Emerging Trends of Financial Markets Integration: Evidence from Pakistan

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Abstract

This study investigates extensively the integration of various segments of financial markets (i.e. money market, lending and deposit market, exchange rate market, and capital market) both domestically and internationally. Cointegration approach is employed in the study to find out long term relationship among the variables. Data are on a monthly interval for the period spreads over 2001 to 2010. The results show no evidence of cointegration between money market and exchange rate market and between capital market and exchange rate market of Pakistan. On the other hand, international financial markets integration is also investigated and the findings revealed that domestic money market rates of Pakistan and USA are not cointegrated. Whereas, an evidence of cointegration between capital markets of Pakistan and USA is found in this study.

Keywords: Financial Integration; Money Market; Capital Market; Exchange Rate Market; Cointegration.

JEL Classification: G1, G2, E4.

1. Introduction

The rapid increase in the globalization of world financial markets and greater volatility transfer among the markets has lead to the exploration of the factors that drive international financial integration and volatility. The international financial crisis in the recent periods caused by localized crises such as the collapse of Russian bond market, the Asian financial crisis, and the very recent US financial crisis have made it very important to determine and understand the global financial markets integration (Antoniou et al., 2007). The market is said to be fully integrated if all participants; undergo equivalent rules regarding financial instruments and/or services, have equal access to the financial instruments and/or services, and enjoy equal treatment in the market (Baele et al., 2004; Schmiedel & Schonenberger, 2006).

In other words, one can understand financial markets integration as a situation which excludes all quantitative and qualitative barriers. These barriers are tariffs, taxes, restriction on trading in foreign assets etc. furthermore, it these barriers also include information cost which hinders the free flow of capital from one market to another. Thus, financial markets integration allows domestic investors to buy foreign assets and foreign investors to buy domestic assets. In the recent years, several factors like globalization, technological advancement, trade and financial liberalization etc. have contributed significantly to the process of financial market integration. Integration of financial markets occurs in the four ways.

- Public sector integration: It occurs in the form of foreign currency debt issuance whether under foreign or domestic law, and in the form of local-currency debt issuance to the foreigners in the issuer's domestic market.
- Corporate sector integration: It occurs in the form of foreign direct investment and cross border borrowings.
- The further integration of corporate sector in the form of stock and bond trading in foreign countries markets. It occurs when institutional and individual investors buy and sell the stocks and bonds in other countries' markets.
- Banking sector integration: It occurs due to the lending and borrowing of banks in a world wide interbank market or run operations globally.

The literature on finance establishes the outfitted connections among different financial markets on the basis of two principles. First, the term structure of interest rates which is derived from the impartial expectations, preference of liquidity and segmentation of market, creates integration across the spectrum of maturity, that is, short, medium, and long ends of the financial markets (Misra & Mahakud, 2009). Money economics literature recognizes that the term structure of interest rate contains the information of inflation and growth in future paths, which characterizes the purposive function of policy in most countries. Second, the CAPM presented by Sharpe (1964) creates linkage between different instruments, both risky and risk free such as government securities. Afar economic and financial principles, information efficiency also establishes financial markets integration, as economic agents make predictions about the future course of policy and real sector developments.

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Knowledge of integration of financial markets is useful to different role players. As International portfolio investments can influence the exchange rate and could lead to appreciation of local currency so co-integration among markets has considerable value for multinational companies in making financial policies. Furthermore, According to portfolio diversification theories (Markowitz, 1952; Sharpe, 1964; Lintner, 1965) if stock markets are interlinked then there is no long run benefit of diversification for international investor and vice versa. Therefore, it is vital for global portfolio managers and international investors to examine the dependencies among international equity markets. Finally, to study co-integration among stock markets would be useful for policy makers in a sense that if stock markets are found to be closely linked then there is a danger that shocks in one market may spill over to other markets thus require closer cooperation among the authorities of these countries, whose equity markets are closely linked (Majid & Kassim, 2009). However, studies show heterogeneous results regarding effect of global financial crisis on stock markets of different countries (Karim, 2011; Pass & Kuusk, 2012).

Domestic investors also need to know about the inter-relationship of domestic markets to make certain investment decisions. Businesses and financial institutions make short term investments and also raise funds through money markets' short term instruments like T-bills, commercial papers, and certificates of deposits, etc. Hence the knowledge of relationship of money market instruments among themselves and with foreign exchange market and capital market is very useful for the domestic investors.

Pakistan has introduced many reforms since 1990 in almost all major economic activities. Privatization commission was set up for the purpose of identifying and privatizing public services and institutions. Foreign investors were allowed to purchase public assets. Many public service units were privatized under the liberalization program of the government. In the banking and finance sector, rule based system has been introduced. By the year 2000, Habib Credit and Exchange, Allied Bank, Banker's Equity, and Muslim Commercial Bank were privatized.

Before introducing reforms, Pakistan was following import substitution policy with high tariff level and non-tariff barriers. The domestic market was isolated from international market competition. But during the decade of 1990, Pakistan has brought many reforms which strongly focus on competitive trade, reduction in the tariff walls and opening up of the domestic market. Licensing requirement for goods was abolished. Foreign companies were permitted to undertake foreign trade. Export credit scheme was introduced to facilitate credit for exporters and importers. Foreign exchange was made freely available to the commercial and industrial registered importers. Private sector was allowed to export restricted items like cement and related products. Regulatory duty was also abolished.

These developments were followed by the inflow of foreign capital through the Pakistan Fund, the Common wealth Equity Fund and the Credit/Lyonnaisee Pakistan Growth Fund. The

process continued in 2000s. The year 2001 evidenced some more changes after the 9/11 attacks. The war against terrorism started and after the war, some of the advantages to Pakistan's economy were the rebirth of alliance with the United States, increase in export quotas for textiles to US and EU, increase in foreign remittances via proper channels, foreign direct investment, and rescheduling of the debt of country.

It is expected that financial market of Pakistan has achieved some degree of maturity and integration after undergoing such process of developments. Similarly, it also establishes the relationship between exchange rate stock returns as cross border investments must incorporate the foreign exchange market (Umar et al., 2012; Shetty & Manley, 2006). Extensive literature is available on financial markets integration. However, most of the studies focused on the integration of stock markets of different countries. There is a significant lack of studies on the investigation of the relationship among various segments of financial markets like money markets, credit markets, and foreign exchange markets etc. The objective of this study is to investigate extensively the integration of various segments of financial markets (i.e. money market, lending and deposit market, exchange rate market, and capital market, both domestically and internationally.

2. Literature Review

Ampoch (2011) examined the linkages between African stock markets between African and global markets taking monthly returns of stock markets. The results evidenced the absence of cointegration between African markets global markets. Whereas, Oh (2003), investigated the sectoral returns and capital market integration for four European countries (France, Germany, Italy and the UK), using a panel data of return on assets of listed firms for the period 1988 – 1995. The findings showed the partial integration among capital markets of Europe. Linkage between Middle East and North African (MENA) countries is examined by Gentzoglanis, (2007) which included monthly time serious data from 1996 to 2002. The study confirmed the link between the high income countries and this relationship is weak for the low income MENA countries. Beaulieu et al. (2009) examined the financial integration across North American stock markets for the period 1984 – 2003 utilizing arbitrage pricing theory frame work. The study showed the mild rather than partial or strong integration in both domestic portfolio and interlisted stocks.

Oh (2009) examined the monetary integration with or without capital market integration in the case of East Asia. The findings of the study imply that the less – integrated capital markets are helpful to achieve monetary integration for the case of East Asia. On the other hand, Ferreira, (2008) explored the integration between financial intermediation and economic growth in the European countries. The study confirms the influence of financial systems on the output growth of the European

countries. Arouri and Nguyen (2010) examined the cross – market linkages using data of Gulf stock markets and proposed an empirical procedure for examining the time varying features of cross – market correlations. The study concludes that conditional cross market correlations between selected Gulf markets are time varying, past dependent and subject to structured breaks. However, the study shows that the co movements are still small within the Gulf region and insignificant between Gulf stock markets and international markets.

Whereas, Bhattacharyya and Banerjee (2004) investigated the integration among the stock markets of 11 countries of the three continents (Asia, Europe and America) using data for the period 1990 – 2001 and confirmed integration among the studied markets. Antoniou et al. (2007) investigated the market-wide and sectoral integration in the UK, the USA, and Europe for the period 1988 – 2003 using dynamic conditional (DCC) model. The findings suggested that UK equity market is more integrated with Europe in terms of both stock markets and sectors.

Aktan et al. (2009) investigated the linkages among the stock markets of Brazil, Russia, India, China, and Argentina (BRICA) and their relationships with the US market. Data was taken from 1st January, 2002 to 18th February, 2009. The findings showed that the US market has significant effect on all BRICA countries in the same trading day. The most integrated countries were Russia and Brazil and the least integrated countries were China and Argentina. Furthermore, Granger causality test showed that Russia influenced all other countries and Brazil affected Argentina, Russia and India. China only affected Argentina and Russia. Impulse response test revealed that all countries respond to an anticipated shock immediately and recover in nearly five or six days.

Menon and Subha (2009) investigated the cointegration of stock markets of Indian Subcontinent with US stock market. The results showed that there is no cointegration between Indian stock market and US stock market. The integration among the various segments of financial market is investigated by Misra and Mahakud (2009). The study examined the integration among money market, gilt market and foreign exchange market, in Indian case using VAR framework. The findings report that the money market integration is inconclusive in India.

3. Methodology

3.1. Data and Variables

The study includes various segments of money market and credit market. Monthly data was chosen to avoid false correlation problem often found in annual and quarterly data while not compromising on available degrees of freedom required in selecting appropriate lag structure whereas daily data was also deemed to contain too much noise and is affected by day of the week effect. The variables are listed below, with the symbols used in parentheses:

- US Fed Fund Rate (USFR).
- US Certificate of Deposit Rate (USCDR).
- US Commercial Paper Rate (USCPR).
- KSE-100 Index (KSE).
- Standard & Poor 500.
- Exchange Rate (EXR).
- Government of Pakistan Treasury Bill Rate (GPTBR).
- Call Money Rate (CMR).
- Deposit Rate of Bank (DRT).
- Lending Rate of Bank (LRT).

Data on Government of Pakistan Treasury Bill Rate (GPTBR), Call Money Rate (CMR), Lending Rate (LRT) and Deposit Rate (DRT) were collected from the various published sources of State Bank of Pakistan (SBP) whereas data on exchange rate and KSE-index were collected from business recorder website. On the other hand data on US Certificate of Deposit Rate, US Federation Fund Rate and US Commercial Paper Rate were obtained from the website of Board of Governors of the Federal Reserve System. The study uses the data on a monthly interval for the period spreads over Jan 2001 to Dec 2010.

3.2. Procedure

This study aimed at testing the financial market integration hypothesis by performing co-integration tests for various instruments of money and capital markets. Cointegration technique makes out the long-run relationship among the variables under consideration. This test assumes the stationarity of the variables. Hence, before estimating the cointegration model, the stationarity of data is analyzed which can be done using augmented Dicky Fuller (ADF) or Philip-Perron tests. If the linear combination of two non-stationary variables is stationary, the regression becomes meaningful and it can be inferred that the two variables are co-integrated and thus, they have a long-run relationship with common trend. Both bivariate and multivariate co-integration analysis can be carried out using the standard Johansen (1991, 1994) methodology to measure the process of market integration. The null hypothesis says that the series has unit roots or follows random walk and the null hypothesis can be rejected if the calculated t-statistic values are greater in absolute terms than the critical values.

All the series of data are expressed in logarithmic form. This is done to make the time series data stationary. The returns for the series were also calculated as the log difference between the two consecutive rates. Financial time series are normally found to be non-stationary most of the times. The non stationary time series has a problem in wrong inference since any statistical inference obtained from running the regression is dubious. A number of alternatives tests are available for testing whether a series is stationary or not, Dickey and Fuller, the Augmented Dickey and Fuller (ADF) (Dickey & Fuller, 1979,

1981) and the Philips-Perron (PP) test developed by Philips (1987) and Philips and Perron (1988). After descriptive test, this study tests the variables for unit root to establish the order of integration by employing Augmented Dickey Fuller Statistics and Philips-Perron (PP) test. ADF and PP tests were applied on all the variables both at log level and first difference. Co-integration test of various segments of financial markets, is carried out separately to find out the long run relationship among the variables.

3.3. Descriptive Statistics

Logarithmic transformation of all the original time series is performed and descriptive statistics of logged data is presented in Table 1 in terms of mean, standard deviation, skewness and kurtosis etc. The skewness values for all the series are negatively skewed except exchange rate. The kurtosis values in table reveal that all the indices are platykurtic with lower than normal kurtosis except USCDR, GPTBR and CMR which are leptokurtic with more than normal kurtosis. However, since the values of skewness and kurtosis are not significantly different from zero and three respectively, the departures from normal distribution may not seriously affect the test of cointegration. The standard deviation, skewness and kurtosis of EXRT are comparatively low as compared to the other series of domestic markets.

<Table 1> Descriptive Statistics

	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
USFR	0.144	0.537	-0.791	2.321	14.832
USCDR	0.232	0.496	-0.330	3.493	3.398
USCPR	0.189	0.488	-0.808	2.489	14.371
GPTBR	0.813	0.290	-1.104	3.214	24.612
CMR	0.830	0.303	-1.324	4.045	40.551
KSE 100	3.753	0.332	-0.766	2.271	14.406
S&P 500	3.057	0.069	-0.323	2.685	2.581
DRT	0.535	0.237	-0.678	2.188	12.498
LRT	1.009	0.145	-0.984	2.768	19.637
EXRT	1.817	0.057	1.159	2.584	27.763

3.4. Unit Root Tests

Table 2 depicts the results of ADF and PP tests. It is very clear from the table that all the time series are non stationary at log level both in ADF test and PP test. However, ADF and PP statistics are significant for first difference of all time series at 5% level of significance. It is obvious from the table that all the variables are integrated of order one, I(1). Therefore, we can proceed to the cointegration analysis because all the indices are integrated in the same order which is essential for cointegration.

The aim of cointegration analysis is to investigate whether there is a long run relationship among the instruments of various segments of financial markets like money market, credit market, exchange rate market, and capital market. The pair wise Johansen and Juselius cointegration tests are applied separately in each segment of financial market followed by the Granger causality tests.

<Table 2> ADF and PP Statistics

	ADF		PP	
	Level	1st Diff.	Level	1st Diff.
USFR	-1.009	-4.374 *	-0.793	-5.503 *
USCDR	-1.185	-11.484 *	-2.326	-21.403 *
USCPR	-0.810	-6.060 *	-0.568	-5.945 *
GPTBR	-1.893	-3.556 *	-1.181	-8.224 *
CMR	-1.715	-16.163 *	-2.169	-18.038 *
KSE 100	-1.530	-10.200 *	-1.525	-10.195 *
S&P 500	-1.985	-8.782 *	-2.184	-8.827 *
DRT	-1.483	-2.893 *	-0.967	-28.515 *
LRT	-1.038	-3.222 *	-1.372	-11.847 *
EXRT	0.574	-5.942 *	0.046	-10.648 *

Note: Critical value at 5% is -2.886 for ADF and -2.885 for PP.
      * indicates stationary of data at 5% critical value

4. Empirical Results

4.1. Integration of Money Markets of Pakistan and USA

To study the integration of money market, US money market variables were paired with the Pakistani money market variables individually. In other words, US rates were considered as the reference rates or independent variables. It is a known fact that when domestic financial markets integrate with international financial markets then domestic interest rates lose their independent character and become influenced by international pulls and pressure (Misra & Mahakud, 2009). To check this in Pakistani context, a bivariate Johansen and Juselius cointegration test is applied and results are presented in Table 3. The results reveal that no evidence of cointegration is found in money markets of Pakistan and USA, thereby infer that money markets of Pakistan and USA are not integrated. This is very interesting finding. Since during the last few years there has been increasing relationships between US and Pakistan in the form of foreign aid, trade discount agreements, and huge inflow of remittances to Pakistan in US dollars. Therefore, it was assumed that both markets would have been highly integrated. However, it is not proved in case of money market variables. It could be inferred that interest rates of both markets have their own autonomous characteristics and any change in either of market's rates could not affect the rates of other market.

<Table 3> Results of Cointegration Tests

Variables	Eigen Value	Trace Statistics
DRT - USFR	0.064	8.798
LRT - USFR	0.059	7.502
CMR - USFR	0.036	4.535
GPTBR - USFR	0.052	6.528
DRT - USCDR	0.076	10.361
LRT - USCDR	0.081	10.473
CMR - USCDR	0.062	7.627
GPTBR - USCDR	0.054	6.931
DRT - USCPR	0.083	11.016
LRT - USCPR	0.064	8.001
CMR - USCPR	0.041	5.053
GPTBR - USCPR	0.056	7.081

Note: Critical value at 5% is 15.494

4.2. Integration of Money Market, Exchange Rate Market and Stock Market

Interest rate differentials are considered as the price for the foreign exchange (Misra and Mahakud, 2009). Therefore, it is assumed that there could be some inherent and causal relationship between money market and exchange rate market. A bivariate cointegration analysis is conducted between exchange rate and money market variables and between exchange rate market and stock market. The results are presented in Table 4. The results find no evidence of cointegration between exchange rate and money market variables thereby revealing that money market and exchange rate market are not integrated. Similarly, there is no cointegration between exchange rate market and stock market.

<Table 4> Cointegration Tests - Money Market, Exchange Rate Market and Stock Market

Variables	Eigen Value	Trace Statistics
GPTBR - EXRT	0.058	7.240
LRT - EXRT	0.047	5.725
DRT - EXRT	0.046	5.875
CMR - EXRT	0.039	5.028
EXRT - KSE	0.042	4.992

Note: Critical value at 5% is 15.494

4.3. Integration of Capital Markets of Pakistan and USA

Results of pair wise Johansen and Juselius cointegration tests based on two statistics - the trace statistics and eigenvalue are reported in Table 5. The table reveals that there is a cointegration between stock markets of Pakistan and USA as trace statistics exceeds the critical value at 5 % significance level. Therefore, on the basis of these results, it can infer that capital markets of Pakistan and USA are cointegrated. This infers that there are no opportunities to international investors for risk diversification in the two markets as both markets undergo co-movement.

<Table 5> Results of Cointegration Tests - Capital Markets of Pakistan and USA

Variables	Eigen Value	Trace Statistics
KSE - S & P 500	0.086	18.175 *

Note: Critical value at 5% is 15.494

4.4. Error Correction Model

When cointegration of domestic and international capital market is confirmed, the next step is to conduct error correction model to investigate the short term equilibrium between the two markets. Results of error correction model are depicted in Table 6. The results show that KSE equation doesn't have any significant effect of S&P500 as not any lagged changes in S&P500 are significant. Whereas, in S&P500 equation, 1 period lagged changes in KSE are significant. This mean that S&P500 is affected by KSE and it depends on KSE. These results seem very strange as the S&P500 is supposed to be more stable than KSE and has its impact on KSE rather than having affected by KSE. One of the reasons, behind this phenomenon, might be that in recent years, financial crisis in USA had severely impaired financial markets of USA thereby lead to the instability of stock markets whereas KSE was not as much affected by the crisis and remained in its ongoing situation. Error correction term (ect) for the both variables is insignificant which reveals that both variables are unresponsive to the previous period's deviations from equilibrium.

<Table 6> Vector Error Correction Estimates - Capital Markets of Pakistan and USA

Cointegrating Eq:	CointEq1	
KSELOG(-1)	1	
S&P500LOG(-1)	-3.146(-1.790)	
	[-1.757]	
C	5.856	
Error Correction:	D(KSELOG)	D(S&P500LOG)
Ect	-0.017(-0.013)	0.010(-0.006)
	[-1.264]	[1.588]
D(KSELOG(-1))	0.007(-0.096)	0.091(-0.046)
	[0.075]	[2.012]*
D(KSELOG(-2))	-0.077(-0.098)	0.009(-0.046)
	[-0.794]	[0.201]
D(S&P500LOG(-1))	0.308(-0.201)	0.178(-0.095)
	[1.532]	[1.859]
D(S&P500LOG(-2))	0.109(-0.195)	-0.133(-0.093)
	[0.560]	[-1.430]
C	0.008(-0.004)	-0.000(-0.001)
	[2.032]	[-0.272]

Note: Standard errors in ( ) & t-statistics in [ ], * significant at 5 %

5. Discussion and Conclusions

Economic and financial sector reforms measures, which have been continuing in Pakistan since last decade, facilitated the process of financial integration. Trade barriers have been declining and capital inflows have been increasing. This study investigated the cointegration of various segments of money markets of Pakistan and USA using Johansen and Juselius cointegration tests based on two statistics - the trace statistics and eigenvalue. Based on the results of cointegration analysis, it is revealed that domestic money market rates of Pakistan and USA are not cointegrated.

Recent reforms in the financial sector of Pakistan and liberalization policies of govt. of Pakistan have matured the domestic financial markets to a large extent. Furthermore, increasing ties with US in the form of financial aid, long-term debt, capital investments and trade discounts etc. have established a significant relationship between financial markets of two countries. Therefore, it was assumed that their might be an integration among different segments of money markets. However, the results are contradicting to a large extent. With the short-run interest rates integration, the issue arises how fast changes in money market rates will be passed on towards borrowers. If credit costs are an important element in the monetary transmission process, then convergence in lending rate behavior will play a vital role in unifying the impact of a single monetary policy. Although it is controversial to what extent the cost of borrowing is a major transmission channel of monetary policy, research shows that lending rates adjust with a different speed in changes in official interest rate.

Since, economies of countries are going to be integrated and cross border barriers are going to be removed, therefore, an international investor can buy or sell domestic instruments and domestic investors can buy or sell international financial instruments. Absence of cointegration between domestic and international money markets tells the investors to get an opportunity of risk diversification in lending or borrowings or in short term trading of financial instruments.

6. Limitations of the Study

One of the limitations of this study is the non-availability of data on the financial market variables. In fact, the markets are undergoing technological reforms and computerization of databases is being done. Yet, there is still a lack of computerized databases on many variables. The more the variables of money markets, the more well could be the results of the study.

Another limitation of this study is the selection of countries for international financial integration. The study considered US money market as a representative of international financial markets. In fact, this selection is due to the assumption of increasing ties with the USA in the recent years, but one country could not actually be the representative of the whole world. In order to investigate the financial integration of domestic markets with global financial markets, more countries should be taken into account.

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