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MACROECONOMIC VARIABLES AND STOCK EXCHANGE RETURNS

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Abstract:
In this study, made an endeavor to find out the dynamic co-relation among Stock Exchange return and Macroeconomic variables i.e. ER (exchange rate), IR (Interest rate), IP (industrial production), M2 (Money Supply)and Inf (Inflation) by applying monthly data from 1st June 2000 to 30th May 2017. The data have been analysed by applying a Granger causality, coupled with a multivariate cointegration Juselius and Johansen which reflected a long-term relationship among the Stock Exchange Return and selected macroeconomic variables. Denial of the null hypothesis at 5% shows that there occurs unidirectional Granger Causality Test (GCT) among the ER and M2 at the 5% level. There is no other variable exist which are unidirectional GCT. t statistic of ECM is less than 1.96 thus indicating that there is no short term disequilibrium exists between ER, IR, IP, M2, Inf and equity market return. The question of modification, therefore does not exist. In case of Variance decomposition analysis the selected macroeconomic variables shocks are not significant cause of volatility for stock returns. The role of macroeconomic variables to the stock exchange returns ranges from 0 to 3 % over different time lags. Correspondingly, the VECM also approve the non-presence of a short-term co-relation between variables. On the other side, the trace test shows the presence of four cointegrating equations and Maximum eigen value also approves the presence of two cointegrating equations at 5%. The result therefore provides facts of a long-term co-relation among macroeconomic variables and stock returns. It merits that macroeconomic variables be measured as a vital factor in determining stock market movements.

Key words: 6 to 9 words. Stock exchange, economy, variables, stock returns

Introduction

Pakistan has struggled in the field of economic progress since inception; however in the past it was observed that the decade of military rule from 1999 to 2008 and the two decades, democracy in Pakistan from 2008 to 2017 Pakistan has seen both the ends peak and down trough of economic progress. During military rule the stock exchange out performed, along with an easy access to money around the country and period from 2008 to 2012 mixed pattern was observed but after 2012 stock exchange again out performed with multiple reasons. Pakistan attracted record foreign direct investments (FDI) and there was dearth of money involving each segment of society in the business. The major economic indicators of the country including Karachi stock exchange (KSE) touched highest ever closing at 53,042.15 points on 25 May, 2017. The important point of concern here is that KSE-100 was at peak when average buying power of an ordinary citizen was good linked to overall economic progress, thereafter as the KSE-100 index stared declining

the economy as a whole and buying power of people in the country (as indicated by the macroeconomic variables also degenerated by indicated by undeclared high inf in the country. This trend continues till now with few improvements.

1. Concept of Macroeconomic Developments.

The concept that the macroeconomic developments affect the stock exchange returns is generally accepted but with less empirical support. Although the unidirectional relationship among financial markets and macro economy is not argued in theory, however stock returns are commonly measured as returning to external forces (even though they may also be responding to some other variables as well). Volatile financial markets around the world generally reciprocated in terms of volatility in returns of stocks. Therefore, the regulators, investors and academics were attracted to investigate the root causes leading to such behavior. On (EMH) theory rapid change in stock prices in response to newly available information points out to the existence of an efficient capital market. Favorable macroeconomic atmosphere promotes the portability of business, which allows them to consider as the main causes of the development of an economy.

The study is aimed at analyzing the identifying the empirical evidence suggesting the applicability of the macroeconomic for Stocks index at the Karachi Stock Exchange (KSE), and to verify the macroeconomic variables which match up more near to stock factors. Particular study will exam 5 macroeconomic factors to price the stocks of KSE With these variables specified, we will collect information of historical values of the variables and the portfolio returns from the period of January 2000 to period of May 2017. Using these data, we calculated the sensitivity of the portfolios return to the variables factors.

1.2 Identification of Macroeconomic variables. We consider that our statistics on 17 macroeconomic factors from 1981 to 2009 establishes the most broad statement dataset in this literature. These include CPI, PPI, IR, M1, M2, inf, oil prices, gold rates, Monetary Aggregate, ER, Employment Report, IP, Balance of Trade, GDP growth and Housing Starts etc. The identified five macroeconomic indicators have been shortlisted out of list 17 indicators.

1.3 Problem definition. Review of literature between the relationship of stock exchange returns and the macroeconomic factors, suggests that normally there is an absence of experiential indication on the subject. This shortcoming restricts the ability of the stake holders to make accurate predictions regarding the stock exchange returns. So, the study has been aimed to investigate the connection in the KSE environment so as to eliminate the void in the knowledge space.

The behavior of microeconomic factors is not necessarily constant across time series and different market environments, with special reference to Stock Index returns. It therefore requires periodical evaluation / re confirmation of the behavior of the macroeconomic factors, before applying these across different time frames and market environments. This confirmation of behavior is fundamental to reliably estimate the behavior of macroeconomic indicators, prior to for any investment decisions at any time frame or market.

1.4 Research Question

1.4.1 What is the direction of relationship (long or short run) between stocks returns and microeconomic factors?

1.4.2 Do the outcomes of previous studies stand confirmed or negated in the current environments of KSE?

1.4.3 Do there exist long term relationship among Stock returns and macroeconomic variables?

1.4.4 Do there exist short term relationship among Stock return and macroeconomic variables?

1.4.5 Do there exist lead log relationship among Stock return and macroeconomic variables?

1.5 Significance of study. This study will identify the key indicators of the relationship among the Stock Index (KSC 100 Index) and macroeconomic factors. The knowledge attained will be pivotal to make an accurate forecast of the likely trends of KSC index and hence will be of prime value to the investors.

1.5.1 It is will be endeavored to provide a refined view of the relationship of Stock Index returns and macroeconomic factors and present empirical evidence on the relationship of Stock returns, with reference to macroeconomic factors, an area which remains mostly least explored to date.

1.5.2 Accordingly the knowledge accrued will be extremely beneficial to:

1.5.3 Investors, for the purpose of decision-making on investment.

1.5.4 Registered companies, for the purpose of self-appraisal and improvement.

1.5.5 Government, for the purpose of formulation and modification of monitory policies.

1.5.6 Common user, for the purpose of comprehension of the business process at stock exchange.

1.5.7 Researchers for the purpose of identifying new areas for further investigation on related studies.

1.6 Research objective. The impartial of this study is to govern the direction and intensity of the association among Stock returns and macroeconomic factors i.e. IR, ER, IP, M2 and inf. The specific objectives are:-

1.6.1 To investigate and understand the relationship (long or short run) between Stock Index returns and macroeconomic factors.

1.6.2 To confirm or negate the findings of the previous studies on the issue, totally or partially.

1.6.3 There exist long term relationship among Stock return and macroeconomic variables.

1.6.4 There exist short term relationship among Stock return and macroeconomic variables.

1.6.5 There exist lead log relationship among Stock return and macroeconomic variables.

2. Literature Review.

Researcher has endeavored to find the relationship between monetary progress and financial development, since then it has been a significant issue of discussion. A number of studies have dispensed with different features of this association at hypothetical as well as experiential levels. However the widest distribution of a financial structure is between financial mediators. A huge share of investments is in-between investments through monetary intermediaries and markets.

2.1 Money Supply. The effect of the M_2 vs the stock returns has been commonly discussed in this paper. Many researchers has been found a optimistic association among the M_1 and the stock prices, the result of variations in the variables is still questioned. The

query of how money effect the stock exchange should be dignified. Friedman and Schwartz (1963) simply explained this query in a way to generate a surplus money which indications to an extra mandate for shares. In this case, share prices are likely to increase. Bernanke and Kuttner (2005) gave clarity that compression the M_1 would increase the IR resultantly a growth rate, which declines the worth of the standard. In addition, tightening the money supply will increase the risk premium which subsequently decease the investor interest. Presence of the M_1 or M_2 may contribute to the current literature in respects to the relationship among variations in the M_1 or M_2 and share prices in a developing stock market. Different studies proved that M_1 or M_2 played decisive role as we see in case of Saudi economy proved the deficiency of a unique measure of the money supply.

2.2 Interest Rate. Relationship between stock exchange volatility and interest rate defined in finance literature in many ways. In 1990, Shanken negatively explained this relationship. Same the case, Campbell (1987) found optimistic relation with market change and negative relation with forthcoming stock returns. Bren' et al. (1989) found optimistic relation on evidence that one month IR with the variance of the surplus return on stock. To find out the association among Istanbul exchange and IR, Çifter and Ozun (2007) functional granger test and seen the significant relationship. He also indicated that IR on stock price rises with higher time measures. In Pakistan, Rizwan and Khan (2007) studied the relationship among macroeconomic variables using VAR and GARCH model. Vardar'et al (2008) explored the influence of IR and ER and return and volatility in Istanbul Stock Exchange. As per his findings variations in IR have an aggregate influence on instability of skill zone and a declining influence on financial and amalgamated volatility. Korean Stock market return is adversely and meaningfully behavior to IR modification of yields has an optimistic and irrelevant association with IR found by Konan Leon (2008). Bjornland, Hilde, and Leitemo (2009) comprehensively described the monetary strategy shocks outcome on stock exchange index directly through the interest rate and indirectly through its effect on total uncertainty condition that intermediary could challenge in the stock market

2.3 Inflation. Impact of research / empirical study conducted under umbrella of macroeconomic variables, inf is a major factor which played pivotal role to find out actual facts and figures. The strong statement that the stock market assists as a boundary against inf is established on the vital indication of significance results. Boudhouch and Richardson (1993).Early research studies established a undesirable correlation among the inf and stock returns, Žsee, Lintner (1975), Bodie (1976), Jaffe, Mandelker and Nelson (1976), Fama and Schwert (1977), Fama and Schwert (1981). Omran and Pointon (2000) investigated a study, moderately than a time series examination but he examined Egyptian market founded on a model of 109 registered firms. However their main purpose was to test the variations across sectors. As per research findings of Hatemi-J, (2009) that why inf negatively effects equity prices because stakeholders move their portfolios to actual resources if the predictable inf rate becomes extraordinarily high.

2.4 Industrial Production. Different researcher has potentially agreed on the vital variables i.e. Industrial Production and being a risk factor, Cutler, Poterba, and Summers (1989) examined IP progress Vs stock exchange returns and found certainly associated with stock returns from 1926 to 1986, which considerably connections of 1958-1984 sample period. For Poon and Taylor (1981), the monetary moveable which are used in this study comprise periodic and yearly progress rate of IP, and period assembly of yield on significance subjective stock index.

2.5 Exchange Rate. After incorporating this exchange rate we gain a better understanding of how this variable affect stock market volatility within a framework of small economy (Karachi stock exchange) as compare to develop country. Two major

approach which lead to us in a consolidated way forward and clearly define the relationship among stock exchange volatility and ER. Goods market approach. This approach was first introduced by Dornbusch and Fischer (1980). He explained the fluctuation in exchange rate variations on the stock market using the trade equilibrium. Few major aspects are highlighted below for future simulation.

2.5.1 This approach proposes a negative connection between stock exchange prices and exchanges rates.

2.5.2 This approach indicates that deviations in exchange rates may change global attractiveness of the economy, and lastly variation in its trade permanence.

Portfolio Balanced Approach. This approach was introduced by (Frankel, 1993) in that he describes the association among the ER and market prices in different way. Major points highlighted in this approach are as follows:-

2.5.3 This approach dictates an optimistic link among stock returns and exchange rates, with stock market prices being the origin of the relationship.

2.5.4 Increasing (deteriorating) stock prices may guide to an approval (reduction) of the exchange rate of the local currency.

2.5.5 This deduction is based on the statistic that stockholders hold domestic and foreign resources, comprising currencies. The exchange rate shows a important role in balancing the demand for assets.

Few research studies has defined concept of these approach in that major researcher are Frank and Young (1972), Aggarwal (1981), Solnik (1987), Mao and Kao (1990), Bahmani-Oskooee, Bartov and Bodnar (1994), Ajayi and Mougoue (1996), Soenen and Hennigar (1988), Chortareas et al (2000), and Mishra (2004) have found mixed results positive and negative association among stock index and exchange rates.

2.6 Conclusion and important Notes. This literature review specified a comprehensive and clear overview to find out exclusive conclusions, which subsequently help us to indicate the way forward. Three major and comprehensive conclusions are as under:-

2.6.1 Existing and modern theories indicated positive link between macroeconomic variables and stock markets, but do not specify the type or the number of macroeconomic variables that should be incorporated. Thus, the current studies, studied in literature review, have revealed the use of a huge variety of macroeconomic and microeconomic variables to examine their impact on stock market index.

2.6.2 The findings from the current literature are indicating that they were complex and sensitive to choice of:-

2.6.2.1 Country selection

2.6.2.2 Variables selection

2.6.2.3 Previous studies on the subject was conducted on same lines

2.6.2.4 Time frame (from, to) be studied

2.6.3 It is extremely challenging to simplify the outcomes because each stock market is unique in terms of:-

2.6.3.1 Rules and regulations

2.6.3.2 Type of investors

2.6.3.3 Internal and external environment

2.6.3.4 Trend of Stock exchange investment

3. Research Methodology and Design

3.1 Theoretical Framework. The theoretical framework has been made with the objective to describe the relationship among Stock Return of KSE and macroeconomic factors i.e. IR, ER, IP, M_2 and inf. The data is time series data (secondary data) and cover the time span of June 2000 – May 2017. The study analyzed five major variables mentioned above. The data has been collected from various source which include Karachi Stock exchange, International financial statistic published by IMF and periodic bulletin of state bank of Pakistan

3.2 Research Methodology. The macroeconomic factors can explain a huge portion of Stock Returns Chordia and Shivakumar(2002). However, Cooper et al. (2004) has recognized that the macroeconomic model of Chordia and Shivakumar (2002) cannot estimate time-series. Considering the development and the interdependencies among macroeconomic factors, and stock return, this paper will aim to identify reliable association between these macroeconomic variables and Stock return using co-integration and VAR model.

3.3 Hypothesis. Hypothesis selected for the research:-

3.3.1 H01 There exist long term relationship among Stock return and macroeconomic variables.

3.3.2 H02 There exist short term relationship among Stock return and macroeconomic variables.

3.3.3 H03 There exist lead log relationship among Stock return and macroeconomic variables.

3.4 Proxies of Macroeconomic Factors

3.4.1 **Interest rate (IR)**. IR is the major manipulator towards economy and effects the investor‘s sentiment either way. Since investor considers the cash flow and the discount rate before making an investment decision, and we identify that cash flow is specific to various industries / organizations, hence we only consider “discount rate” for the study. Unlike cash flow, discount rates have vast and general application to the market as a whole.

3.4.2 **Exchange Rate (ER)**. ER is a powerful indicator of the economic trends of a nation. The investors take lead on the expected outcome of the ongoing economic activities accordingly. Exchange rates also attract the foreign investors to invest in stock Exchange or other business operations.

3.4.3 **Industrial Production (IP).** Industrial production indicates that the requirement of the country is met or not. It is another very strong and upright indicator of the economic health a country and affects the Investors sentiments.

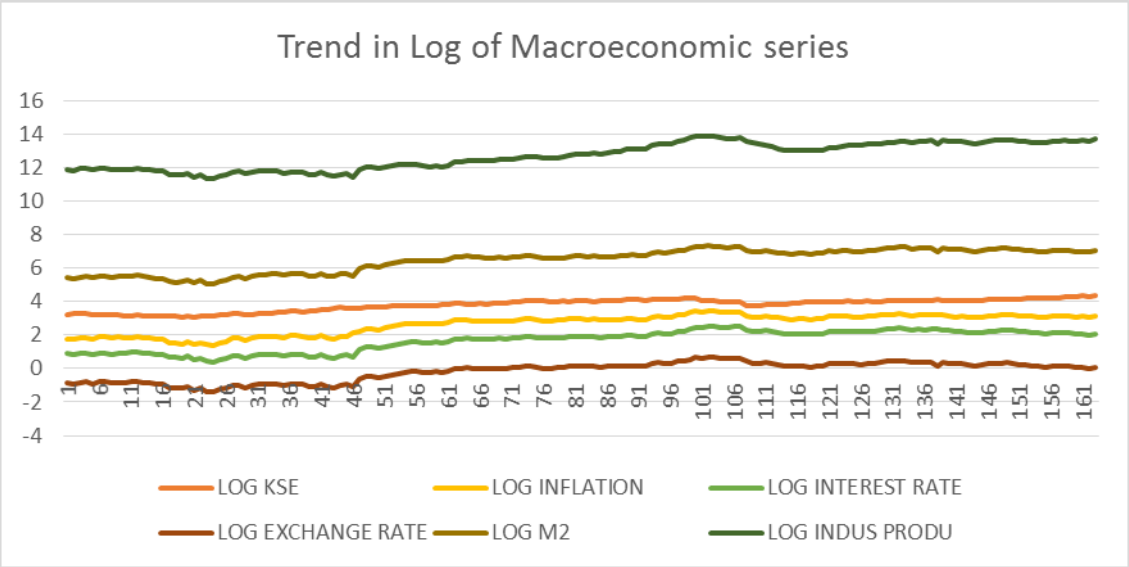
3.4.4 **Money Supply**. M_2 reflects investors’ confidence on midterm economic activities. It is pertinent to stock exchange activities.

3.4.5 **Inflation**. Inf takes it direction from interest rate. It is inversely related to the interest rate and dictates the investor’s sentiment towards investment.

3.5 **Data Depiction and Methodology**. This paper to describe long and short-term relations between the KSE and macroeconomic variables by using monthly data from June 2000 to May 2017. The macroeconomic variables include ER, IR, IP, M_2, and Inf.

The inclination of data is associated with previous work completed by Chan and Faff (1998) to study the long association among macroeconomic variables and stock returns.

3.6 Log Trend in Macroeconomic Series



There are various techniques to examine the long-term relations among stock returns and macroeconomic variables. Particularly, this study highlight analysis the same relationship among macroeconomic variables and stock returns, through:

- ✓ **Descriptive Statistics(DS)**
- ✓ **Correlation Matrix (CM)**
- ✓ **Co-integration Tests (CT)**
- ✓ **Granger Causality Test (GCT)**
- ✓ **Impulse Response Analysis (IRA)**
- ✓ **Variance Decomposition Analysis (VDA)**

Stationary of statistics is verified by implying unit root tests. The null hypothesis of this test is verified by Augmented Dickey-Fuller (ADF) Test and Phillips-Perron Test. The test existence in unit root is an auto regressive model. The tests suppose that the error terms are statistically self-determining and have a continuous variation. If a time series is non-stationary but suits stationary after differencing. If two series are incorporated of order 1, there may be a direct grouping that is stationary without differencing. If linear grouping exists then such flow of variables are called co-integration. Co-integration tests are divided into two grouping:-

3.6.1 **Residual-based tests**. This tests include the Engle-Granger (1987) test

3.6.2 **Maximum likelihood-based tests**. This test contains Johanse (1988, 1991) and Johansen-Juselius (1990) tests. Throughout this study, we used the Johansen and Juselius test to describe the event of co-integrating courses in a set of non-stationary time series data. There is co-integration among the series if the null hypothesis is exists.

3.7 **Leading towards the results.** The Johansen and Juselius method is employed to test the relationship among the variables for a long-run. Two propose of Johansen and Juselius tests the number of co-integrated vectors. The VAR method is engaged to test

multivariate co-integration. This supposes that completely variables in the model are endogenous.

If co-integration is existing in the long run, then the method of calculations is proficient by introducing an error adjustment term to confine the short-run divergence of variables from their suitable stability values. It's essential as the influence of fiscal expansion is typically clearer in the short run and evaporates in the long run as the economy enhances and expands.

The maximal eigenvalue test assesses the null hypothesis that there are at most co-integrating courses beside the substitute of r + 1 co-integrating courses. In directive to relate the Johansen process, lag length is nominated on the origin of the Akaike Information Criterion (AIC).

Permitting to Granger (1988), the happening of co-integrating courses specifies that GCT must be present in at least same path. A variable Granger beginning the other variable if it assistances approximation its potential standards.

In co-integrated sequence, variables may split joint stochastic flow thus that dependent variables in the Vector Error Correction Model must be Granger-caused by the lagged standards of the error rectification relations. This is likely as error correction conditions are purpose of the lagged standards of the level variables. So, sign of co-integration among variables itself give the source for the structure of an ECM.

The ECM documents the outline of past dis-equilibrium as descriptive variables in the lively conduct of present variables and as a result allows in seizing mutually the short dynamics and long-run connections among variables. The sequential GCT among the variables can be exposed by relating a combined F-test to the coefficients of each descriptive variable in the VEC.

The variance decomposition of stock returns is established on an examination of reply of the variables to distress. Once the shock through the error expression, we study the impact of this blow on other variables of the scheme and consequently get evidence on the time horizon and % of the error modification. We use variance decomposition examination which division the modification of the estimate error of a specific variable into extents attributable to blows to each adjustable in the scheme.

VDA study presents a precise distribution of the alteration in the significance of the variable in a precise period subsequent from alter in the same variable in compute to other variables in previous periods. The IR study observes the result of a random shock to a variable on additional variables of interest. IRs show the result of blows definitely for changed days while variance decomposition study shows the shared result of blows.

4. Results and discussion (Analysis of Data)

4.1 **Descriptive Statistic**. The monthly regular yield in percentage in the KSE are 3.79% that is same to an annual yield of 45.48%. This is one of the best yields in upcoming market index. The highest return in the KSE in one month is 4.367% and highest loss is 3.04%. In other hand systematic inf is 1.14% also IR at a rate of 0.98% per month. Percentage modify in ER minimum range is -2.22% and maximum is 1.71%. The average expansion in the value of Industrial production is 6.67%.

Table – 4.1 Descriptive Statistics

	Kse	Infla	IR	ER	(M2)	IP
Mean	**3.797**	**1.139**	**-0.985**	**-1.837**	**.629**	**6.237**
Median	**3.963**	**-1.082**	**-1**	**-1.783**	**6.642**	**6.322**

SD	**0.365**	**0.277**	**0.099**	**0.089**	**0.159**	**0.263**
Skewness	**-0.697**	**-0.362**	**-0.681**	**-0.912**	**-0.423**	**-0.712**
Minimum	**-3.054**	**-1.851**	**-1.455**	**-2.222**	**6.249**	**5.627**
Maximum	**4.367**	**-0.596**	**-0.824**	**-1.714**	**6.939**	**6.679**

4.2 Correlation between KSE and Macroeconomic Variables. Means, SD, Median, Skewness and min and max correlations between the study variables are shown in Table 4.2. Correlation analysis was conducted to measure relationship among the variables. Strong positive relationships were found between KSE and inf **(r = .71, p < .01)** and KSE and M_2 **(r = .83, p < .01)**. Weak positive relationships were found between KSE and IR **(r = .10, p < .01)** and KSE and IP **(r = .14, p < .01)**. Strong negative relationship was found between KSE and ER i.e. **(r= -0.60, p > .01)**

Table – 4.2 Correlation Matrix

	KSE	*Infl*	*IR*	*ER*	*M2*	*IP*
KSE	**1**					
INF	**0.7074**	**1**				
IR	**0.1035**	**0.4736**	**1**			
ER	**-0.5996**	**-0.5413**	**-0.5391**	**1**		
M2	**0.82519**	**0.5455**	**0.0496**	**-0.7751**	**1**	
IP	**0.1423**	**0.1808**	**0.6619**	**-0.5111**	**0.1233**	**1**

4.3 **Unit root Test (URT).** First of all in Time series data, the important thing is to know that the data is stationary or non-stationary. The mean and/ or the volatility (variance) of a non-stationary time series will depend on time, and will approach infinity as time goes to infinity. The problem with non-stationary data is that the standard OLS regression procedures can easily lead to incorrect conclusion. If we consider that two completely unrelated series which are both non stationary we would expect that either they will both go up or down together or one will go up and other will go down. For this very purpose, E view software gave formal opportunity to identify whether data is stationary or non-stationary with the help of **Unit Root Test.** Our primary stage is to check the stationary of the index series. For this rationale, the ADF test has been implied at level and first difference. Table - 4.3 the results of the Dickey-Fuller, evidently explain that the time series is not stationary at level but that the first differences of the log conversion of the series are stationary. Therefore, the series is unified to the order of 1.

Table – 4.3 URT Analysis

	ADF- Level	ADF- Ist Diff
Ln Index	**-1.38238**	**-11.53163**
Ln ER	**-2.27064**	**-14.60540**
Ln IR	**-1.83560**	**-19.2779**
Ln IP	**-1.76010**	**-4.75079**
Ln M2	**-2.12469**	**-8.41441**
Ln Inf	**-1.83560**	**-19.2779**
1% Critic. Value	**-4.01570**	**-4.01570**
5% Critic. Value	**-3.43780**	**-3.43780**
10% Critic. Value	**-3.14314**	**-3.14314**

4.4 **Order Selection Criteria in VAR Lag.** Lag length is selected by using Schwartz Barisal criteria and appropriate Lag length is 1 as shown in Table 4.4.

Table – 4.4 Order Selection Criteria in VAR Lag

Lag	LogL	LR	FPE	AIC	SC	HQ
0	668.1533	NA	7.84e-12	-8.543914	**-8.426104**	-8.496062
1	**2089.530**	**2714.372**	**1.35e-19**	**-26.41975**	**-25.59508***	**-26.08478**
2	2173.535	153.9177*	7.30e-20*	-27.03916*	**-25.50763**	-26.41709*
3	2200.967	48.13959	8.19e-20	-26.92861	**-24.69022**	-26.01943
4	2225.606	41.32956	9.58e-20	-26.78201	**-23.83676**	-25.58572
5	2250.201	39.35255	1.13e-19	-26.63486	**-22.98275**	-25.15145
6	2266.044	24.12213	1.50e-19	-26.37477	**-22.01580**	-24.60425
7	2283.997	25.94428	1.95e-19	-26.14189	**-21.07606**	-24.08427
8	2306.167	30.32261	2.44e-19	-25.96344	**-20.19075**	-23.61870

4.5 **Co-integration Analysis.** For imply these fundamentals, we may obtain co-integration study in light and spirit. The maximum likelihood-based method is used to define the happening of co-integrating calculations in a set of non-stationary time series. A trace indicator has been applied to test the null hypothesis of r co-integrating by the alternate of r or more co-integrating vectors. Table-4.5 and 4.5(a) the results of the multivariate test for the whole sample period.

Table – 4.5 Trace Statistic (Multivariate co-integration Analysis)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.324728	159.1389	95.75366	0.0000
At most 1 *	0.217876	95.92382	69.81889	0.0001
At most 2 *	0.144422	56.35942	47.85613	0.0065
At most 3 *	0.109301	31.24694	29.79707	0.0338
At most 4	0.073086	12.61131	15.49471	0.1299
At most 5	0.002433	0.392230	3.841466	0.5311
Trace test indicates 4 cointegratingeqn(s) at the 0.05 level				

Table – 4.5(a) Maximum Eigenvalue (Multivariate co-integration Analysis)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.324728	63.21503	40.07757	0.0000
At most 1 *	0.217876	39.56440	33.87687	0.0094
At most 2	0.144422	25.11248	27.58434	0.1003
At most 3	0.109301	18.63563	21.13162	0.1079

At most 4	**0.073086**	**12.21908**	**14.26460**	**0.1027**
At most 5	**0.002433**	**0.392230**	**3.841466**	**0.5311**
Max-eigenvalue test indicates 2 cointegratingeqn(s) at the 0.05				

The trace test indicates the presence of four co-integrating equation and maximum eigenvalue shows the existence of two co-integration equation at the .05 level. Consequently, the outcome offers sign of a long-term association among macroeconomic factors and stock return. Though, it is well-known here that the Johansen co-integration exams do not clarify for important pauses in the data.

4.6 **Vector Auto regression Estimates (VECM)**. VAR model approach has very good trait to find a short term association among the variables. The major advantages of VAR model is that estimation is very simple and in the sense that each equation can be estimated with the usual OLS method separately. If **data is > 1.96 then short term relationship exists** between the variables. We found out that there is no **short term relationship between KSE, ER, M2, IR and IP.**

Table – 4.6 VECM Estimates

Error Correction:	D(LKSE)
CointEq1	0.007894
	(0.00613)
	[1.28820]
D(LKSE(-1))	0.054918
	(0.08199)
	[0.66980]
D(LM2(-1))	0.011157
	(0.31704)
	[0.03519]
D(LCPI(-1))	-0.036165
	(0.05111)
	[-0.70766]
D(LIP(-1))	-0.053248
	(0.12828)
	[-0.41508]
D(LIR(-1))	-0.070091
	(0.07670)
	[-0.91384]
D(LXR(-1))	-0.099354
	(0.09943)
	[-0.99928]
C	0.006170
	(0.00322)
	[1.91776]

Table 4.6 exhibit, t statistic of vector error correction model is less than 1.96 so indicating that no short term disequilibrium exist. It is also evidence from ΔLKSE, ΔLCPI, ΔLM2, ΔLIR, ΔXR and ΔIP that no short run relationship exist among ER, IR, IP, M2 and Inf and equity market return.

4.7 **Granger Causality Test (GCT).** In description theorem, if 2 variables are co-integrated then GCT must ascend in at least one course. The outcomes of GCT are defined in Table - 4.7. Denial of the null hypothesis at 5.00 % shows that there occurs unidirectional GCT among the Exchange rate and Money supply at the 5 % level. There is no other variable exist which are unidirectional Granger causality.

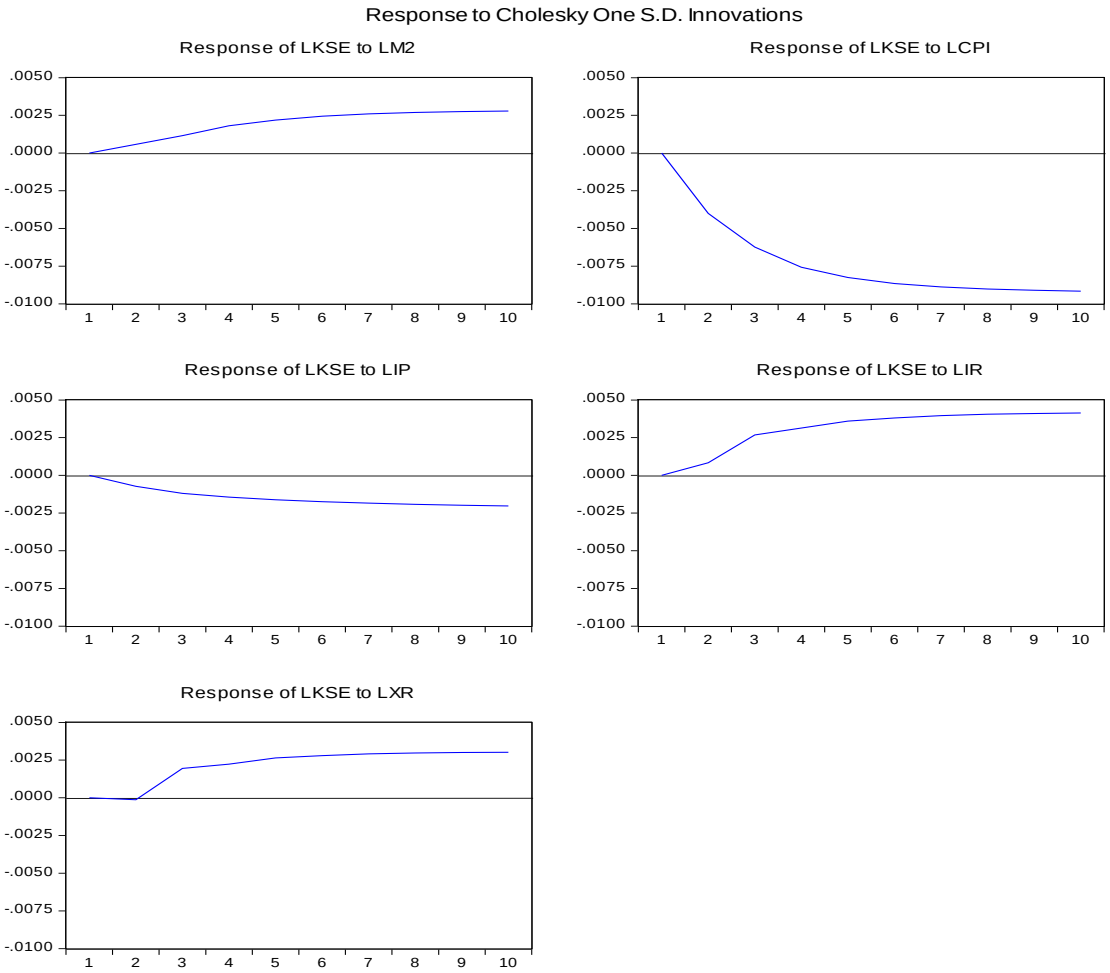
Table – 4.7 Pairwise GCT

Null Hypothesis:	Obs	F-Statistic	Prob.
RLIP does not Granger Cause RCPI	161	0.27118	0.6033
RCPI does not Granger Cause RLIP		0.61341	0.4347
RLIR does not Granger Cause RCPI	161	0.18903	0.6643
RCPI does not Granger Cause RLIR		2.24953	0.1357
RLKSE does not Granger Cause RCPI	161	0.84136	0.3604
RCPI does not Granger Cause RLKSE		1.59668	0.2082
RLM2 does not Granger Cause RCPI	161	0.11091	0.7395
RCPI does not Granger Cause RLM2		0.43360	0.5112
RLXR does not Granger Cause RCPI	161	0.01930	0.8897
RCPI does not Granger Cause RLXR		0.08631	0.7693
RLIR does not Granger Cause RLIP	161	0.02709	0.8695
RLIP does not Granger Cause RLIR		0.75319	0.3868
RLKSE does not Granger Cause RLIP	161	0.01994	0.8879
RLIP does not Granger Cause RLKSE		0.03867	0.8444
RLM2 does not Granger Cause RLIP	161	0.58222	0.4466
RLIP does not Granger Cause RLM2		1.66441	0.1989
RLXR does not Granger Cause RLIP	161	24.6075	2.E-06
RLIP does not Granger Cause RLXR		0.79408	0.3742
RLKSE does not Granger Cause RLIR	161	0.53586	0.4652
RLIR does not Granger Cause RLKSE		0.26841	0.6051
RLM2 does not Granger Cause RLIR	161	2.42644	0.1213
RLIR does not Granger Cause RLM2		0.50992	0.4762
RLXR does not Granger Cause RLIR	161	0.10167	0.7503
RLIR does not Granger Cause RLXR		0.09691	0.7560
RLM2 does not Granger Cause RLKSE	161	0.11351	0.7366
RLKSE does not Granger Cause RLM2		0.34505	0.5578

RLXR does not Granger Cause RLKSE	**161**	**0.14352**	**0.7053**
RLKSE does not Granger Cause RLXR		**0.34274**	**0.5591**
RLXR does not Granger Cause RLM2	**161**	**3.90172**	**0.0500**
RLM2 does not Granger Cause RLXR		**1.72218**	**0.1913**

4.8 **Impulses Response (IRA)**. The impulses response utility will give opportunity to study the reaction of the variables in the VAR to blows in the error terms. Impulse response describes variation in variables will produce the variation in other variable. In our circumstances we confirm the effect of inf, IR, M_2, ER and IP. We observe that one standard deviation shocks to the variable will allow how much affect the KSE returns. The reactions of stock returns have also been observed by using (IR) in the VAR and effects are shown in Figure-1. IR analysis functions custody the effect innovations in macroeconomic variables on Stock returns in the KSE. Figure-1 shows the IR of stock returns from a 1 SD shock to macroeconomic variables. These figures confirm that an only two period similarity exist between the variables.

Fig.-4.8: IR Analysis



4.9 **Variance Decomposition**. Variance decomposition indicates that how much data influence due to its internal factors. **KSE is influenced by 95 % to 100 % by itself, there is very less contribution by other factors i.e. 1 % to 3 %** as shown on Table 4.9**.** For more preciously, Variance decomposition refers to the interruption of the prediction mistake modification for an exact time limit. Variance decomposition can designate which variables have short-term and long-term influences on another variable of interest.

Table – 4.9 Variance Decomposition Analysis

Perod	S.E.	LKSE	LM2	LCPI	LIP	LIR	LXR
1	0.036684	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.053868	99.39201	0.011345	0.553463	0.018449	0.024142	0.000595
3	0.067636	98.46300	0.036308	1.202212	0.043258	0.171743	0.083477
4	0.079591	97.66481	0.077951	1.775026	0.063870	0.279686	0.138656
5	0.090222	97.00995	0.119647	2.218049	0.081793	0.376563	0.193995
6	0.099865	96.49476	0.157615	2.560626	0.097246	0.452915	0.236836
7	0.108730	96.08587	0.189984	2.826903	0.110778	0.514860	0.271603
8	0.116968	95.75910	0.217090	3.037232	0.122685	0.564720	0.299172
9	0.124686	95.49456	0.239632	3.205884	0.133221	0.605367	0.321333
10	0.131967	95.27773	0.258425	3.343197	0.142579	0.638798	0.339269

5. **Conclusion**.

This study observes the lead lag association among stock returns and 5 important macroeconomic factors which include ER, IR, IP, M_2, and inf from June 2000 to May 2017 by applying multivariate cointegration and the GCT. The outcomes offer indication on evidence show in stock markets and describe Causal Connection among Macroeconomic Variables and stock Returns. In ADF test has been applied at level and first difference. The trace test shows the existence of 4 cointegrating equation and maximum eigenvalue shows the existence of 2 co-integration equation at the 0.05 level. Hence, the outcome offers sign of a long-term association among macroeconomic variables and stock returns. We found out that there is no short term relationship between KSE, ER and M2 IR and IP. Denial of the null hypothesis at 5 % shows that there occurs unidirectional GCT among the ER and M2 at the 5% level. There is no other variable exist which are unidirectional GCT. The reactions of stock returns have also been studied by using IRF analysis in the VAR sys. IR functions capture the outcome innovations in m2, ER, IR, IP and inf on stock returns in the KSE. Variance decomposition shows that how much data impact due to its internal causes. KSE is influenced by 95 % to 100 % by itself, there is very less contribution by other factors i.e. 1 % to 3 %.

We determined that macroeconomic variables have a long-run association with stock returns. The certification of the influence of macroeconomic variables on stock market show simplifies investors in manufacture actual theory in long run. Developers of financial policy should retain in mind the effect of variations in IR on the capital market in the form of a decrease of prices. The state bank should study the influence of M_2 on capital markets. Under the efficient market theory, capital markets answer to the influx of new suggestion, indicating that macroeconomic policies should be calculated to provide steadiness to the capital market.

References: (Times New Roman 14 Bold)

[1] Shanken, J. &. (2006). *Economic Forces and Stock Market* Revisited. Empirical Finance ., Vol. 13:, 129-44.
[2] Campbell, J. Y. (1987). *Stock Returns and the Term Structur*e. Journal of Financial, 371-401.
[3] Campbell, J. Y. (1999). "By Force of Habit: A Consumption-Based explanation. Political Economy, 203-253.
[4] Campbell, J. Y. (2003). "*Consumption-Based Asset Pricing.* Constantin ides.
[5] Bren W., G. R. (1989.). "*Economic Significance of Predictable Variations in Stock Index Returns*. The Journal of Finance, 1177-1189.
[6] Hussan A, Javed T (2009) "*An Empirical Investigation of the Causal relationship among monetary variables and Equity market returns*", The Lahore Journal of Economics pp 115-137.
[7] Brennan, M. J. (2001). "*Stock Price Volatility and Equity Premium*. Journal of Monetary Economics, 249-283.
[8] Brenner, R. J. ((1996). *Models of the Short-Term Interest Rate*. Journal of Financial and Quantitative Analysis, 85-107.
[9] Bjornland H. C. and Leitemo, K.(2009).*Identifying the interdependence between U.S. Monetary Policy and the Stock Marke*t. Journal of Monetary Economics, 275-282
[10] Friedman, M. & Schwart., A. J. 1963. *Money and Business Cycles.* Review of Economics and Statistics 45 (1): 485.
[11] Bernanke, B. S. and Kuttner, K. N. (2005) *What Explains the Stock Market's Reaction to Federal Reserve Policy?*. Journal of Finance, 60(3), 1221-1257.
[12] Shanken, J., and M. Weinstein, 1990, "*Macroeconomic Variables and Asset Pricing: Estimation and Tests,"* working paper, University of Rochester.
[13] Cifter, Atilla and Ozun A. 2007. "*Estimating the Effects of Interest Rates on Share Prices Using Multi-Scale Causality Test in Emerging Markets: Evidence from Turkey",* MPRA Paper No: 2485.
[14] Rizwan, Mohammad Faisal ; Khan, Safi Ullah. 2007. "*Stock Return Volatility in Emerging Equity Market (Kse): The Relative Effects of Country and Global Factors",* International Review of Business Research Papers, Vol.3, No.2, pp. 362 – 375.
[15] N.dri. Konan Léon, 2008. "*The Effects of Interest Rates Volatility on Stock Returns and Volatility: Evidence from Korea*", International Research Journal of Finance and Economics, Issue 14, 285-290.
[16] Jornland H. C. and Leitemo, K. (2009) *Identifying the Interdependence between U.S. Monetary Policy and the Stock Market*. Journal of Monetary Economics, 56 (2), 275-282.
[1] Affe, J. F. and Mandelker, G. (1976) the *Fisher Effect for Risky Assets: An Empirical Investigation*. Journal of Finance, 31(2), 447-458.
[17] Fama E. F. & Schwert, W.G. 1977. *Asset returns and inflation*. Journal of Financial Economics 5: 115-146.
[18] Fama, E. F. 1981. *Stock returns, real Activity, inflation and money*. The American Economic Review 71(4): 45-565.
[19] Fama, E. F. & Gibbons, M. R. 1982. *Inflation, real returns and capital investment*. Journal of Monetary Economics 9: 297-323.
[20] Fama, E. F. 1990. *Stock returns, expected returns and real activity*. Journal of Finance 45(4): 1089-1108.
[21] Hatemi-J A.(2009)The *International Fisher Effect: Theory and Application. Investment Management and Financial Innovations,* 6 (1), 117-121.

[22] Cutler, D. M., J. M. Poterba, and L. H. Summers, 1989, "*What Moves Stock Prices?"* Journal of Portfolio Management, 15, 4-12.
[23] Cutler, D., J. M. Poterba, and L. H. summers (1989): "*What Moves Stock Prices?"* Joumal of Portfolio Management, Spring, 4-12.
[24] Poon S, Taylor J (1981). *Macroeconomic Factors and the UK. Stock Market*. J. Bus Financ. Account. 18(5): 619-636.
[25] Dornbusch R, Fisher S (1980). *Exchange Rates and the Current Accoun*t. Am Econ. Rev. 70: 690-971.
[26] Frankel, J. A.(1993), *Monetary and Portfolio--Balance models of the Determination of Exchange rates*, MIT Press, Cambridge
[27] Bahmani-Oskooee, M. and A. Sohrabian. (1992), *Stock Prices and the Effective Exchange Rate of the Dollar*, Applied Economics, 24(4): 459 - 64
[28] Ajayi, R.A and M. Mougoue (1996), *"On the dynamic relations between Stock prices and exchange rates"*, The Journal of Financial Research, 19,SW2F193-207.
[29] Soenen LA, Hennigar ES (1988). *An analysis of exchange rates and stock prices: The US experience between 1980 and 1986.* Akron Bus. Econ. Rev. 19: 71-76.
[30] Mishra K.A (2004) *Stock market and foreign Exchange market in India. Are they related?* South Asia Economic Journal, 5:2, Sage Publications, New Delhi.
[31] Engle, R. F. and Granger, C. W. J. (1987) *Cointegration and Error Correction: Representation Estimation and Testing*. Econometrical, 55.
[32] Johansen S, Juselius K (1990). *Maximum Likelihood Estimation and Inference on Co-integration with Applications to the Demand for Money*. Oxford Bulletin of Economics and Statistics. 52: 169-210.