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Nexus of KSE-30 Index

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Abstract
The Financial development in Pakistan is mostly represented by Karachi stock exchange 100-Index with ignorance of Karachi stock exchange 30-Index which was established to represent financial development Indicator and economic growth indicator as well in Pakistan. So, this study will be investigate the relationship of financial development and economic growth in Pakistan by taking KSE-30 Index, KSE-All Share Index and KSE-100 Index for financial development in Pakistan. In this study time series data varying from 1992 to 2013 is investigated by different econometric tools i.e. Augmented Dickey Fuller (ADF) unit root test, Johansen Cointegration method and Granger causality test. The results of these tools showed that a positive relationship exists between financial development and Economic growth of Pakistan both in long run and short run perspectives. The result also derived that there is bidirectional causality relationship between financial development and economic growth in Pakistan
Keywords: Financial Development, Economic Growth, KSE 30-Index

1. Introduction

There are many debates in past about the consequences of financial development effecting economic growth. Economic growth is the ability of the economy to increase its productive capacity in terms of goods and services over the period of time. Financial development is the development of new institutions that leads to investment in the production process. Schumpeter (1911) laid stress on financial institutions like banking system of a country for mobilizing savings (household or foreign) that facilitates the entrepreneur to successfully invest to enhance the productive capacity of the economy. Financial development is an important element that contributes to economic growth as studied by Gurley and Shaw (1955). Hicks (1969) emphasized that new financial markets play an important role in instigating industrialization by implementing new inventions and technologies. A similar study was conducted by Goldsmith (1969) about the acceleration of economy due to overall financial expansion. McKinnon (1973) and Shaw (1973) laid stress that the role of repressive policies (low interest rate or high reserve requirements) decelerates the financial development and economic growth in developing countries.

Stock market contributes in economic development through its functions varying from liquidity creation, mobilization of savings, distribution and acquirement of information to risk diversification. Better will be the efficacy and efficiency of these services, more will be the economic growth rate. A high return investment is associated with high risk, stock market diversifies this risk and converts savings to investments enabling economy risk distribution, enhances the economy. A liquid stock market provides incentive to investors about information acquisition of a firm before it is publically spread to get profit. Improved information contributes to economy and quality resource allocation (Holmstrom and Tirole, 1993). Liquid stock market reduces risk of investment, thus attracts investor. Diversification of risk as function of stock market contributes to economic growth as study by Obstfeld, (1994). Bencivenga, Smith and Starr (1996) articulate that a liquid capital market(stock market) is essential for industrial revolt, as promise of long term capital investment offers profitable outlay and investors are not interested to mobilize their savings for such long time period

A full grown (developed) country has high level of industrialization, general standard of living, gross domestic product (GDP), the Per Capita Income and amount of widespread infrastructure. It important to note that whether giant capital markets (stock market) of these countries surge and boost their economies or there is no impact of capital markets on economic progression. (Adjasi and Biekpe, 2006) states that a developed capital market provides the liquidity which reduces the cost and provides better resource allocation, results economic

growth Such countries are Canada, United States, Japan, United Kingdom, Spain Germany, Italy, and South Korea.

A developing country has an underdeveloped industrial base, lower living standard and low Human Development Index relative to other countries. Now-a-days capital markets in such countries are expanding and it will be interested to take consideration on association of capital markets (stock markets) of these countries with their economic boost. These economies include Argentina, Brazil, Bangladesh, China, Chile, India, Greece, Kenya, Mauritius, Nigeria, Nepal, Portugal, Saudi, and Zimbabwe. Among these developing nations which has increasing industrialization and economic growth are transforming to emerging economies like Argentina, Brazil, China, Chile, India, Korea, Malaysia, Pakistan, Turkey, Philippines. Different researchers have worked on the liaison of capital market (stock market) with economic increment in developed, developing and emerging countries.

In Pakistan from 1947 up to 1980s, government supported macroeconomic policies by improving infrastructure. Financial sector kept under great consideration. In Pakistan, Karachi stock exchange which was established in 1947 is best liquid and biggest stock exchange of the country. Karachi Stock exchange has three main indexes, KSE All-Index, KSE 100-Index and KSE-30 Index. As on February 2nd, 2015 there are 579 companies listed in KSE and the total market capitalization is Rs. 7,439.095 billions.

Although, many researchers have worked on relationship of financial development and economy in Pakistan but the purpose of this paper is to investigate the relationship of financial development and economy in Pakistan by introducing a new variable i.e. Karachi Stock Exchange 30-Index (KSE 30- Index). So, this paper will investigate the relationship of KSE-30 index, KSE-All Share Index and KSE-100 Index with GDP of Pakistan, both in shot run and long run. Furthermore, the direction of causal linkage of financial development with economy in Pakistan will also be examined by using all these variables.

The rest of paper contains different sections. Section 2 is review of Literature. Section 3 explains the methodology and model used in paper. Analysis is explained in Section 4. The last Sections 5 represent the conclusion.

2. Review Of Literature

A full grown stock market should motivate savings as well as maintain an efficient allocation of capital for productive investment that results an increase in economic growth (Dailami and Aktin, 1990). Financial development enhances economic growth and a prosperous economy is a result of financial deepening in many countries Cesoran Calderon (1999).

In less developed countries or emerging markets, there exists a relationship between financial development and economic growth. K. Filer, Jan Hanousek and Nauro F. Campos, (1999) in their study of developing and developed countries explored to find out that if the stock markets participate in economic growth or not. Using a sample of 64 countries and time period of 13 years, they find out that a causal relationship exists between financial development and economic growth.

Philip Arestis, Panicos O. Demetriades and Kul B. Luintel, (2001) implement the time series methods to examine the relationship of financial progress (development) and economic rise (growth) in five developed countries. Inputs are stock market progress (development), banking system progress (development) and stock market volatility with output as economic development. The stock market (capital market) and banks have positive contributions in economic rise (growth) of France, Germany and Japan but the contribution of banking system is in small fraction. The financial progress (development) and economic rise (growth) linkage is small in United Kingdom and United States and banking system can play a major contribution in economic development compared to capital market in these countries. The effect of stock market volatility has insignificant effect on financial progress (development) and economic output in Germany, but the effect is negative in case of United Kingdom.

Addressing the question about the linkage of financial development, stock market progress (capital market development) with economic growth, a study is represented by Guglielmo Maria Caporale, Peter G. A Howells and Alaa M. Soliman, (2004) taking account Argentina, Chile, Greece, Korea, Malaysia, Philippines and Portugal with data from 1977:1to1998:4 having 50 observations. Stock market development is represented by Market Capitalization and Traded Value variables, Bank development by Bank deposit liabilities and bank claims and Economic development by GDP, a VAR test is used focusing bivariate causality tests and trivariate causality tests. The result suggests that stock market development is big triggering force for the economic development in major five countries compared to Bank development in two countries only.

Jordan Shan and Qi Jianhong, (2006) study the relationship of china's financial development and its economic growth by applying VAR techniques (impulse response function analysis and variance decomposition analysis), as inputs for financial development used the ratios of quasi money, saving, investment, credit, and total stock market capitalization while real GDP as output in china. The study suggests that following the labor's contribution to economy financial development is second factor contributing the economic growth of china and

economic growth of china has also impact on financial development in the last 2 decades causing a bi-directional causality, further more credit growth is not influencing economic growth on a great deal but labor is the major strength creating the economic growth of china.

EGGOH C. Jude (2008) employs cross sectional and dynamic panel over the 1960 to 2004 for 71 countries to examine short-term and long-term relations between financial expansion and economic rise. The financial instability has no negative consequence on economic growth and its liaison with financial development in long-run case, but causing a negative impact both on economic growth and link of it with financial development in short-run case. Despite of this effect, there is a constructive impact of financial development on economic rise.

Muhammad Shahbaz, Nadeem Ahmed and Liaquat Ali, (2008) examined the relation of stock market (capital market) development with Pakistan's economy by using time series data for the period 1971-2006 with market capitalization as independent variable and real GNP as dependent variable. J-J Co-integration, ARDL bound testing techniques, DF-GLS and Ng-Perron tests with Engle-Granger causality tests are employed in this study result a strong relationship between stock market and economy of Pakistan in both short-term and long-term dynamics. A better stock market is spurring to the economic development in the country. The causal relation between these two factors is bidirectional in long run but unidirectional from stock market to economic growth of Pakistan short term parameters.

Sezgin Acikalin, Rafet Aktas, Seyfettin Unal, (2008) employ Co-integration tests and vector error correction model (VECM) on a quarterly data from 1991:Q4 to 2006:Q4 to examine the relationship of Istanbul Stock exchange with Turkish's macroeconomic variables. This study uses stock exchange returns as dependent variable with production levels, foreign exchange rates, current account deficits and interest rates as independent variable in a time series analysis. ISE and macro-economic indicators have a long-term relationship and there exists unidirectional relationship between macro-economic indicators of turkey and Istanbul Stock Exchange but ISE is also causing the interest rate, thus forms a bidirectional causal relationship in case of interest rate of Turkey.

Roshai za Taha, Sisira R.N. Colombage and Svetlana Maslyuk, (2009) investigate the liaison of stock market (capital market) and economic growth of Malaysia taking in account Kuala-Lumpur Composite Index and Industrial Production Index. They applied Granger causality test and vector error correction model (VECM) to investigate the liaison for period 1980 to 1998. They recommend that financial development (stock market) can make a major contribution in economic rise (growth) of Malaysia and the causality liaison between financial development and economy is bi-direction. Financial development can play positive role in economy of Malaysia both in short-term and long-term case.

Baboo M Nowbutsing and M. P. Odit, (2009) study the relationship of stock exchange and economic growth of Mauritius by applying time series analysis over the period 1989 to 2006, apply Engle-Granger approach using size and liquidity as input for stock market development. The stock market (capital market) development plays a positive role in economy of Mauritius both in shot run and long run aspects.

A study on relation of financial development with economic growth in sub continent (Bangladesh, India and Pakistan) over a period of 32 years (1976 to 2008) is studied by Md abdul Wadud (2009). Banking system and Capital markets as indicator of financial development and GDP as indicator of economic growth are used in Vector Autoregressive (VAR) and Granger Causality Tests. The study shows a long run relation of capital markets with economy of South Asian countries, furthermore a unidirectional causality relationship exists as financial markets are causing economic growth in one direction in South Asian countries.

To investigate the question whether stock market development is one of determinant in the economic growth of Pakistan, Mohammad Mafizur Rahman and Mohammad Salahuddin, (2010) represents a study over period 1971-2006 using market capitalization, financial instability, inflation rate, foreign direct investment, financial development, stock market liquidity and literacy rate as independent variable with Real GNP as dependent variable. To examine the long-run relationship ARDL and FMOLS bounds-testing with ECM for the short-run relationship are employed. The result shows both short run and long run stable influence of stock market (capital market) development in economic enlargement (growth) of Pakistan contrary to high inflation rate and financial instability causing negative impact on economic growth.

Ake Boubakari and Dehuan Jin, (2010) represent the study on causality connection of stock market (capital market)capitalization with economic growth of five Euronext economies (Belgium, Netherlands, United Kingdom, France and Portugal) using time series data for duration 1995:Q1-2008:Q4. To check the causality relationship Granger causality test is used taking GDP, Foreign Direct Investment, Market Capitalization, Turnover ratio, and Stock total traded value as variables. Highly active and liquid stock markets have strong relationship with stock market (capital market) capitalization and economic growth, thus small and less liquid stock markets like Portugal and Belgium the causation effect is insignificant.

Sharif hussain and mostafa kamal, (2010) examine the connection of capital market (stock market) with economic growth in Bangladesh by using real GDP and real per capita Income as economic indicators and

market capitalization with market capitalization to real GDP ratio as economic growth indicators. They employed the Unit root test, co-integration method and Granger-causality method to examine the relationship. There exists a long-run liaison between capital market development and economic growth in economy of Bangladesh. There is a uni-directional causality liaison as stock market (capital market) development is causing the economic growth but insignificant causal relationship from economic rise (growth) to stock market development.

Michael C. Budden, Robert F. Cope III, Yu Hsing and Susan M. L. Zee, (2010) study the stock market (capital market) and exchange rate performance with context of Brazilian economy using the real stock price index, central government revenues, world real interest rate, central government spending, the real BRL/USD exchange rate, the expected inflation rate and world output the as inputs having effect on equilibrium real GDP in Brazil a output for time period 1996.Q3 to 2009.Q3. The Dickey-Fuller (ADF) unit root test shows that, the ratio of government deficit to nominal GDP, U.S. output positively affect Real GDP of Brazil and real stock price index impact of inflation rate is negative but is insignificant. The economy of Brazil can be flourishing by vigorous development in stock market.

Tichaona Zivengwa, Joseph Mashika and Fanwell K Bokosi (2011) explore and evaluate the association of stock market progress with economic growth applying Vector Autoregressive (VAR), Unit Root Tests and Granger Causality Tests on time series annual data from year 1980 to year 2008 in Zimbabwe, using stock market size and stock market turnover as indicators of stock market (capital market) development with GDP per capita (real GDP/capita) for economic growth of Zimbabwe. The result suggest that the stock market size of Zimbabwe has no direct effect on real GDP, but the stock market size is triggering the investment in country which is main contributor in real GDP of Zimbabwe, thus stock market size is contributing in economic growth via investment in Zimbabwe while real GDP is also causative to stock market turnover in reverse relation which means a causal relationship between investment and stock market exists.

Anson Wong and Xianbo Zhou, (2011) investigate the contribution of Financial market in growth of Hong Kong, Japan, United Kingdom, china and United States economies using cross-country panel data over period 1988 to 2008. Market capitalization of stock exchanges in these countries is independent variable influencing the GDP of these countries as dependent variable. The financial market development is positively correlated with industrial production, key driver of economic growth in these developed countries in every mode of Financial System, type of Economic System and stage of Economic development.

Tobias O. Olweny and Danson Kimani (2011) apply Vector Autoregressive (VAR), Unit Root Tests and Granger Causality Tests for quarterly secondary of period 2001:Q1 to 2010:Q4 to check the relationship of stock market and economy of Kenya, use Consumer Price Index and Nairobi stock exchange-20 index to represent independent variable while GDP of Kenya as dependent variable. One way causal relationship exists from Nairobi stock exchange to economic growth (GDP) of Kenya, thus a positive sign in Nairobi stock exchange signals a high corporate profits and dividend in future causing positive economic growth in country.

Alajekwu, Udoka Bernard, Achugbu and Austin A., (2012) use Ordinary Least Square method on a time series data of 15 years for the period 1994 to 2008 to investigate the contribution of stock market (capital market)development in Nigerian economy, proxy for capital market size is market (stock market) capitalization ratio and on other hand the market liquidity is represented by value traded and turnover ratios. The stock market is negatively correlated with weak form to economic growth while the liasion of economic growth with market liquidity is strong, but the relationship is weak in terms of market liquidity and market size.

Dr. Udaya Raj Regmi (2012) examines the relationship of stock market development of Nepal with its economic growth employing unit root test, vector error correction and co-integration models over the period 1994 to 2011. The developing NEPSE composite index is used to indicate the stock market development of Nepal. The market capitalization ratio, turnover ratio and traded value ratio is representing the explanatory variable with GDP as explained variable. The result shows positive relation of stock market (capital market) development with economic growth, can be used to spur the economy in Nepal as a stable and well built stock market can accelerate the economy showing attractiveness to investors.

Kwame D. Fynn (2012) examines the linkage of stock market first and foremost on economic growth considering the Panel-Data analysis for duration starting from 1990 to 2010 for 50 countries including developed and developing economies, with Generalized Least Squares technique for predetermined effects with the elimination of 2005 to 2010 subgroup. In this study, the author measures real GDP/capita, industrial manufacturing and services sector growth as dependent variable of economic growth, independent variables are Turnover ratio (measure of stock market Development), Human Capital, Private Sector Credit, Inflation and Government Consumption . The result of this investigation suggests that overall financial progress (development) has no impact on the growth of an economy for the sample of 50 countries but there is a constructive relationship between financial progress (development) and economic growth of Brazil, China, India and G7 countries. This relationship depends upon different time periods and different regions of world as economic regimes and peripheral factors impact the growth in different ways and fluctuate across countries as oil

prices rise's in Russia was observed.

Indika Karunanayake, Abbas Valadkhani and Martin O'Brien, (2012) examine the interchange of stock market return and economic growth rates across four countries using quarterly data from 1959:Q3 to2010:Q4 for United Kingdom, United States, Australia and Canada. A multivariate GARCH model is applied to check the explosive spillovers nature across the stock return and GDP growth of these countries, results that co-volatility with varying time exists at high degree across their stock markets. There are positive own and co-volatility spillovers within and across the stock market returns and GDP growths of these countries. Australian stock return is affected by lagged-US stock return but this return and GDP growth is also forcing the US stock return. While the Australian GDP growth is affected by its lagged-Australian stock return and growth rates but lagged-US growth rates also has impact on it.

Mohammed Moosa Ageli & Shatha Mousa Zaidan, (2013) explore the Saudi's financial development relation with Saudi's economy by implementing unit root tests, the Co-Integration test with VECM and Granger Causality test for causal-effect from year 1970 to year 2012 using the stock market index as input of financial development of Saudi with GDP as output of Saudi economy. The study suggests that a strong liaison contains between stock market and economic growth of Saudi in long-term and this financial development (stock market) can be a positive force in development of Saudi economy.

3. Research Methodology And Model

The research methodology that has been adopted here is to measure the causal-effect relationship among the stock market and the economic growth, in case of Pakistan. The three stock exchanges are functional in Pakistan, named as Karachi Stock Exchange (KSE), Lahore Stock Exchange (LSE) and Islamabad Stock Exchange (ISE).The Karachi Stock Exchange (KSE) is oldest stock exchange of the country incorporated on March 10th, 1949 and had started five (5) companies having paid up capital of Rs. 37 million and trading was done through an open-out-cry system. KSE managed four (4) indexes, i.e.: (i) KSE All Share index ;(ii) KSE-100 Index; (iii) KSE-30 index; and (iv) KMI-30. But in the current study, first three KSE indexes have been selected.

3.1 KSE All Share Index

KSE All Share Index was incorporated in August 19, 1995.In 2013, 560 companies had been listed in KSE, out which 436 are non-financial companies and remaining are financial companies. The capital of these listed companies is Rs. 1.13 trillion but the market capitalization value is Rs. 6.05 trillion. The turnover of shares of these listed companies was 196.68 billion share in 2012 and but at the end of 2013, it is 238.62 billion share. The listed companies are categorized in thirty five (35) different sectors. KSE All Share Index calculates the market capitalization value (MCV) of all these listed company and mange this index (excluding Open-End Mutual Fund).

3.2 KSE-100 Share Index

This index is considered to be basic index of Karachi Stock Exchange. It was introduced in 1991 and is the successor of KSE All Share Index. This index includes top 100 companies of KSE listed companies on two different criteria: first, higher market capitalization value (MCV): select one company from each sector (excluding Open-End Mutual Fund), on the basis of highest MCV; and remaining 66 companies out of 100 companies has been selected on the basis of the highest MCV. These 100 listed companies had captured over 80% of the total MCV of the companies listed in KSE. The formula used for calculating the indices are:

$$I_t = \frac{\sum_{i=1}^{n}(O_{it} * P_{it})}{B_t} X\ 1000 \qquad (1)$$

Where:

I_t = the value of index at time period t
O_{it} = the sum of shares i outstanding at time period t
P_{it} = the current price of shares i outstanding at time period t
B_t = the base period value of index at time period t
n = the number of companies included in the index at time period t

3.3 The KSE-30 Index

The KSE-30 Index has been designed for the investor awareness that how large company's script of Pakistan's equity market are performing. The KSE-30 Index has been considered like other economic indicators that track the performance of the various sectors of the country's economic activity such as GDP, CPI etc. The calculation of KSE-30 Index has been involved by using the "Free-Float Market Capitalization" methodology. It reflects the free-float market value of the 30companies in relation to the base period. This index exclude the shares held by the controlling directors, sponsors, promoters, government and other locked-in shares not available for trading in the normal course. The base period of KSE-30 Index was introduced in June 2005 and the base value given at

that time was 10,000 index points, i.e. in 2005 = 10,000 points. On June 30th, 2005, the free float MCV of KSE-30 was Rs. 290.15 billion.

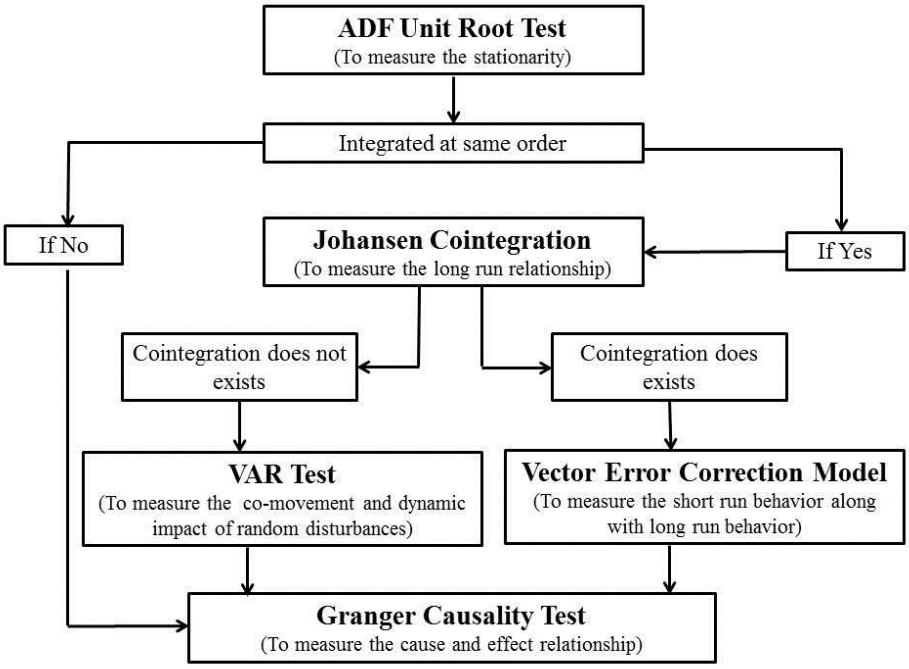
3.4 Economic Growth Variable

The different variable has been used in order to measure the growth of any economy. But in this study, gross domestic product (GDP) has been used as an economic growth variable, which depicts the increase in the size of national economy. It has been measured in local currency unit (Rs.).

The source of data, of all indices and GDP, is the central bank of Pakistan known by State Bank of Pakistan (SBP), digital economics library of Pakistan, Karachi stock exchange (KSE) and Bloomberg databases. The monthly realization period covered from February 1992 to December 2013 for GDP and KSE-100. The monthly realization period covered from April 2003 to December 2013 for Index KSE All Share Index and GDP. But for KSE-30 Index and GDP, the data is from March 2007 to December 2013.

The different econometrics tools have been used to measure the relationship among the stock market indices and GDP. The Figure 1 outlines the research method applied here. And

Figure 1
Flow Diagram of Research Methodology



The unit root method i.e. **Augmented Dickey Fuller (ADF)** is used to find out the stationarity of data whether the existence of unit root (non-stationary) for each variable. The **Schwarz Info Criterion (SBC)** has been used for lag differences. If the data become stationary at same order (means cointegrated), then **Johansen Cointegration Test** will be used to measure the relationship between variables. In order to find the short run relationship **Vector Error Correction Model (VECM)** has been used, which explain the changes in term of change in one variable. The **Granger Causality Test** has been applied in order to measure the bi-directional cause and effect means that both variables can cause and affect each other.

The **Variance Decomposition** or forecast error variance decomposition indicates the amount of information each variable contributes to the other variables in a vector auto regression (VAR) models (Lütkepohl, 2007). Variance decomposition determines how much of the forecast error variance of each of the variable can be explained by exogenous shocks to the other variables. Variance decomposition reveals how much of the changes in each variable may be explained by itself, and how much is explained by other variables.

4. Analysis

The descriptive statistics has been estimated in order to analyze the returns and riskiness through mean and standard deviation respectively. The results are shown in Table 4.1:

Table 4.1
Descriptive Statistics of GDP, KSE-ASPI, KSE-100 Index and KSE-30 Index

Description	GDP	KSE-All Share	KSE-100	KSE-30
Min	-0.033245	-0.411577	-0.448796	-0.593030
Max	0.319326	0.210056	0.246047	0.224364
Mean	0.006673	0.018858	0.011056	0.004844
Standard Deviation	0.021257	0.076554	0.092399	0.096914
Skewness	12.43551	-1.625720	-0.821786	-2.930548
Kurtosis	179.8547	9.99033	6.495155	19.05316
Jarque-Bera	352186.5 0.000000	324.4252 0.000000	164.7134 0.000000	1022.198 0.000000

The results of Table 4.1 show that the all indexes have positive returns. The riskiness has been determined through standard deviation, which shows that the KSE-30 Index is more risky then other indexes. The results of skewness of KSE-ASPI, KSE-100 and KSE-30 Index show that the data series exhibit asymmetric and redundant kurtosis. The GDP shows positive skewness and an indication of ARCH effects. The JB-stats show that the all series have highly significant results at 5% level and the acceptance of hypothesis that the series are not normally distributed.

At the first step, ADF Unit Root test and Phillips Perron Unit Root test have been used to check that the economic variables are stationary. The ADF test includes constant with no trend at level *I(0),* and first difference *I(1)* of variables. The lag differences (*k*) are chosen according to Schwarz Info Criterion (SIC) for ADF test. The bandwidth (*t*) is chosen according to Bartlett Kernel for PP Test. The test results had shown in Table 4.2:

Table 4.2
ADF Unit Root Test and PP Unit Root Test Statistic

Variable	ADF Unit Root Test *Trend and intercept*		PP Unit Root Test *Trend and intercept*	
	I(0)	***Results***	*I(0)*	***Results***
GDP	-5.589303*	**ST *I(0)***	-16.31971*	**ST *I(0)***
KSE-All Share	-9.383583*	**ST *I(0)***	-9.383583*	**ST *I(0)***
KSE-100	-10.74069*	**ST *I(0)***	-15.77007*	**ST *I(0)***
KSE-30	-8.040426*	**ST *I(0)***	-7.992096*	**ST *I(0)***

Note: ADF Unit Root Test Statistics and PP Test Statistics of GDP, KSE-All Share Index, KSE-100 Index and KSE-30 Index of Pakistan.
***denotes MacKinnon critical values for rejection of null hypothesis of a unit root and significance at the 5% level.**

The test result shown in Table 4.2, indicates that the time series data at level *I(0)* is stationary at 5% level of significance at different lags. The deterministic trend means that the time series is now completely predictable and no variable. So, all the time series of variables are stationary in case of Pakistan, this implies that

all the shocks that would be temporary and their effects would be eliminated over time as the series regress to their long term variance.

The long run relationship has been checked by the Likelihood Ratio (LR) Tests in order to determine the number of cointegrating relationships proposed by Johansen (1995). The test results of Trace Statistics Tests and Maximum –Eigen Statistics for GDP and KSE-ASI, which is shown in Table 4.3.

Table 4.3
Cointegration Test Statistic for GDP and KSE-ASI

Hypothesized no. of CE	Eigen Value	Trace Statistics	Critical Value	Prob**	Results
None* r=0	0.397958	113.1548	23.34234	0.00	Yes
At Most 1* r≤1	0.309087	47.69662	10.66637	0.00	Yes
Hypothesized no. of CE	**Eigen Value**	**Max-Eigen Statistics**	**Critical Value**	**Prob****	**Results**
None* r=0	0.397958	65.45822	17.23410	0.00	Yes
At Most 1* r≤1	0.309087	47.69662	10.66637	0.00	Yes

Note: Cointegration Test of GDP & KSE-All Share Index of Pakistan from April 2003 to December 2013.
* denotes rejection of hypothesis at the 1% significance level.
** MacKinnon-Haug-Michelis (1999) p-values.

Table 4.3 reported that the long run equilibrium relationship exist between GDP and KSE-ASI in terms of Pakistan. The trace statistics and Maximum –Eigen Statistics indicate that there are two numbers of cointegration equations exist at the 5% level which confirm the results of the Pesaran et al. (2001) cointegration approach.

The test results of Trace Statistics Tests and Maximum –Eigen Statistics for GDP and KSE-100 Index, which is shown in Table 4.4.

Table 4.4
Cointegration Test Statistic for GDP and KSE-100 Index

Hypothesized no. of CE	Eigen Value	Trace Statistics	Critical Value	Prob**	Results
None* r=0	0.353804	216.4199	23.34234	0.00	Yes
At Most 1* r≤1	0.320390	101.5802	10.66637	0.00	Yes
Hypothesized no. of CE	**Eigen Value**	**Max-Eigen Statistics**	**Critical Value**	**Prob****	**Results**
None* r=0	0.353804	114.8397	17.23410	0.00	Yes
At Most 1* r≤1	0.320390	101.5802	10.66637	0.00	Yes

Note: Cointegration Test of GDP & KSE-100 Share Index of Pakistan from February 1992 to December 2013.
* denotes rejection of hypothesis at the 1% significance level.
** MacKinnon-Haug-Michelis (1999) p-values.

Table 4.4 reported that the long run equilibrium relationship exists between GDP and KSE-100 Index in case of Pakistan. The trace statistics and Maximum –Eigen Statistics indicate that there are two numbers of cointegration equations exist at the 5% level which confirm the results of the Pesaran et al. (2001) cointegration approach.

The test results of Trace Statistics Tests and Maximum –Eigen Statistics for GDP and KSE-30 Index, which is shown in Table 4.5.

Table 4.5
Cointegration Test Statistic for GDP and KSE-30 Index

Hypothesized no. of CE	Eigen Value	Trace Statistics	Critical Value	Prob**	Results
None* r=0	0.414720	78.26268	23.34234	0.00	Yes
At Most 1* r≤1	0.342137	34.33818	10.66637	0.00	Yes
Hypothesized no. of CE	**Eigen Value**	**Max-Eigen Statistics**	**Critical Value**	**Prob****	**Results**
None* r=0	0.414720	43.92450	17.23410	0.00	Yes
At Most 1* r≤1	0.342137	34.33818	10.66637	0.00	Yes

Note: Cointegration Test of GDP & KSE-30 Share Index of Pakistan from March 2007 to December 2013.
*** denotes rejection of hypothesis at the 1% significance level.**
**** MacKinnon-Haug-Michelis (1999) p-values.**

Table 4.5 reported that the long run equilibrium relationship exists between GDP and KSE-30 Index in case of Pakistan. The trace statistics and Maximum –Eigen Statistics indicate that there are two numbers of cointegration equations exist at the 5% level which confirm the results of the Pesaran et al. (2001) cointegration approach.

The Figure 4.1indicates the long run co-integration relation between GDP and KSE All Share Index for the period of 2003-2013, 4.2 indicates the long run co-integration relation between GDP and KSE 100 Index for the period of 1992-2013 and 4.3 indicates the long run co-integration relation between GDP and KSE 30 Index for period 2007-2013.

Figure 4.1
Long Run Co-Integration Relation for KSE All Share

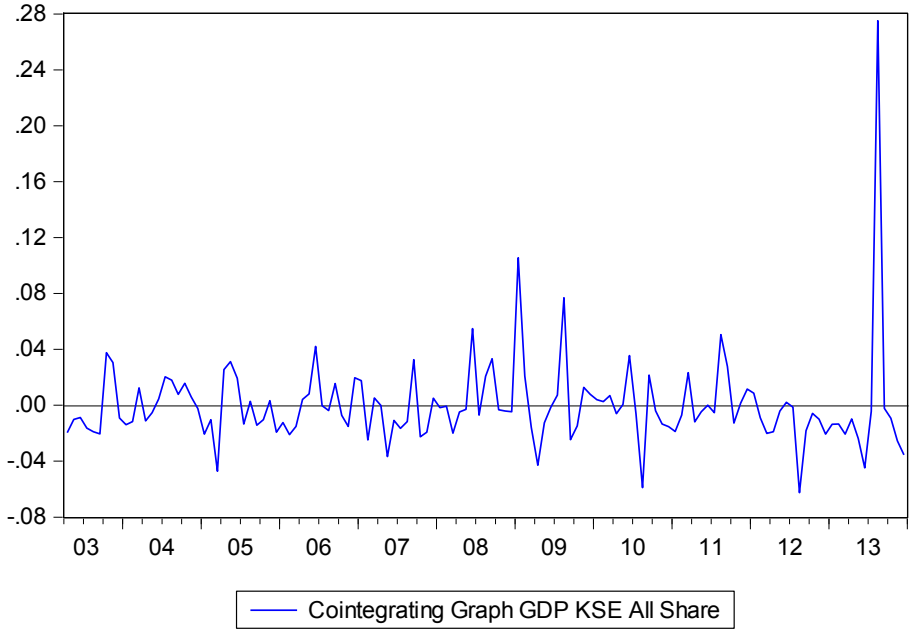


Figure 4.2
Long Run Co-Integration Relation for KSE-100 Index

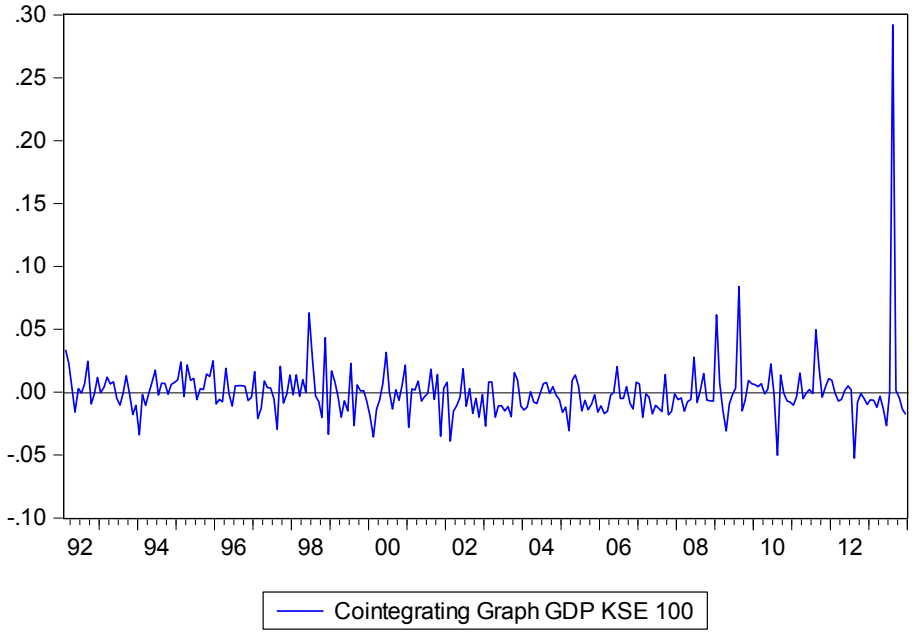
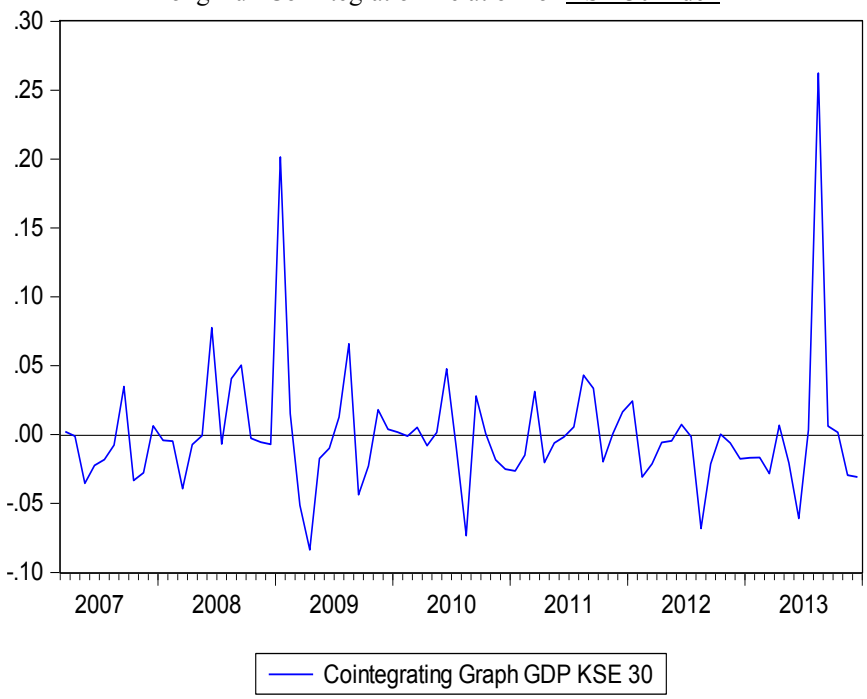


Figure 4.3
Long Run Co-Integration Relation for KSE-30 Index



All graphs clearly indicate an unstable mode of long run relation in the whole period. This is not a surprising indication because most of the Asian countries have faced unstable economics performance in that particular period, thereby the economic growth and stock market indicators were also affected directly from unstable monetary effects.

As the long-run relationships have been calculated, the short run coefficients have been estimated in the next step. The estimated results of VECM allow measuring the speed of the adjustments required to adjust to long run values after a short term shock. The short run results are shown in Table 4.6:

Table 4.6
VECM Estimates

Cointegration Eq.	GDP & KSE-ASPI		GDP & KSE-100		GDP & KSE-30	
γ	-0.268* (0.045)		-0.153* (0.022)		-0.353* (0.063)	
VECM	ΔGDP_t	$\Delta KASPI_t$	ΔGDP_t	$\Delta K\text{-}100_t$	ΔGDP_t	$\Delta K\text{-}30_t$
ρ	-0.759* (0.114)	1.180* (0.318)	-0.734* (0.080)	1.894* (0.382)	-0.606* (0.132)	1.371* (0.362)
$D(GDP_{t-1})$	-0.095 (0.088)	-0.647* (0.245)	-0.122 (0.062)	-0.940* (0.295)	-0.162 (0.110)	-0.727* (0.302)
$D(KSE_{t-1})$	-0.155* (0.032)	-0.184* (0.090)	-0.072* (0.012)	-0.322* (0.059)	-0.167* (0.042)	-0.122 (0.116)
Adj. R^2	0.444	0.189	0.431	0.282	0.405	0.236

Note: VECM Test Statistics of GDP, KSE-All Share Index, KSE-100 Index and KSE-30 Index of Pakistan
***significance at the 10% level.**

The coefficient γ on KSE-ASPI with GDP in the cointegrating vector is -0.268, which is significant based on ADF critical values. The VECM results indicate the changes in the GDP and changes in Stock Market Indicators (i.e. KSE-ASPI, KSE-100 Index and KSE-30 Index). The adjustment coefficient in VECM equation for the GDP is negative as expected, -0.759 with 10% of significant level. The adjustment coefficient for KSE-ALSPI is 1.180 and is significant.The results for lagged variables are significant except difference of GDP with change in GDP.

The coefficient γ on KSE-100 Index with GDP in the cointegrating vector is -0.153, which is significant based on ADF critical values. The adjustment coefficient in VECM equation for the GDP is negative as expected, -0.734 with 10% of significant level. The adjustment coefficient for KSE-100 Index is 1.894 and is significant. The results for lagged variables are significant except difference of GDP with change in GDP.

The coefficient on KSE-30 Index is -0.353 and statistical significant. The adjustment coefficient for GDP is significant that is -0.606. The KSE-30 Index adjustment coefficient is 1.371 for GDP but statistical significant. The results for lagged variables are significant except difference of GDP with change in GDP and difference of KSE-30 with change in KSE-30 Index.

It can be seen from all the above cointegrating relationships studied that the adjustment coefficient ρ is significant in the GDP equations as well as in the stock market models. This indicates that GDP responds to deviations in the long term relationship between economic growth and stock market performance. Similarly, the stock market variables also appear to respond to deviations as much as the GDP growth. Therefore it suggests that the stock market tend to react to short run changes in GDP. The long run relationship between stock market performance and GDP growth and short run changes in the stock market performance influencing GDP growth together explain a substantial part of the relationship examined. The adjusted R^2 of the error correction equations ranges mostly between 19% - 45%.

The Granger Causality test has been used to verify the direction of causality between the variables of Pakistan. It measures the two ways causality means the cause and effect relationship between two or more variables. The results are shown in Table 4.7:

Table 4.7
Granger Causality Results F-statistics: Pakistan

Null Hypothesis	**F-Stat**	**Prob**	**Causality**
KSE-ASPI does not Granger cause GDP	22.76170	0.0000*	Yes
GDP does not Granger cause KSE-ASPI	6.951935	0.0084*	Yes
Null Hypothesis	**F-Stat**	**Prob**	**Causality**
KSE-100 does not Granger cause GDP	33.50841	0.0000*	Yes
GDP does not Granger cause KSE-100	10.14027	0.0000*	Yes
Null Hypothesis	**F-Stat**	**Prob**	**Causality**
KSE-30 does not Granger cause GDP	15.53838	0.0001*	Yes
GDP does not Granger cause KSE-30	5.806813	0.0160*	Yes

Table 4.7 results show that there is bidirectional causality between KSE-ASI and GDP. Similarly, the test results also show that there is bidirectional causality between KSE-100 Index and GDP. In the end, the case of KSE-30 Index and GDP, there is also bidirectional causality. In all three cases, GDP causes KSE-ASI, KSE-100 Index and KSE-30 Index; on the other hand KSE-ASI, KSE-100 Index and KSE-30 Index also cause GDP in Pakistan.

The findings of the Variance Decomposition analysis of GDP and KSE-ASI show in Table 4.8:

Table 4.8
Variance Decomposition of GDP and KSE- ALSI

Variance Decomposition of GDP			**Variance Decomposition of KSE-ALSI**		
Period	**GDP**	**KSE-ALSI**	**Period**	**GDP**	**KSE-ALSI**
1	100.000	0.000	1	10.561	89.439
2	98.438	1.562	2	17.133	82.867
3	81.599	18.401	3	27.164	72.836
4	76.402	23.598	4	30.877	69.123
5	73.058	26.942	5	33.177	66.823
6	70.461	29.539	6	34.877	65.123
7	68.062	31.938	7	36.311	63.689
8	66.142	33.858	8	37.418	62.582
9	64.552	35.447	9	38.304	61.696
10	63.210	36.790	10	39.033	60.967

Table 4.8 results show that **39.033%** forecasting error variance of the KSE-ASI has been explained by GDP, **60.967%** is explained by itself. Similarly, **63.210%** of GDP had been determined by itself and **36.790%** has been described by the KSE-ASI. These findings are more equivalent to the outcomes of the causality analysis.

The findings of the Variance Decomposition of GDP and KSE-100 analysis show in Table 4.9:

Table 4.9
Variance Decomposition of GDP and KSE-100

Variance Decomposition of GDP			Variance Decomposition of KSE-100		
Period	GDP	KSE-100	Period	GDP	KSE-100
1	100.00	0.000	1	6.872	93.128
2	96.737	3.262	2	12.972	87.028
3	83.699	20.912	3	21.076	78.924
4	79.088	25.512	4	24.360	75.640
5	74.488	25.512	5	26.966	73.034
6	71.959	20.912	6	28.769	71.231
7	68.815	31.584	7	30.206	69.794
8	66.135	33.865	8	31.321	68.678
9	64.173	35.827	9	32.233	67.766
10	62.508	37.492	10	32.985	67.015

Table 4.9 results show that **32.985%** forecasting error variance of the KSE-100 Index has been explained by GDP, **67.5015%** is explained by itself. Similarly, **62.508%** of GDP had been determined by itself and **37.492%** has been described by the KSE-100 Index. These findings are more equivalent to the outcomes of the causality analysis.

The findings of the Variance Decomposition of GDP and KSE-100 analysis show in Table 4.10:

Table 4.10
Variance Decomposition of GDP and KSE-30 Index

Variance Decomposition of GDP			Variance Decomposition of KSE-30		
Period	GDP	KSE-30	Period	GDP	KSE-30
1	100.00	0.000	1	13.38070	86.620
2	98.684	1.316	2	21.731	78.269
3	82.804	17.196	3	33.855	66.145
4	78.956	21.044	4	38.619	61.381
5	76.983	23.017	5	41.648	58.352
6	75.437	24.563	6	44.025	55.975
7	73.884	26.116	7	46.094	53.906
8	72.697	27.303	8	47.708	52.292
9	71.754	28.246	9	49.009	50.991
10	70.973	29.027	10	50.092	49.908

Table 4.10 results show that **50.092%** forecasting error variance of the KSE-30 Index has been explained by GDP, **49.008%** is explained by itself. Similarly, **70.973%** of GDP had been determined by itself and **29.027%** has been described by the KSE-30 Index. These findings are more equivalent to the outcomes of the causality analysis.

5. Conclusion

An extensive research has been done on the relationship between financial development and economic growth in

past few decades. Similarly, this relationship is also researched in case of Pakistan but we examined it by taking KSE-30 index, KSE-All Share Index and KSE-100 Index as an indicator of financial development and GDP for economic growth in Pakistan using time series data varying from February 1993 to December 2013. The ADF unit root test showed that all data is stationary at same order. The Johansen Cointegration Test and Vector Error Correction Model (VECM) results showed a positive relationship of all three Indexes of Karachi stock exchange with GDP in long run and shot run respectively, in case of Pakistan. The results showed that KSE-30 index, KSE-All Share Index and KSE-100 Index have positive relationship with GDP both in short run and long run dynamics. Furthermore, a bi-direction causal relationship is examined between financial development and economic growth by Granger Causality test. This causal relationship is also justified by Variance Decomposition Analysis.

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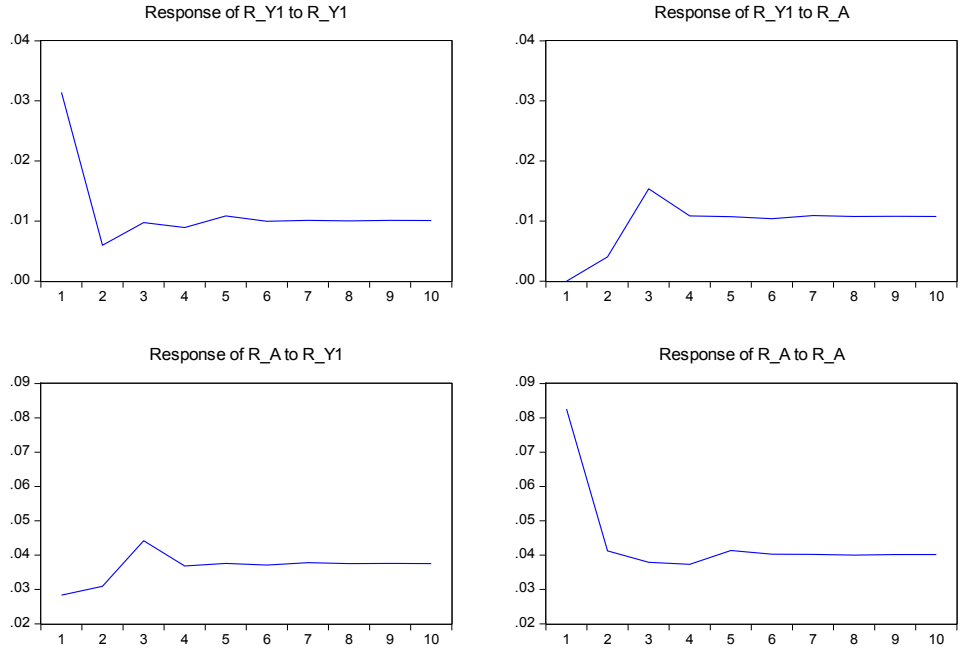
Annex 1

Graphs of Impulse-Response Functions of GDP and KSE-ASPI

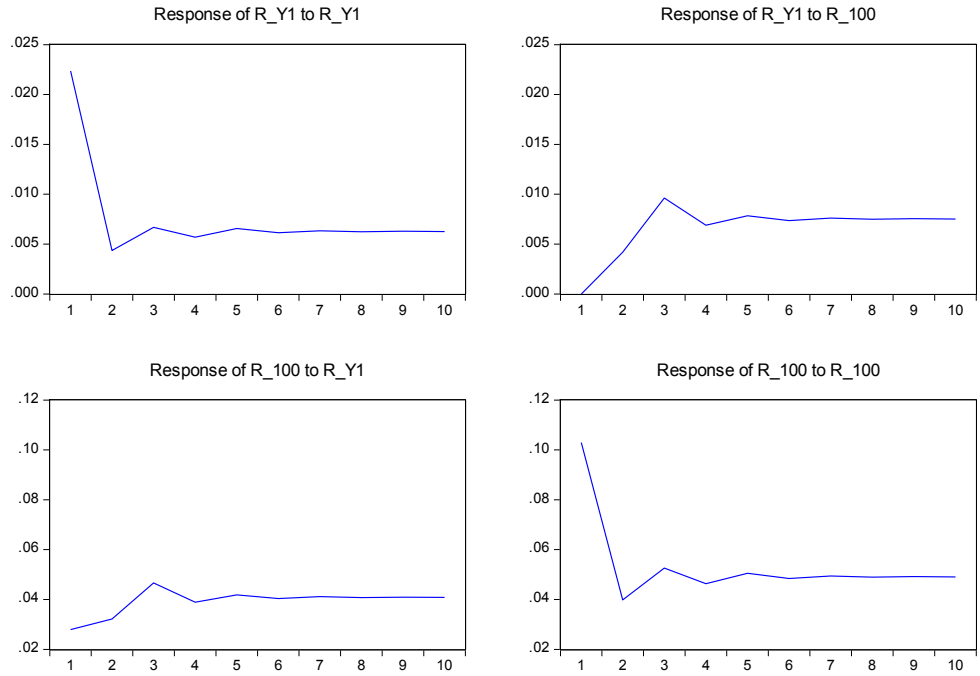
Response to Cholesky One S.D. Innovations



Annex 2

Graphs of Impulse-Response Functions of GDP and KSE-100 Index

Response to Cholesky One S.D. Innovations



Annex 3

Graphs of Impulse-Response Functions of GDP and KSE-30 Index

Response to Cholesky One S.D. Innovations