



Long run Relationship between Pakistan KSE (Karachi Stock Exchange) and China SSE (Shanghai stock exchange) Markets

Muhammad Junaid*, Faisal Abbas, Hasnain Manzoor, and Aftab Ahmed

Department of Commerce, University of Sargodha, Pakistan.

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ABSTRACT

This study examines integration between Karachi Stock Exchange of Pakistan and Shanghai Stock Exchange of China. Monthly data ranging from January 2001 to December 2010 is included and tested in this paper. This relationship is tested by using descriptive statistics and correlation matrix. Data stationary is ensured by Unit Root Test. Evidence from Granger Causality and Impulse Response Test. The Results shows that SSE and KSE has no long term relationship or impact on each other focusing on the data of KSE (Karachi Stock Exchange) and SSE (Shanghai Stock Exchange).

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Introduction

As the whole world is changing into a globe, the governments of all the countries are providing facilities to international investors to invest in their countries. These investors when go in a country and invest their, definitely the stock markets of that country is influenced by these investments. The researchers from the world are very keen to observe and study the behaviors of stock markets in different countries in response to these investments. These studies are becoming an interesting field of research in academic researches and are increasing the existing knowledge. As there is saturation and less opportunities in the developed countries markets for portfolio diversification, investors from these investors are now targeting the developing countries for portfolio diversification and minimizing their portfolio risks.

Stock exchanges are the important parts of any economy and help diversifying the domestic resources in the productive ways. A stock exchange which is efficient in its working helps in growth of the economy, to increase the savings of the people, proper and efficient and effective allocation of resources and funds and helps in attracting the foreign investors to invest in the country.

Karachi Stock Exchange is the biggest and known stock exchange of Pakistan. It is contributing more than seventy per cent of total stock transaction of Pakistan. More than 650 companies are listed on Karachi Stock Exchange. It was the best performing stock exchange of the world according to Bloomberg in 2002 when all the Stock Exchanges of the world were facing declination due to the terrorist attacks in USA.

Shanghai Stock Exchange is the one of two Stock exchanges of People Republic of China. It is the world 5th largest stock exchanges with respect to market capitalization. It is still not totally open for foreign investment because of the certain local sanctions. It is a basically not for profit

organization and is under control of the China Securities Regulatory Commission (CSRC).

A study was conducted to find the integration between USA stock markets and Middle East stock markets of Egypt, Jordan and Morocco. This study was conducted by the A.F. Darrat, K. Alkhal and S.R Hakim in 2000 and their results suggested that although the Middle East stock exchanges are segmented at international level but they are more integrated with each other at regional level rather than at international level. Moreover, they said that the Egyptian Stock Market is leading the other markets in the Middle East. B.N Haung, C.W Yang, J.W.S Yu in 2000 studying the "Causality and co-integration in Stock Markets among USA, Japan and South China growth triangle" and found the same results as A.F. Darrat. They said that there is not any relationship in these markets in long run except the markets of Shanghai and Shenzhen. They also said that the Hong Kong Stock Exchange is in Contemptuous with the USA markets while the Hong Kong Stock Market leads the stock changes one day before than the Taiwan Market and feedback causality exists between Shanghai Stock Market and Shenzhen Stock Market.

In this paper we are going to examine the integration of the KSE and SSE. The data from both Karachi Stock Exchange and Shanghai Stock Exchange was taken on monthly basis and was examined using statistical tools and procedures to find the correlation between both markets but the results shown that there does not exist any particular relationship on long term basis between both the markets.

Objective

This paper focuses on the relationship among SSE and KSE. This study can be helpful for investors and portfolio managers in minimizing the risk. This study is also helpful for the prediction of stock market behaviour in future. Objective of

this paper is to analyse whether relationship between China and Pakistan stock Markets exist or not by using monthly data.

Literature Review

A study regarding integration of Pakistani Equity market with International Markets was conducted in 2000. This study showed that there is no significant integration in between Pakistani Equity market and international markets. Moreover, they also described that Pakistani equity market is more attractive for reduction in portfolio risk.

They gathered data from 1973 to 1983 on weekly basis, (Saidi and Hussain, 2000). A research was conducted to study the integration relationship in south Asian markets. In this study data from 1995 to 2001 was taken on daily basis. This study showed integration between stock prices of Pakistan, India, Sri Lanka and Bangladesh, (Narayan et al, 2004).

Haroon et al. examined the association among south asian equity markets (Bombay stock exchange, Karachi stock exchange, Colombo stock exchange, Dhaka stock exchange) by using monthly data from 1999 to 2009.

They used Co-integration, Vector error correction model (VECM) and unit root test techniques for the examination. Their results explore that there is no association among these four equity markets.

Hussain et al (2012) examined the dependency of East Asian equity markets with respect to Karachi Stock exchange of Pakistan by testing monthly data from 2000 to 2010. They used descriptive statistics, correlation, co-integration, unit root test, granger causality, and impulse response function tests to find the results. Results describe that there is no long run relationship among Karachi stock Exchange and East Asian equity markets but there was unidirectional relationship from Japan to China and From Japan to Pakistan.

In 2005 a study conducted by Islam et al to know if there exist any relationship between the equity markets of India, Malaysia and Singapore. The study described that there was a relationship between all these markets in both direction except Singapore to Kuala Lumpur which is in single direction. Lamba in 2005 conducted a study to find if any relationship exists between south Asian markets (Pakistan, India and Sri Lanka) and developed countries USA, UK and Japan equity markets. He found that the south Asian markets are independent from the changes in the stock markets of these developed countries. He also found that Indian stock market is receptive for some extent to the changes in the markets of developed countries while Pakistan and Sri Lanka markets showed no such trends.

Using the Johansson co-integration and Granger causality test Glezakos in 2007 studied the short term and long term relationship between the Greek equity market and other world leading and big markets.

In this study ten developing and developed markets of different countries were studied and data was taken on monthly basis. The results of this study showed that the stock market of Greece was affecting significantly the markets of Germany and France.

A study was conducted in 2000 to find the relationship and integration between the South Asian stock markets and the markets of USA and UK.

For this study data was taken for the period of 1994 to 1999 and different techniques such as multivariate and bivariate techniques were used to study the integration between these markets.

This study was conducted by Naeem in 2000. He found that there is not any evidence of integration and close relationship between these South Asian equity markets and the equity markets of US and UK. He also suggested that this may be helpful for those investors who want to diversify their portfolio risk between these markets.

A study conducted by Roca in 1999 to illustrate the integration and relationship in the stock markets of Japan, Taiwan, USA, Singapore, UK, and Australia. He used the Johansson co-integration technique to get the results. He found that that there was no significant integration exists between Australian and other countries' stock markets but there is a significant relationship exists between the markets of USA, Australia and UK. Janakirmanan in 1998 and Hsiao in 2003 examined the integration between the equity markets of Pacific-Basin countries and the Asian Pacific countries respectively with the USA equity market.

They both found the integration of US to these countries in only one direction.

Leong in 2003 studied the relationships of the five East Asian stock indices. He also found some interdependence between these markets. Elyasiani in 1998 also studied the interdependence and dynamic integration between the developing of Sri Lanka with the equity markets of the major trading partners of Sri Lanka and they declared that there was no significant linkage between the Sri Lankan markets and the other Asian and US equity markets.

Gilmore studied the short term and long term linkages between the US equity market and the three other central European equity markets. He found that there is no long term integration linkage between these markets.

Three Researchers Yang, Sutanto and Kolari in 2004 studied the long run linkage between US equity markets and the markets of emerging economies of Asian equity markets before the Asian financial markets crisis.

They found that there was no integration relationship exists between these markets in before crisis era but such relationship exists up to some extent in the period of crisis. Moreover, they with Min in 2003 also examined the long term and short term relationship during the crisis period. They found that the linkage between these markets were greater and strong during the periods of crisis and also integrated in the post crisis period. Manning in 2002 argued that the equity markets of South East Asian countries' convergence were somewhat reserved as well as abruptly halted by the crisis.

Data and Methodology

This study includes Monthly stock prices indexes for the period of January 2001 to December 2010 for KSE and SSE Stock Markets. The continuous compounded rate of return is calculated by using the following model

$$\text{Return} = R_t = \ln (P_t / P_{t-1}),$$

Where;

R_t = Return for given period 't'.

P_t = Price at closing time

P_{t-1} = Price at the opening time

ln = Natural Log

Hypothesis of the study is confirmed by applying the above explained methodologies.

Hypothesis:

H_1 : KSE have long term relationship with SSE stock Market.

H_0 : KSE have no long term relationship with SSE stock Market.

Results

Table 1. Descriptive Statistics

	SSE	KSE
Mean	-0.00258	-0.017708
Median	-0.008042	-0.019439
Maximum	0.282779	0.448796
Minimum	-0.242526	-0.241114
Std. Dev.	0.089958	0.089027
Skewness	0.553277	1.22597
Kurtosis	3.894578	8.562427
Jarque-Bera	10.03929	183.2233
Probability	0.006607	0
Sum	-0.307075	-2.107245
Sum Sq. Dev.	0.954909	0.935253
Observations	119	119

Descriptive Statistics is used to analyze the behavior of the returns. Descriptive statistics employed on the returns showed that SSE has an average return of -0.25 percent and with standard deviation of 8.9 percent. KSE has highest returns than SSE with standard deviation of 8.9 percent and average return of -1.7 percent. It has been observe that SSE and KSE both have same standard deviation.

Table 2. Correlations

	SSE	KSE
SSE	1	0.064204
KSE	0.064204	1

From results obtained through correlation it is evident that there is very slight almost negligible correlation among SSE and KSE.

Table 3. VAR statistics

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-176.109	NA	0.092788	3.298315	3.347984	3.318454
1	212.1744	754.9956	7.53E-05	-3.81805	-3.669038*	-3.75763
2	213.1378	1.837557	7.97E-05	-3.76181	-3.513466	-3.66112
3	227.7834	27.39262	6.54E-05	-3.95895	-3.611268	-3.817978*
4	228.2417	0.840263	6.99E-05	-3.89337	-3.446343	-3.71211
5	236.3238	14.51786*	6.49e-05*	-3.968959*	-3.422599	-3.74743
6	237.4906	2.052729	6.84E-05	-3.91649	-3.270795	-3.65469
7	241.0192	6.077046	6.91E-05	-3.90776	-3.162727	-3.60568
8	242.6108	2.682029	7.24E-05	-3.86316	-3.018787	-3.5208
9	243.0516	0.726661	7.75E-05	-3.79725	-2.85354	-3.41461
10	247.7065	7.499496	7.67E-05	-3.80938	-2.766329	-3.38646
11	250.2318	3.975011	7.91E-05	-3.78207	-2.639681	-3.31887
12	252.927	4.14265	8.14E-05	-3.75791	-2.51618	-3.25443

* 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

Lag selection is a pre-requisite in order to employ co-integration test. To estimate Johansen and Julius (1991) unrestricted VAR is estimated. Schwarz criterion is found minimum at one lag. So one month lag is appropriate lag length.

Table 4. Unit root test statistics

	ADF Level	ADF Diff.	First Level	PP Level	PP Diff.	First Level
KSE	0.173406	-7.59618	0.224065	-9.65885		
SSE	-1.38012	-5.81835	-1.34179	-10.049		
Critical Values						
1%	-3.48655	-3.48705	-3.48606	-3.48655		
5%	-2.88607	-2.88629	-2.88586	-2.88607		
10%	-2.57993	-2.58005	-2.57982	-2.57993		

To run co-integration test it is necessary for the data to be stationary of same order. Above tests ensure that this data is

non-stationary at level but becomes stationary at first difference. Data stationary is tested through Augmented Dicky Fuller and Phillip Perron Tests as the later is not that much strict in nature as is ADF test and both tests confirmed similar results (Dickey & Fuller,1981). Data is stationery of same order so we can test co-integration among SSE and KSE.

Table 5. Co-integration Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.092273	11.16308	15.49471	0.2017
At most 1	0.000259	0.029789	3.841466	0.8629

Co-integration is used to analyze the long run relationship between different series. Results of Table 5 shows that there exists no long run relationship between SSE (Shanghai stock exchange) and KSE (Karachi Stock Exchange) stock markets.

Table 5.1 Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.092273	11.13329	14.2646	0.1477
At most 1	0.000259	0.029789	3.841466	0.8629

Results of Table 5.1 confirm the results reported by Trace Statistics that there exists no longrun relationship between SSE (Shanghai stock exchange) and KSE (Karachi Stock Exchange) stock markets.

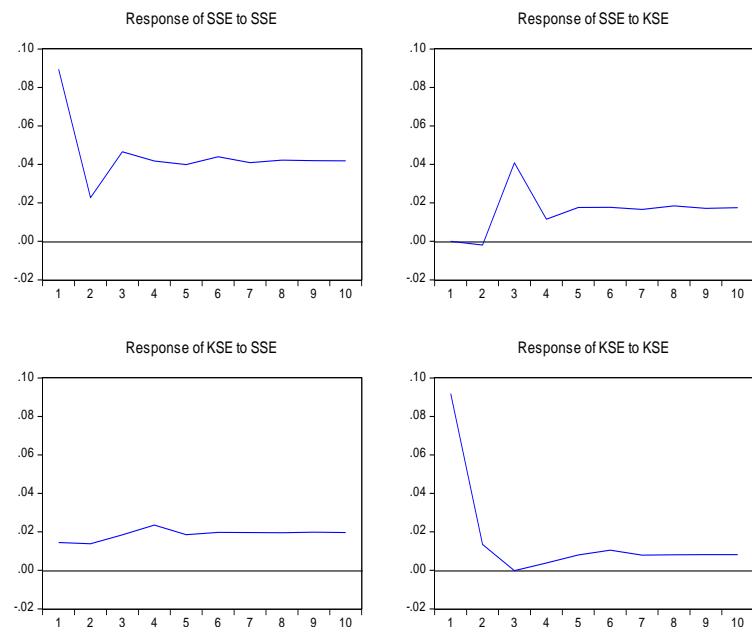
Table 6. Granger causality

Null Hypothesis:	Obs	F-Statistic	Prob.
KSE does not Granger Cause SSE	118	0.12969	0.7194
SSE does not Granger Cause KSE		0.17847	0.6735

Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another. Granger causality test reports that the KSE granger causes the SSE. Similarly SSE granger causes KSE. It shows that flow of information or relationship exists between SSE (Shanghai Stock Exchange) and KSE (Karachi stock Exchange).

Impulse Response Function

Response to Cholesky One S.D. Innovations



Impulse response function shows that one standard deviation change in on market brings what standard deviation

change in other market. Results from impulse response function show that Karachi Stock Exchange exerts pressure on Karachi Stock Exchange and Shanghai stock exchange exert pressure on Shanghai stock Exchange while KSE and SSE don't exert pressure on each other. Impulse response function shows that KSE is affected by KSE itself and SSE is affected by SSE itself, While SSE and KSE has no effect on each other.

Table 7. Variance Decomposition of SSE:

Period	S.E.	SSE	KSE
1	0.089449	100	0
2	0.092311	99.95646	0.043541
3	0.111157	86.49447	13.50553
4	0.119291	87.34164	12.65836
5	0.127009	86.92053	13.07947
6	0.135577	86.80814	13.19186
7	0.142586	86.72306	13.27694
8	0.149835	86.4663	13.5337
9	0.156538	86.39962	13.60038
10	0.162975	86.29473	13.70527

Table 8. Variance Decomposition of KSE:

Period	S.E.	SSE	KSE
1	0.093044	2.421411	97.57859
2	0.095015	4.424161	95.57584
3	0.096784	7.88607	92.11393
4	0.099677	13.00973	86.99027
5	0.10169	15.80902	84.19098
6	0.104119	18.67809	81.32191
7	0.106239	21.34455	78.65545
8	0.108329	23.80011	76.19989
9	0.110429	26.12247	73.87753
10	0.112455	28.23013	71.76987

Variance Decomposition shows the decomposition of variance. It was found that most the changes in SSE are explained by its own market innovations and KSE has no or very little effect on it. Variance Decomposition of KSE shows that variance in KSE returns are caused by its own market innovations and due to changes in SSE.

Conclusion

This paper focuses on integration among Shanghai Stock Exchange of China and Karachi Stock Exchange of Pakistan. Descriptive statistics employed on the returns showed that KSE has highest returns than SSE. From results obtained through correlation it is evident that there is very slight or negligible correlation among SSE and KSE. Through VAR statistics it is found that one month is appropriate lag length. Co-integration results shows that there exists no long run relationship among SSE and KSE. Impulse response function shows that KSE is affected by KSE itself and SSE is affected by SSE itself, While SSE and KSE has no effect on each other. Variance Decomposition explained that SSE is affected by its own market performance and variance in KSE are caused by its own market

innovations and due to changes in SSE. Conclusively all results shows that SSE and KSE has no long term relationship or impact on each focusing the data of KSE (Karachi stock Exchange) and SSE (Shanghai Stock Exchange).

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