MACROECONOMIC INFLUENCES AND EQUITY MARKET RETURNS: A STUDY OF AN EMERGING EQUITY MARKET

Arshad Hasan, Muhammad Ali Jinnah University
Muhammad Tariq Javed, Quaid -i -Azam University

ABSTRACT

This study examines the short run and long run causal relationships among macroeconomic variables and equity market returns in the emerging equity market for the period of 6/1998 to 6/2008 by employing the VAR framework on monthly data. Macroeconomic variables include industrial production index, consumer price index, money supply , exchange rate, foreign portfolio investment, Treasury bill rates and oil prices. Results support the finance theory and provide evidence that long term relationship exist among equity market and macroeconomic factors. Unidirectional causality has been observed flowing from consumer price index, exchange rates, money supply and interest rate to equity market. No granger causality is observed among industrial production, foreign portfolio investment and equity market returns. This insignificant relationship with industrial production, oil indicates that market movement is not based on fundamentals and real economic activity. The cointegration analysis only captures the long-run relationship among the variables, it does not provideinformation on responsiveness of equity market returns to shocks in macroeconomic variables so impulse response function and Variance decomposition analysis based on VECM has also been performed. Variance decomposition analysis also confirms that monetary variables are a significant source of volatility in equity market.

INTRODUCTION

During last decade phenomenal growth has been observed in emerging equity markets and Pakistan is no exception. The KSE- 100 index, which is the benchmark for the Pakistani equity market, has exhibited unparalleled growth and

moved from 921 in 2002 to over 16000 points. This remarkable growth has been a subject of global interest. During said period significant changes has also been observed in macroeconomic factors. An unprecedented change has also been observed in Interest rates, inflation, exchange rates, capital flows and Oil prices in the country. So question arises whether there exists a relationship among equity markets and macroeconomic factors.

The link among macroeconomic variables and the equity market has always attracted the curiosity of academicians and practitioners as it has an innate appeal. Finance theory suggests that prices of financial instruments are based on expected cash flows and discount factor. Macroeconomic variables affect both expected cash flows as well as discount rates. Therefore macroeconomic changes should be priced by market. The traditional dividend discount model is also based on above theoretical framework.

Therefore it is a well established fact that equity prices are influenced by economic information but theory is silent about specific variables which may influence equity prices. The empirical work has attempted to establish the relationship but results are yet inconclusive

Chen, Roll, and Ross (1986) explore this new avenue by examining the link among equity prices and macroeconomic variables by employing a multifactor model which provides evidence that macroeconomic factors are priced. Pearce and Roley (1985), Hardouvelis (1987), McElroy and Burmeister(1988), Hamao (1988) and Cutler, Potterba and Summers (1989) also confirm that equity prices react to arrival of macroeconomic information. At the same time, Poon and Taylor(1991), Shanken(1992) contradict the results. Some studies are in partial agreement. Flannery and Protopapadakis (2002) are of opinion that macroeconomic variables can predict future equity market returns to some extent and exact relationship among is difficult to establish. Therefore empirical evidence on relationship among macroeconomic variables and equity market is mixed

Under this cloud of uncertainty, number of studies has been conducted in various parts of globe by using various methods of exploring long term relationship among time series data. Mukherjee and Naka (1995), Cheung and Ng (1998), Nasseh and Strauss (2000), McMillan (2001) and Chaudhuri and Smiles (2004) employs cointegration analysis and granger causality test to explore long run relationship among equity prices and macroeconomic variables.

According to Humpe and Macmillan(2007) significant research has been done to investigate the relationship between equity market returns and a broad range of macroeconomic factors , across a number of equity markets and over a

range of different time horizon. But this research is generally focused on developed markets or emerging markets of Asia Pacific Rim. Only few studies are available with reference to Pakistan which is one of the major countries of south Asia and lies on cross roads of Central Asia, Middle East. And these studies only explore few variables.

The objective of this paper is to analyze the long-term relationship between the KSE and a broad set of macroeconomic factors for a longer time period by employing conitegration approach proposed by Johnson and Jusilius. Direction of causal flow has been captured by using Granger causality test. Other dynamic of time series data have also been explored by using impulse response analysis and variance decomposition analysis. The broad set of macroeconomic variable include industrial production index , consumer price index, money supply , exchange rate, foreign portfolio investment, Treasury bill rates and oil prices. This set of data has been used first time in Pakistan. Karachi stock exchange index return has been used as proxy for equity market returns. The study's main contribution is to examine the short run and long run relationships between Karachi stock market and macroeconomic variables , which have been relatively neglected by previous researchers

The rest of the paper is organized as follows: Section II incorporates a brief over view of recent empirical work. Section III describes the macro economic variables and Methodology used in the study. Empirical results are reported in Section IV and finally Section V concludes the results.

LITERATURE REVIEW

The relationship between equity market returns and economic fundamentals has been extensively researched in developed markets e.g.Chen et al. (1986), Fama(1990), Chen(1991), Cheung and Ng (1998) , Choi et al.(1999), Dickinson (2000), Nasseh and Strauss(2000). However the literature with reference to transition economies is limited and that too is focused on Asia pacific rim.

Chen, Roll and Ross (1986) investigate the existence of long run relationship among equity prices and industrial production, inflation, risk premium, market return, oil prices, term structure and consumption for US. Study assumes that the variables are uncorrelated and changes in variables are unexpected. . Results provide evidence about the existence of long run relationship between the macroeconomic variables and the expected equity returns. It has been observed that industrial production, risk premium, yield curve, and unanticipated inflation can

explain expected returns during periods of high volatility. However, oil prices, market index, and consumption are not priced in the market. CRR also investigate the sensitivity of US stock returns to the unanticipated news and conclude that equity returns responds to arrival of macroeconomic news and this responsiveness is priced by the market.

Beenstock and Chan (1988) investigate the presence of long term relationship among export volume, fuel and material cost, relative export prices, money supply, inflation, and interests rates and equity markets by employing IN UK equity market and find that unanticipated increase in fuel and material costs and interest rate leads to reduction in equity returns. Study also provides evidence about existence of positive relationship among equity returns and money supply and inflation. However export prices and export volume are not priced by equity market.

Hamao (1988) uses the methodology proposed by Chen, Roll and Ross (1986) for Japanese economy and reveals that variations in expected inflation and unexpected variations in risk premium and term structure of interest rates influence equity returns significantly. However, variations in macroeconomic activities are found weakly priced in Japanese economy in comparison to variations priced in U.S.A.

Mukherjee and Naka(1995) examine the relationship between exchange rate, inflation , long term government bond rate, money supply, real economic activity and call money rate in the Japanese stock market and find that cointegration is present among macroeconomic variables and positive relationship exist between the industrial production and equity market return.

Habbibullah *et al* (1996) explores the long run relationship among Malaysian equity market and money supply(M1 and M2) and output(GDP) by using monthly data and finds equity market of Malaysia is informationally efficient with respect to money supply as well as output

Cheung and Ng (1998) provides evidence about long term interlinkages among equity market indices and real oil price, real consumption, real money, and real output by employing Johansen cointegration framework. Equity market returns are found related to transitory deviations from the long run relationship and to changes in the macroeconomic variables. Cointegration analysis under constrained environment provide insight about equity market return variation that is not already captured through dividend yields, interest rate spreads, and GNP growth rates.

Fazal and Mahmood (2001) explore causal relationship between equity prices and economic activity, investment spending, and consumption expenditure

for the period 7/1959 to 6/99 by employing cointegration analysis and VECM and provide evidence about existence of long run relationship among above stated variables. Unidirectional causality has also been found flowing from macro variables to equity prices. However it is observed Pakistani equity in unable to influence aggregate demand. Fazal(2006) again examines relationship to investigate the stochastic properties of the variables by considering the shifts as a result of economic liberalization and finds unidirectional causality between the real sector and equity prices. No significant change in patterns is observed.

Ibrahim and Yusoff (2001) examine dynamic relationship among macroeconomic variables and equity prices for Malaysian capital market for the period 1/1977 to 7/1998 by employing VAR framework. Macro economic variable include industrial production, consumer price index , money supply, exchange rate, and equity prices. Results indicate that equity prices are being influenced by money supply. Money supply is found positively associated with equity prices in short run and negatively associated with equity prices in the long run. A negative impact of depreciation shocks has also been observed on equity prices. Maysami *et al* (2004) examines the long run relationship among macroeconomic variables and STI and sectoral indices like the property index, finance index and the hotel index and finds STI and the property index have long term relationship with industrial production, inflation , exchange rate , changes in the short and long-term interest rates and money supply.

Al-Sharkas(2004) investigates the relationship among equity market and real economic activity, money supply, inflation, and interest rate for Jordanian equity market by using Johansen Approach and provides evidence about presence of long run relationship among equity market and macroeconomic variables. Gay(2008)investigates the relationship among Indian equity market and exchange rate and oil price for Brazil, Russia, India, and China (BRIC) by employing ARIMA model and finds no evidence about existence of significant relationship among variables. It is further observed that equity markets of Brazil, Russia, India, and China are weak form efficient

Shahid (2008) explores causal relationships among equity prices and industrial production, money supply , exports, exchange rate , foreign direct investment and interest rates for the period 3/95 to 3/2007 by employing cointegration analysis and Toda and Yamamoto Granger causality test on quarterly data. Short run relationships among variables have also been investigated by using Bivariate Vector Autoregressive Model for variance decomposition and impulse

response functions. The study concludes that equity prices in India lead economic activity in general. However, Interest rate is found to lead the equity prices.

DATA DESCRIPTION AND METHODOLOGY

This study explores the long term causal relationship among macro economic variables and Pakistani capital market for the period 6/1998 to 6/2008 by using monthly data. The macroeconomic variables include Industrial Production Index, Broad Money, Oil Prices, Foreign Exchange Rate, Inflation and Interest Rate. Monthly time series has been chosen as it is consistent with earlier work done by Chan and Faff (1998) to explore the long run relation ship between macroeconomic variables and equity markets. Variables have been constructed and measured by using following proxies

Data Description

Equity Market Returns

Equity market returns has been calculated by using following equation

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

Where: R_t is Return for month 't';and P_t and P_{t-1} are closing values of KSE- 100 Index for month 't' and 't-1' respectively.

Industrial Growth rate

Industrial production index has been used as proxy to measure the growth rate in real sector and it has been calculated by using log difference of industrial production index.

$$\text{Growth Rate} = \ln (IIP_t / IIP_{t-1})$$

Studies that explore the relationship among industrial production and equity market returns include Chan, Chen and Hsieh (1985), Chen, Roll and Ross (1986), Burnmeister and Wall (1986), Beenstock and Chan (1988), Chang and Pinegar

(1990), Kryzanowski and Zhang (1992), Chen and Jordan (1993), Sauer (1994), Rahman, Coggin and Lee (1998).

It is hypothesized that an increase in growth rate is positively related to equity market returns.

Money Supply

Broad Money (M_1) is used as a proxy of money supply. Money growth rate has been calculated by using log difference of broad money (M_2)

$$\text{Money growth rate} = \ln (M_t / M_{t-1})$$

Studies that explore the relationship among money supply and equity market returns include Beenstock and Chan (1988), Sauer (1994)

It is hypothesized that an increase in money supply is positively related to equity market returns

Inflation Rate

Consumer Price Index is used as a proxy of inflation rate. CPI is chosen as it is a broad base measure to calculate average change in prices of goods and services during a specific period.

$$\text{Inflation Rate} = \ln (CPI_t / CPI_{t-1})$$

Studies that explore the relationship among inflation and equity market returns include Chan, Chen and Hsieh (1985), Chen, Roll and Ross (1986), Burnmeister and Wall (1986), Burmeister and MacElroy (1988), Chang and Pinegar (1990), Defina (1991) Kryzanowski and Zhang (1992), Chen and Jordan (1993), Sauer(1994), Rahman, Coggin and Lee (1998).

It is hypothesized that an increase in inflation is negatively related to equity market returns.

Change in oil prices

Brent oil prices has been used as proxy for oil prices and change in oil prices has been measured by using log difference i.e

$$\text{Change in oil prices} = \ln (\text{Brent}_{t} / \text{Brent}_{t-1})$$

Chan, Chen and Hsieh (1985), Chen and Jordan (1993) investigate the relationship among oil prices and equity markets for US market.

It is hypothesized that an increase in oil rates is negatively related to equity market returns

Change in Foreign Exchange Rate

Change in Foreign exchange rate is measured by employing end of month US$/Rs exchange rate and change in value is worked out through log difference i.e

$$\text{Change in foreign Exchange Rate} = \ln (FER_{t} / FER_{t-1})$$

Where FER is foreign exchange rate US $/Rs

Kryzanowski and Zhang (1992), Sauer (1994) also explore the relationship between foreign exchange rate and equity market returns.

It is hypothesized that depreciation in home currency is negatively related to equity market returns

Change in Interest Rate

Treasury bill rates have been used as proxy of Interest rate. Change in interest rate has been measured by using log difference to T bill rates.

$$\text{Change in Interest Rate} = \ln (TB_{t} / TB_{t-1})$$

Burmeister and MacElroy (1988) study the relationship between short term interest rates and equity market return.

It is hypothesized that an increase in interest rate is negatively related to equity market returns

Change in Foreign Portfolio Investment

Foreign portfolio Investment has been used as proxy of Investor confidence. Change in Foreign portfolio Investment has been measured by using log difference to Foreign portfolio Investment.

$$\text{Change in Interest Rate} = \ln (FPI_t / FPI_{t-1})$$

It is hypothesized that an increase in foreign portfolio investment is positively related to equity market returns

Methodology

There are several techniques for testing the long term causal and dynamic relationship among equity prices and macro economic variables. In this study the emphasis is given to test the relationship among macro economic variables and Karachi stock exchange by employing via;(i) Descriptive Statistics ,(ii) Correlation Matrix,(iii) JJ cointegration Tests,(iv) Granger Causality Test,(v) Impulse Response Analysis and (vi) Variance Decomposition Analysis

Stationarity of data is tested by using unit root tests. Null hypothesis of a unit root is tested by using Augmented Dickey-Fuller Test and Phillips-Perron Test. The ADF test examines the presence of unit root in an autoregressive model. A basic autoregressive model is $Zt = áZ_{t-1} + u_t$, where Z_t is the variable studied, t is the time period, á is a coefficient, and u_t is the disturbance term. The regression model can be written as $ÄZ_t = (á - 1)Z_{t-1} + u_t = äZ_{t-1} + u_t$, where Ä is the first difference operator. Here testing for a unit root is equivalent to testing. ä = 0.

The Dickey-Fuller tests assume that the error terms are statistically independent and have a constant variance. This assumption may not be true in some of the data used so Phillip Perron test is also used that relaxes above assumptions and permits the error disturbances to be heterogeneously distributed and it can be represented mathematically by

$$Z_t = á_o + á_1 Z_{t-1} + á_t \{t - T/2\} + u_t$$

Test statistics for the regression coefficients under the null hypothesis that the data are generated by $Z_t = Z_{t-1} + u_t$, where $E(u_t) = 0$.

If a time series is non stationary but it becomes stationary after differencing then said time series is said to be integrated of order one i.e. I (1). If two series are integrated of order one, there may exist a linear combination that is stationary without differencing. If such linear combination exists then such streams of variables are called cointegrated.

Cointegration tests are divided into two broader categories ;(i). Residual based test ;(ii). Maximum likelihood based tests. Residual based test include the

Engle-Granger (1987) test whereas Maximum likelihood based tests include Johansen (1988; 1991) and Johansen-Juselius (1990) tests. During this study we apply Johansen and Juselius test to determine the presence of cointegrating vectors in a set of non stationary time series. The null hypothesis is that there is no cointegration among the series. Vector Autoregressive (VAR) approach is employed to test multivariate cointegration. This assumes all the variables in the model are endogenous. The Johansen and Juselius procedure is employed to test for a long run relationship between the variables. Johansen and Juselius suggest two likelihood ratio tests for the determination of the number of cointegrated vectors. Maximal eigenvalue test evaluates the null hypothesis that there are at most r cointegrating vectors against the alternative of r + 1 cointegrating vectors. The maximum eigen value statistic is given by,

$$\lambda max = - T \ln (1 - \lambda r+1)$$

where λ r+1,…,λn are the n-r smallest squared canonical correlations and T = the number of observations.

Trace statistic tests the null hypothesis of r cointegrating vectors against the alternative of r or more cointegrating vectors. This statistic is given by

$$\lambda trace = -T \Sigma \ln (1 - \lambda i)$$

In order to apply the Johansen procedure, Lag length is selected on the basis of the Akaike Information Criterion (AIC).

If co-integration in the long run is present then the system of equations is restructured by inserting an Error Correction Term to capture the short-run deviation of variables from their relevant equilibrium values. This investigation is necessary as impact of financial development is generally more apparent in the short-run and disappears in the long run as economy expands and matures. According to Granger (1988) presence of cointegrating vectors indicates that granger causality must exist in at least one direction. A variable granger causes the other variable if it helps forecast its future values. In cointegrated series, as variables may possibly share common stochastic trends so dependent variables in the VECM must be Granger-caused by lagged values of the error-correction terms. This is possible because error-correction terms are functions of the lagged values of the level variables. Thus an evidence of cointegration between variables itself provides the basis for construction of error correction model. ECM permits the introduction of past disequilibrium as

explanatory variables in the dynamic behavior of existing variables thus facilitates in capturing both the short-run dynamics and long-run relationships between the variable. The chronological granger causality between the variables can be explored by using a joint F-test to the coefficients of each explanatory variable in the VECM. The variance decomposition of the equity returns is based on the analysis of responses of the variables to shocks. When there is a shock through the error term we study the influence of this shock to the other variables of the system and thus get information about the time horizon and percentage of the error variance F test is in fact a within-sample causality tests and does not allow us to gauge the relative strength of the of causality among variables beyond the sample period.

In order to examine the out of sample causality we use variance decomposition analysis which partitions the variance of the forecast error of a certain variable into proportions attributable to shocks in each variable in the system. Variance decomposition analysis present a factual breakup of the change in the value of the variable in a particular period resulting from changes in the same variable in addition to other variables in preceding periods. The impulse response analysis investigates the influence of random shock in a variable on other variables of interest. Impulse responses of returns in various markets to a shock in oil innovations are also examined. Impulse responses show the effect of shocks for different days separately whereas variance decomposition analysis exhibits the cumulative effect of shocks.

EMPIRICAL RESULTS

Table 1 displays the descriptive statistics regarding changes in macroeconomic variables and equity market returns. The average monthly returns earned at Karachi stock exchange during last ten years is 2.2 % which is equivalent to an annualized return of 29.28%. This is one of the highest returns offered by emerging equity markets. The highest returns achieved during one month are 24.11% and maximum loss incurred in one month is 27.8%.

Average monthly industrial growth rate is 0.22% which is not appreciating at all. Oil prices increased at an average monthly rate of 2.09%. Narrow money growth rate is 1.67% per month which is significantly high. Average change in consumer price index is 0.56% per month whereas T bill rates appear to change at a rate of 0.25% per month. Average decrease in value of Pakistani currency is 0.35%. Percentage changes in exchange rates ranges from a minimum of -7.62% to a maximum value of 3.07% percent. Foreign portfolio investment is on average

increased by 0.55% per month. Average change in Treasury bill is 1.81%. However, significantly high volatility is observed in equity returns, industrial production, oil prices and t bill rates. Unstable macroeconomic variables lead to high risk and affect over all quality of decisions.

Table 1: Descriptive Statistics

	ÄKse100	Ä IPI	Ä Oil	ÄX Rate	ÄT Bill	ÄCPI	ÄFPI	ÄM1
Mean	0.0220	0.0022	0.0209	-0.0035	-0.0025	0.0056	0.0055	0.0167
Median	0.0219	0.0016	0.0310	-0.0006	0.0000	0.0047	0.0018	0.0091
Std Dev	0.0912	0.1121	0.0788	0.0121	0.0985	0.0070	0.0238	0.0422
Skewness	-0.3055	-0.4653	-0.6324	-2.4291	-0.6279	0.9219	3.5235	4.2966
Min	-0.2780	-0.4857	-0.2161	-0.0762	-0.4242	-0.0088	-0.0605	-0.0646
Max	0.2411	0.3533	0.2241	0.0307	0.3200	0.0303	0.1651	0.3481

Table 2 shows the correlation among equity returns and macroeconomic variables. Weak correlation is generally observed between the equity return and monetary variables.

Table 2: Correlation Matrix

	ÄKse100	Ä IPI	Ä Oil	ÄX Rate	ÄT Bill	ÄCPI	ÄFPI	ÄM1
ÄKse100	1							
Ä IPI	-0.0257	1						
Ä Oil	-0.0391	-0.1321	1					
ÄX Rate	0.1219	0.0579	-0.0943	1				
ÄT Bill	-0.1429	-0.1637	0.0325	-0.1974	1			
ÄCPI	-0.1698	-0.0169	0.1892	-0.2029	0.2557	1		
ÄFPI	0.1490	-0.0146	-0.0655	0.0956	0.0221	-0.0172	1	
ÄM1	0.0241	0.1560	-0.0183	0.1455	-0.0198	-0.0145	0.0498	1

Interest rates are negatively correlated with equity returns which are logical as increase in interest rates leads to increase in discount rate and it ultimately results

in decrease in present value of future cash flows which represent fair intrinsic value of shares. However this relationship is found insignificant. The relationship between inflation and equity returns can also be viewed on the basis of above analogy. This relationship is also found insignificant. Foreign portfolio investment increases liquidity in market and higher demand leads to increase in market prices of shares so relationship should be positive. But this relation ship is found insignificant. Increase in oil prices increase the cost of production and decrease the earning of the corporate sector due to decrease in profit margins or decrease in demand of product. So negative relation ship is in line with economic ration but it is again insignificant. Money growth rate is positively correlated with returns that are in line with results drawn by Maysami and Koh (2000). The possible reason is that increase in money supply leads to increase in liquidity that ultimately results in upward movement of nominal equity prices. However relationship is insignificant and weak. Similarly interest rate parity theory is also confirmed from results as interest rate is negatively correlated with exchange rates.

Table 3: Unit Root Analysis

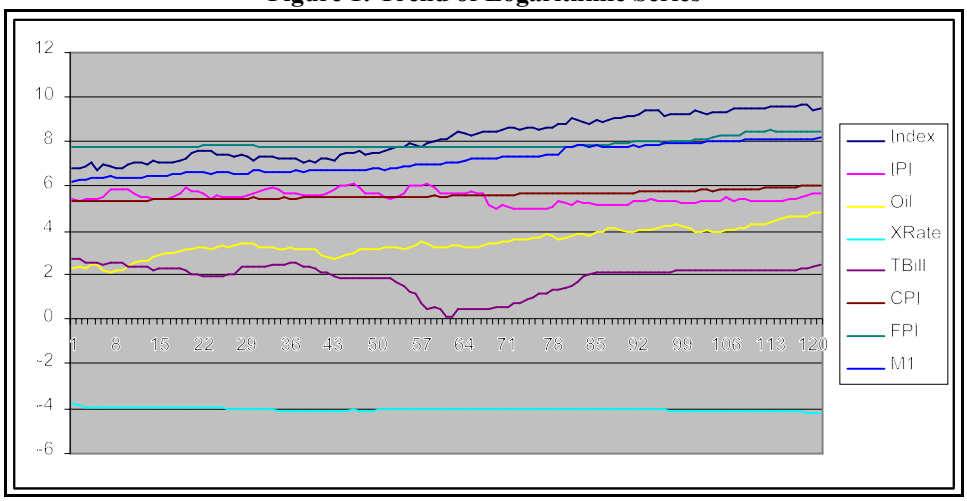
	ADF- Level	ADF- Ist Diff	PP- Level	PP- Ist Diff
Ln Kse100	-2.1686	-12.015	-2.0872	-12.2821
Ln IPI	-3.1322	-8.9420	-2.8182	-8.7609
Ln Oil	-2.3550	-8.3208	-2.0543	-8.2033
Ln X Rate	-2.3659	-6.6074	-3.1003	-6.4168
Ln T Bill	-1.6981	-3.6063	-1.3595	-7.8162
Ln CPI	2.9023	-8.6160	2.6215	-8.6190
Ln FPI	0.4762	-3.6651	-0.4640	-10.8700
Ln M1	-1.8832	-10.245	-1.9545	-10.2284
1% Critic. Value	-4.0363	-4.0370	-4.0363	-4.0370
5% Critic. Value	-3.4477	-3.4480	-3.4477	-3.4480
10%Critic Value	-3.1489	-3.1491	-3.1489	-3.1491

Correlation analysis is relatively weaker technique. Therefore causal nexus among the monetary variables has been investigated by employing multivariate cointegration analysis. Cointegration analysis tells us about the long term relationship among equity returns and set of monetary variables. Cointegration tests

involve two steps. In first step, each time series is scrutinized to determine its order of integration. For this purpose ADF test and Phillips-Perron test for unit has been used at level and first difference. Results of unit root test under assumption of constant and trend have been summarized in Tables 3.

Results clearly indicate that the index series are not stationary at level but the first differences of the logarithmic transformations of the series are stationary. Therefore, it can safely said that series are integrated of order one I (1).It is worth mentioning that results are robust under assumption of constant trend as well as no trend.

Figure 1: Trend of Logarithmic Series



In second step, time series is analyzed for Cointegration by using likelihood ratio test which include (i) trace statistics and (ii) maximum Eigen value statistics.

Table 4 exhibits the results of trace statistics at a lag length of three months. On the basis of above results null hypothesis of no cointegration between the equity indices and macroeconomic variables for the period 6/1998 to 3/2008 can not be rejected in Pakistani equity market. Trace test indicates the presence of 4 cointegrating vectors among variables at the $\alpha = 0.05$. In order to confirm the results Maximum Eigen value test has also been employed and Max Eigen value test also confirms the presence of cointegration at the $\alpha = 0.05$. Therefore, study provides evidence about existence of long term relationship among macroeconomic variables and equity returns.

Table 4: **Multivariate Cointegration Analysis Trace Statistic**

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	Critical Value0.05	Prob.
None *	0.3923	193.3427	159.5297	0.0002
At most 1 *	0.2630	135.0690	125.6154	0.0117
At most 2 *	0.2087	99.3636	95.7537	0.0276
At most 3 *	0.1958	71.9817	69.8189	0.0333
At most 4	0.1507	46.4931	47.8561	0.0668
At most 5	0.1259	27.3791	29.7971	0.0927
At most 6	0.0667	11.6342	15.4947	0.1753
At most 7	0.0300	3.5632	3.8415	0.0591

It is worth mentioning that Johansen and Jusilius cointegration tests do not account for structural breaks in the data.

As variables are cointegrated so Granger Causality must exist among the variables. This requirement of granger representation theorem is helps us to identify the direction of causality flow. Table 5 reports the results Granger causality.

Above table provides evidence about existence of unidirectional causality from X Rate , T Bill , Money Supply and CPI to equity market returns at $\alpha = 0.05$. However no granger causality is observed in industrial production and equity market returns. Results can be summarized as that unidirectional causality flowing from monetary variables to equity market and this lead- lag relationship makes it imperative for financial and economic mangers of country to be more careful and vigilant in decision making as these decisions are priced in equity market and sets the trends in capital market which is considered as barometer of economy. However insignificant relationship with industrial production, oil indicates that market movement is not based on fundamentals and real economic activity.

Impulse response analysis provides information about the response of equity market returns to one standard deviation change in industrial production, oil, money growth rate, foreign portfolio investment, inflation, T bill and exchange rate. Fig 2 is graphical presentation of relationship between innovations in macroeconomic variables and equity market returns in the VAR system. Statistical significance of the impulse response functions has been examined at 95% confidence bounds.

Table 5: Granger Causality Test			
Null Hypothesis:	Obs	F-Statistic	Probability
IPI does not Granger Cause INDEX	117	0.5518	0.648
INDEX does not Granger Cause IPI		0.6710	0.5716
OIL does not Granger Cause INDEX	117	0.6649	0.5753
INDEX does not Granger Cause OIL		3.3713	0.0211
XRATE does not Granger Cause INDEX	117	6.1909	0.0006
INDEX does not Granger Cause XRATE		0.0989	0.9604
TBILL does not Granger Cause INDEX	117	3.5113	0.0177
INDEX does not Granger Cause TBILL		0.9056	0.4409
CPI does not Granger Cause INDEX	117	2.9798	0.0345
INDEX does not Granger Cause CPI		0.3946	0.7571
FPI does not Granger Cause INDEX	117	0.3015	0.8242
INDEX does not Granger Cause FPI		0.3832	0.7653
M1 does not Granger Cause INDEX	117	2.8654	0.0399
INDEX does not Granger Cause M1		0.5660	0.6385

Results confirm that one standard deviation change in money supply leads to increase in equity prices due to increase in liquidity and this result is consistent with results of Maysami and Koh(2000). Similarly one standard deviation change in Treasury bill rate leads to reduction in prices of equity due to increased discount rates. No statistically significant impact has been observed with reference to variation in exchange rates. It is acceptable because in Pakistan a managed floating rate system has been observed and during last five years exchange rates has been managed within a small range by state bank of Pakistan through open market operation. These results are in conformity with earlier work.

Impulse response function captures the response of an endogenous variable over time to a given innovation whereas variance decomposition analysis expresses the contributions of each source of innovation to the forecast error variance for each variable. Moreover, it helps to identify the pattern of responses transmission over time. Therefore variance decomposition analysis is natural choice to examine the reaction of equity markets to system vide shocks arising from changes in industrial

production, inflation, oil, money supply, Treasury bill rates, foreign portfolio investment and exchange rates. Table 7 exhibits the results of VDC Analysis..

Figure 2: Impulse Response Analysis

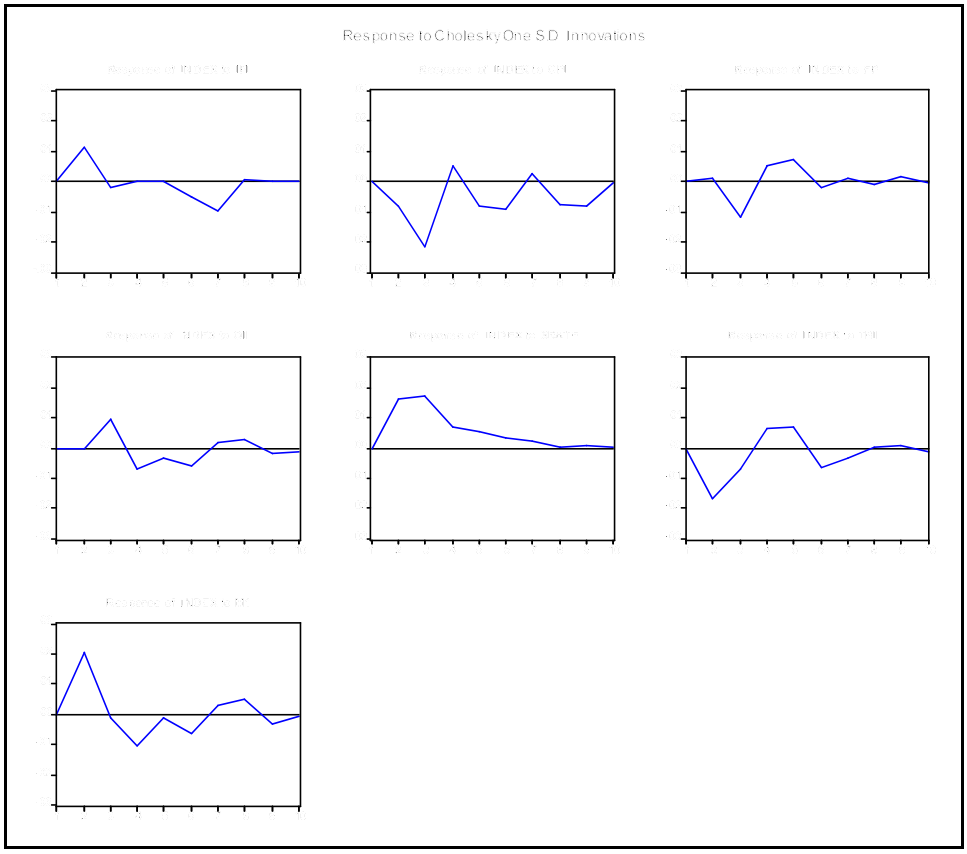


Table 7: Variance Decomposition Analysis									
Period	S.E.	INDEX	IPI	CPI	FPI	OIL	XRATE	TBILL	M1
1	0.08	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.09	86.18	1.56	0.77	0.01	0.00	3.17	3.29	5.02
3	0.10	76.68	1.44	5.58	1.45	0.98	5.97	3.43	4.46
4	0.10	74.47	1.39	5.68	1.67	1.40	6.25	3.70	5.44
5	0.10	72.98	1.36	6.18	2.16	1.47	6.42	4.09	5.33
6	0.10	71.32	1.59	6.82	2.14	1.75	6.36	4.41	5.60
7	0.10	70.50	2.48	6.78	2.12	1.76	6.31	4.44	5.60
8	0.10	69.88	2.46	7.27	2.11	1.83	6.26	4.41	5.80
9	0.10	69.37	2.44	7.80	2.12	1.84	6.22	4.38	5.84
10	0.10	69.36	2.44	7.80	2.12	1.84	6.21	4.39	5.84

Results confirm that monetary variables are a significant source of the volatility of equity market The contribution of an inflation shock to the equity returns ranges from 0.77 % to 7.8%. Similarly the contribution of T bill rates ranges from 3.29% to 4.39% and contribution of X rate ranges from 3.17% to 6.42% which is also significant. Money supply is also one of major contributor of volatility. Role of IPI and Oil in equity market volatility also increase gradually. The pattern of transmission of shocks is also apparent and indicates an increasing trend. This may be helpful to stake holders in their decision making process

CONCLUSION

This paper examines the long run relationship among equity market returns and seven important macroeconomic variables which include industrial production, Money Supply, , foreign portfolio investment, Treasury Bill Rates, oil prices, foreign Exchange Rates and consumer price index for the period 6/1998 to 6 /2008 by using Multivariate Cointegration Analysis and Granger Causality Test. Result provide evidence about existence of long run relationship among equity market and macroeconomic variables and explains the impact of changes at macroeconomic front on the stock market. Multivariate regression analysis provides evidence about the presence of four cointegrating vectors among variables at the $\alpha = 0.05$. Maximum Eigen value test also confirms the results.

Granger causality test indicates that T bill rates, exchange rates, inflation and money growth rate granger causes returns. This relationship has economic rational as increase interest rates , inflation leads to increase in discount rates and it ultimately results in reduction of prices. Impulse response analysis exhibits that one standard deviation change in money supply leads to increase in equity prices due to increase in liquidity and this result is consistent with results of Maysami and Koh(2000). No statistically significant impact has been observed among equity market and industrial production, oil prices and portfolio investment. Results can be summarized as that unidirectional causality flowing from monetary variables to equity market and this lead- lag relationship makes it imperative for financial and economic mangers of country to be more careful and vigilant in decision making as these decisions are priced in equity market and sets the trends in capital market which is considered as barometer of economy. However insignificant relationship with industrial production, oil indicates that market movement is not based on fundamentals and real economic activity.

Variance decomposition analysis is also performed that reveals that confirm that monetary variables are a significant source of the volatility of equity market The contribution of an inflation shock to the equity returns ranges from 0.77 % to 7.8%. Similarly the contribution of T bill rates ranges from 3.29% to 4.39% and contribution of X rate ranges from 3.17% to 6.42% which is also significant. Money supply is also one of major contributor of volatility.

These results reveal that identification of direction of relationship between the macroeconomic variables and capital market behavior facilitates the investors in taking effective investment decisions as by estimating the expected trends in exchange rates and interest they can estimate the future direction of equity prices and can allocate their resources more efficiently. Similarly, architects of monetary policy should be careful in revision of interest rates as capital market responds to such decisions in the form of reduction of prices. Similarly, Central bank should also consider the impact of money supply on capital markets as has significant relationship with dynamic of equity returns. As under efficient market hypothesis capital markets respond to arrival of new information so macroeconomic policies should be designed to provide stability to the capital market.

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