that exports from other countries to Pakistan, inflation and volatility in the bilateral exchange rate are significantly associated with the extent of equity market integration over time.

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