Capital Market Integration Of Pakistan And Its Trading Partners; An Empirical Analysis

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Abstract

The study aims to analyze co integration between Pakistan and its ten trading partners namely US, China, UK, Germany, India, Hong Kong, Korea, Japan, Malaysia and Singapore. The sample time period is composed of daily data of stock indices for the period ranging from May 1, 2000 to May 31, 2012 which was further reduced to January 4, 2010 to May 31, 2012 due to the existence of structural breaks found through the use of Chow test. By applying pair wise Johansen Co integration technique four co integrating relationship has been identified between Pakistan and its trading partners including US, UK, Japan and Korea. The study has implication for stock market investors in terms of international diversification.

Keywords: Long-term Equilibrium relationship, Co integration, and Johansen Co integration test.

1. Introduction

In order to reduce exposure to risk and to get suitable return investor normally holds a well-diversified portfolio and to get better opportunities to hedge their risk investors therefore always search for securities which are not co integrated (Bodie, Kane & Marcus, 2007). Consequently, investors these days go beyond their national borders and tend to invest in foreign markets. Foreign investments are attributable to two main reasons. Firstly, developed countries, followed by developing countries, have eased capital controls during 1980s and 1990s due to global liberalization of capital flows making foreign investments an attractive opportunity (Yang, Khan & Pointer, 2003). Secondly, due to better communication network and technological advancements between countries, it has become very easy for investors to invest in international stock markets. The desire of investors to diversify one's portfolio and to invest abroad actually has resulted in the flow of capital across countries.

Consequently increased investor capital mobility has paved the way for the development of an economically integrated world. Moreover the integration of financial markets has further facilitated the global economic integration. Financial markets integration is considered imperative for accessing needed resources to grow economically. Hence, financial markets integration can be inferred as a source of achieving economic

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integration (Aksoy, Akin & zeytunlu, 2010). Furthermore economic integration leads towards equal distribution of resources and creates opportunities for foreign investors to design a well-diversified portfolio. However due to financial markets integration, information easily flows across the borders and independent price behavior across different stock markets is no more observable. The flow of information and increased stock market dependence diminishes the benefits of diversification from international investments (Moosa & Bhatti, 1997).

Across several markets, financial market particularly stock markets integration, is prevented through imposing barriers in the form of information availability, foreign ownership restrictions, exchange rate risks, legal and tax differences and home country biases (Errunza & Losq, 1985; Stulz, 1981). Removing these barriers will enhance the long-term equilibrium relationship between the stock markets. This will facilitate the global investors to invest across different markets. Nevertheless, financial market integration will create market links depicting dependences between the stock prices making diversification a difficult task to achieve. An investor planning to enter the international market with the intention of diversification cannot benefit from well-integrated markets as due to share price correlation between the two markets. Financial market integration might facilitate access to financial capital yet it can hinder the process of diversification (Aksoy, Akin & zeytunlu, 2010).

Countries from different groups and regions of the world are analyzed for Capital market integration, which falls within the boundaries of financial, markets integration (Aazim, 2012; King & Wadwhani, 1990; Hassan & Naka, 1996). This study has been conducted for the examination of co integration of Pakistan's major trading allies and equity markets. Pakistan holds a significant position in the South Asian region due to its strategic position however little empirical work has been done to investigate the nature of financial market integration of Pakistan and its trading partners.

According to Aazim (2012) main trading partners of Pakistan includes US, UK, China, Germany, Malaysia, India, Japan, Hong Kong, Singapore and Korea. For example in 2010, the total volume of Pakistan trade with European Union 14.7%, with China was 14.2%, with UAE was 9.6%, with US was 8.5%, with Saudi Arabia was 7.8%, with India was 4.3%, with Malaysia was 4.2%, with Kuwait was 3.8%, with Afghanistan was 2.9%, with Japan was 2.7%, with Iran was 2.5%, with Singapore was 2.1% and with Hong Kong was 1% (DG Trade, 2012). In this study, trading partners including, Afghanistan, UAE, Saudi Arabia, Kuwait and Iran are not included because of unavailability of data for the sample time period.

The major motivation behind this study of assessing co integration of the stock market of Pakistan and its major trading partners is the fact that these countries

represent markets that are possible venues for international portfolio diversification because they are relatively performing well. As according to portfolio theory, the degree of linkages between assets or markets shows the benefits arising from diversification. Moreover, for policy implication point of view, if interdependence is found between Pakistan equity market and the equity markets of its trading partners then there is the danger that shocks of other markets may spill-over to Pakistan (King & Wadwhani, 1990), in this situation there will a need for stronger cooperation between the government of these countries. Finally studies on equity market integration that take a non-US perspective are in dearth, so this study addresses this particular need by addressing non- US perspective. The rest of the study has been organized as; section 2 provides a brief account of the literature supporting the identified objective of the study. Section 3 describes the data collection process and methodology adopted in this study. Section 4 describes the empirical results of the co integration analysis. Lastly section 5 discusses the findings and significance of the study.

2. Literature review

Abundance of literature is available on the issue of capital market co integration analysis in order to justify international diversification as a tool to minimize risk associated with various investment opportunities available in the international markets. Hassan & Naka (1996) have examined long and short-run relationships between stock market indices of Germany, Japan, US and UK using daily data for the period of 1984-1991 and found long and short-run relationships between their stock market indices and observed that in short run the post and pre October 1987 crash era, all other stock markets were led by U.S. stock market. While in long run US market led all other markets in all examined periods. However, Yang & Bessler (2003) studied co-integration of the stock markets of Hong Kong, Japan, Australia, UK, Germany, France, Switzerland, US and Canada by using daily stock index closing prices from June 1997 to June 1999 and provided an evidence of one co-integrating vector and stated a consistent long-run impact of US on the other markets.

Similarly Muckley, Lucey & Aggarwal (2003) focused on European markets and examined European equity markets' integration by using co integrating technique for the period of 1985-2002. Their findings identified Frankfurt as the dominant equity market and also found out that during 1997-98 period European equity markets' integration was increased. However, Atyeh & Rashed (2012) examined integration between the European Union countries and the Arab countries financial markets by using Johansen approach for indices data extending from May 2005 to January 2011 and found integration between European Union countries and Arab countries financial markets. Their findings further asserted that when Arab market index are

led by the stock indices representing European Union Countries.

Erdal & Gunduz (2001) have examined relationship between G-7 countries and Istanbul Stock Exchange and Egypt, Morocco, Israel and Jordan, before and after the Asian crisis, but couldn't find any link with MENA countries; on the other hand underlying relation among G-7 countries and Istanbul Stock Exchange was determined. Gunduz & Omran (2001) also conducted a similar study for Japan, Jordan, Turkey, Egypt and Morocco from the MENA region for the period 1997-2000 and rejected hypothesis of common stochastic existence. However, Maghyreh (2003) examined the developing markets' integration in Jordan, Turkey, Morocco and Egypt from 1997-2002 and have founded that there is low level of integration in the equity markets of Morocco, Egypt, Jordan and Turkey.

Kucukcolak (2008) measured Turkish equity market's integration level with EU market indices of France, UK, Greece and Germany for the period of 2001-2005 by daily data. By using Engle-granger equation revealed that in the long run, Turkish stock market is not co-integrated with UK, German and France, whereas it is co-integrated with Greek market. However, Glezakos & Mylonakis (2009) examined interdependence among the stock markets of Romania, Bulgaria, Croatia, Slovenia, Greece, Germany and Turkey from November 2000 to February 2009 before and during the economic recession. To check stationarity Augmented Dickey-Fuller Test and the Phillips-Person Test was used and pair wise Granger Causality Tests was used to check causality. They found that these markets are loosely related during normal economic activity and are strongly interrelated during economic recession.

Naeem (2000) used bivariate and multivariate techniques in study of integration in order to explore the dynamic linkages among South Asian Stock Market and UK and US equity markets for the period of 1994-1999. The findings of the study indicated no long run relationship between UK, US and South Asian stock markets. Therefore investors can diversify their portfolio in stock market of UK or US and the Asian Stock market as an investment opportunity. However, Nath & Verma (2003) used daily stock market data from January 1994-November 2002 for the study of interdependence among three most important stock markets in South Asia (the stock markets of India, Taiwan and Singapore). They have found that the index level series are non-stationary and has also revealed no co-integration amongst the stock market indices.

Lamba (2005) examined markets of Pakistan, Sri Lanka and India and the chief developed markets from July 1997 - December 2003 for short- and long-run relationships. His study indicated that India's market is influenced by US, UK, Japan and this impact has persevered following the September 11, 2001 terrorist attacks on the

US and that the three South Asian equity markets are becoming more integrated with each other but at a relatively slow pace. However, Azeem, Ahmad & Yasir (2009) examined relationship among four major South Asian equity markets including Colombo Stock Exchange, Dhaka Stock Exchange, Karachi Stock Exchange and Bombay Stock Exchange by using monthly data from 1999 to 2009. They founded there is no long run and short run relationship among the equity markets of South Asia by using co integration analysis and vector error correction model.

Abdullah, Saleem & Hassan (2008) examined long-term relationship among equity markets of developed world and Karachi stock exchange by using weekly stock market data from 2000 to January 2006 by using Johansen and Juselius multivariate co-integration analysis. The study indicated that there exist a long-term relationship and these markets are integrated. Pair wise co-integration has shown that equity markets of Germany, Canada, US, UK, Italy and Australia are not co-integrated with Karachi stock market. However, the study has found France and Japan to be integrated with Karachi stock exchange. However, Muhammad (2011) examined long run association among US, UK, China, India, Germany and Pakistan by using weekly data from 2000 to 2010. It was founded that US equity market was well correlated with Pakistan equity market as compared to other equity markets.

The literature shows that only regional analyses, developing countries and developed countries have been focused by previous studies and studies conducted to find long term equilibrium relationship of Pakistan to its major trading countries are scant. This study is different from previous studies as firstly; it has used latest data for examining country and stock performance over the global financial crisis that spanned from January 2006 to May 2012. Secondly, whereas most studies have used monthly values this study has used daily stock market indices values because it is believed that information flows instantly and markets react to the information revealed in prices on other markets very quickly. As Cerny & Koblas (2008) found that it takes only one hour for information flow to be reflected in the stock markets of other countries.

3. Data collection and methodology

Daily data of stock KSE-100 Index for Pakistan and indices of its ten major trading partners including US, UK, China, Korea, Hong Kong, India, Germany, Malaysia, Singapore and Japan, has been collected. Data of all the indices has been obtained from Bloomberg (2012)³. E-views 5 statistical package has been used for analysis of the data. The data of 11 stock indices included in the study ranges from 1st May 2000 to 31st May 2012. After removing all the mismatched dates, the sample size contained 2934 observations for each country. However the initial sampled time period selected

3 <http://www.bloomberg.com>

for this study comprised of 12 years during which the international market was also hit by the international financial crisis of 2008-2009. Therefore before formal analysis the data was checked for structural breaks using Chow test. The Chow test results indicated structural breaks in the data. Consequently the final data set employed for the study extended from January 4, 2010 to May 31, 2012 containing 547 observations. Since the study is based upon time series analysis therefore Natural logarithm of all the series have been taken for normalization of the data.

In this study KSE 100 index is used as a proxy for the capital market of Pakistan, S&P 500 index is used as a proxy for the capital market of US, FTSE 100 index is used as a proxy for the capital market of UK, Shanghai Composite Index is used as a proxy for the capital market of China, KOSP index is used as a proxy for the capital market of Korea, Hang Sang index is used as a proxy for the capital market of Hong Kong, BSE index is used as a proxy for the capital market of India, DEX index is used as a proxy for the capital market of Germany, FTSE Bursa index is used as a proxy for the capital market of Malaysia, Straits time index is used as a proxy for the capital market of Singapore and Nikkei 225 Index is used as a proxy for the capital market of Japan.

3.1 Unit root test

In order to analyze co integration between time series variables Augmented Dickey-Fuller unit root test has been used. All the error terms are independently distributed and have a constant variance is assumed by Augmented Dickey-Fuller test. Due to its strict assumptions Augmented Dickey-Fuller test is assumed a strict test. Augmented Dickey-Fuller test is used to test the following hypothesis.

Ho: There is a unit root/or non-stationary

H1: There is no unit root/ or stationary

The model used by ADF test has been described by Equation.1 given below.

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 \Delta Y_{t-1} + \varepsilon_t \quad (1)$$

For determining stationarity of the data β_1 has been analyzed in the above given model. This coefficient has been explained by equation.2 given below.

$$\beta_1 = \rho - 1 \quad (2)$$

Moreover the number of autoregressive components included in the model is determined by the Modified Akaike Information Criteria (MAIC).

3.2 Co integration analysis

As the aim of the study is to explore the long-term equilibrium relationship between the capital market of Pakistan and its trading partners therefore the concept of Co integration has been used in this study. Co integration requires all time series to be non-stationary and assumes linear combination of two times series to be stationary even if they are individually non-stationary. This study has used Johansen Co integration technique.

Johansen and Juselius (1990) proposed the Johansen Co integration technique. Johansen Co integration test has superiority due to its ability to cover the underlying properties of the times series data being analyzed. The results of the study have been based on the Trace Test statistics in order to determine the number of co integrating vectors. The Johansen test proceeds sequentially by first analyzing $H_0: r \leq 0$, here r is the number of co integrating vectors. If H_0 is rejected, then the next hypothesis $H_0: r = 1$, is analyzed and so on until the null hypothesis could not be rejected.

4. Empirical Results

Descriptive statistics of the daily data for all the 10 indices incorporated in the study are given below in Table 2.

The descriptive statistics of the study indicated positive mean of all the variables. However Nikkei 225 Index of Japan has the highest mean and FTSE Bursa index of Malaysia has the lowest mean. Analyzing statistics, Standard deviation shows that PAK has the highest deviation from mean 80.7% while UK has the lowest deviation

Table 2: Descriptive Statistics

Countries	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera p-value
Pakistan	8.648869	8.961435	0.807129	-0.677644	1.949288	0.000
US	7.067373	7.082477	0.160313	-0.557909	2.82158	0.000
China	7.629456	7.589354	0.395266	0.487871	2.586788	0.000
UK	8.560043	8.583786	0.156877	-0.485283	2.241256	0.000
Germany	8.57106	8.639073	0.271122	-0.653262	2.703102	0.000
Hong Kong	9.67769	9.65977	0.299198	-0.121007	2.010887	0.000
India	9.021497	9.128674	0.663597	-0.17694	1.471041	0.000
Japan	9.373527	9.319441	0.243317	0.36308	2.069275	0.000
Korea	7.0178	7.088546	0.433482	-0.183002	1.679575	0.000
Malaysia	6.881168	6.825075	0.288234	0.105376	1.852834	0.000
Singapore	7.714296	7.726643	0.285009	-0.147932	1.906646	0.000

from mean 15.6%. Skewness shows that data series of CHI, JAP and MAL are positively skewed however data series of PAK, USA, UK, GER, HK, IND, KOR and SIN are negatively skewed having long left tail. Since the Kurtosis of all the time series is less than 3 therefore the distribution of all monthly time series under study can be categorized as platykurtic. The Jarque-Bera statistic of normal distribution is rejected for all the time series at the significance level of 5%.

Augmented Dickey-Fuller test results are shown in Table 3 below, which show that for all the time series included in the data null hypothesis is accepted except for Japan. For all the time series the ADF test statistic is greater than the critical value at 5% but not for Japan. This shows that time series of the capital markets of all the countries are found to be non-stationary excluding Japan and hence the data is viable for co integration analysis. Figure 1 shows the line graph of the capital market of each country, which also shows that the data is non-stationary.

4.1 Co integration analysis

Johansen co integration test has been applied at critical value of 5%. Linear de-

Table 3. Augmented Dickey-Fuller test Statistics (without constant)

Indices	tau-Statistics	Prob.*
Pakistan	-2.1814	0.2133
US	-1.8186	0.3718
China	-1.5060	0.5308
UK	-2.5535	0.1029
Germany	-2.2252	0.1973
Hong Kong	-1.96805	0.3013
India	-2.47844	0.1208
Japan	-21.847	1.773e-38
Korea	-1.14182	0.7014
Malaysia	-0.62265	0.8633
Singapore	-2.22192	0.1985
1% level	-3.43239	
5% level	-2.86233	
10% level	-2.56723	
*Mackinnon (1996) one sided p-values.

Figure.1 Line graphs of all capital market indices: 1st May 2000-31st May 2012

terministic trend assumption has been considered in Johansen test for Co integration due to non-stationary of the data. Table 4 given below shows the results for the pair co integration of Johansen co integration test. By analyzing the value of Trace Statistic (Q) in the table it has been found that there is a long-term equilibrium relationship between the capital market of Pakistan and four trading partners including US, UK, Japan and Korea at the critical value of 5%.

5. Discussion and Conclusion

Invertors maintain a well diversification portfolio in order to obtain risk adjusted and significant returns. Due to globalization these days' investors go across their national borders and invest in different international capital markets of the world. Diversification has become easy due decrease in trade barriers, high availability of information and greater communication. In order to get advantage from international

Table. 4: Johansen Co integration Test (Trace Statistics) Bivariate Co integration

Pair wise co-integration	Hypothesized No. of CE(s)	Trace Statistic (Q)	p-value (5%)	Conclusion
PAK VS US	r=0	24.084	0.0016	One Co integrating Vector
	r<1	2.3788	0.1230	
PAK VS CHINA	r=0	5.8227	0.7186	No Co integration
	r<1	1.2408	0.2653	
PAK VS UK	r=0	19.719	0.0096	One Co integrating Vector
	r<1	3.5010	0.0613	
PAK VS GER-MANY	r=0	10.879	0.2227	No Co integration
	r<1	2.4293	0.1191	
PAK VS HONG KONG	r=0	11.188	0.2032	No Co integration
	r<1	4.1406	0.0419	
PAK VS INDIA	r=0	14.352	0.0727	No Co integration
	r<1	5.8441	0.0156	
PAK VS JAPAN	r=0	79.647	0.000	One Co integrating Vector
	r<1	2.6506	0.1035	
PAK VS KOREA	r=0	16.650	0.0317	One Co integrating Vector
	r<1	1.9052	0.1675	
PAK VS MALAY-SIA	r=0	12.546	0.1333	No Co integration
	r<1	0.79617	0.3722	
PAK VS SINGAPORE	r=0	12.975	0.1159	No Co integration
		4.7033	0.0301	

diversification investors are supposed to invest in countries which capital markets are not integrated with the capital market of the home country.

The literature shows that a lot of work has been done to study capital markets co integration between different countries of the world but the literature on co integration between Pakistan and other countries is very scant. In this study co integration between Pakistan and its ten trading partners has been analyzed by using Johansen test of co integration. The results showed that there is co integration between capital market of Pakistan and four trading partners including US, UK, Japan and Korea found out by using daily data of the indices of these countries. The long-term equilibrium relationship found out between the four trading partners can prove to be helpful as well as harmful for the investors. The findings of the study depicted a

long-term relationship however the nature of relationship is still not clear. Therefore investors can check these markets for a possible negative return relationships and can achieve diversification in their investment portfolio. Moreover these markets can also be avoided for the purpose of investment incase of positive return relationships.

The reason behind the lack of Cointegration between trading partners other than US, UK, Japan and Korea lies in the fact that the Pakistani capital market is inefficient and therefore do not depict the effect of other international capital markets although it is receptive to national events like natural disasters (Earth quake and flood) and manmade disasters (Terrorism, War against Terror) and depicts the effects of these events. Moreover the Pakistan's banking sector is also not aligned internationally which also prevents along term equilibrium relationship between certain trading partners of Pakistan.

The study aimed to find out co integration between capital market of Pakistan and its each trading partner in order to benefit investors who are interested to do international investment in international capital markets for diversifying their portfolio in order to reduce their systematic risk.

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