Co-Integration Analysis of Macroeconomic Variables as Determinants of Equity Market Premium

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Stock market of any country plays a vital rule in discovering the economic development and growth progress. The industrial growth and its importance cannot be overlooked in economic growth. Companies issue share to generate capital for their expansion and new opportunities. Investment in stock market not free of risk and investor always demand for high return due to the risk they are taking. In this research the equity premiumand its determinants are highlighted. The equity premium has been calculated by taking the difference of market return and interest free returns. Monthly data has been used in this study ranging from July 2001 to Dec 2014. Co-Integration test has confirmed that there is long term relationship between endogenous and exogenous variable. The Granger Causality test were also applied and found that interest rate does granger cause to equity risk premium followed by exchange rate that causes equity risk premium at 10% significance level. Also exchange rate does granger causes to interest rate. Variance decomposition and impulse response showed that interest rate has significant effect followed by exchange rate and Inflation over equity premium. Foreign private investment has no or very little effect on equity premium.

Keyword: Equity Premium, Inflation, Exchange rate, Co-integration, Granger Causality, Variance Decomposition

JEL Classification: B22, F31, G12, E44,

1. Introduction

Stock market of any country plays a vital rule in detecting the economic growth and its progress. The industrial growth and its importance cannot be overlooked in the economic growth. Companies need capital for their expansion and new opportunities to create. When companies want expansion of their existing projects or opening new project they need funds for these new projects. For funds collection theyhave two mainoptions to accumulate funds, equity financing or debt financing. In debt financing they will need to pay a certain amount each year whether they earn or not. However, for equity financing they will issue dividend and earning to shareholder when the companies earn profits. So, many times companies are looking for equity financing. So, by this way the companies get an access to capital and the investor become partial owners of that particular company in which they invest their money. The prospects of earning based on the future performance of the companies, and investors are looking for dividends out of the profit of the company.

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The main stock market of Pakistan is the Karachi Stock Exchange Karachi (KSE), KSE has become pretty active stock market during 1990 and has been reported as in the list of twenty emerging stock market by International Financial Corporation. Karachi Stock Exchange showed a tremendous growth in the last decade of making records of its KSE100 Index. The growth of the KSE in the recent over decade remains attractive for investors. Stock market giving the opportunity of higher return in comparison to other investment in the market like Treasury bills, Government Bonds and Fixed term deposits. However, stocks entail certain amount of risk associated with it. The reward for this risk is called market premium- that is the difference between market rate and risk free investments in the financial market. This risk is due to fluctuations in the stock market, and this fluctuation is existing due to certain changes in macroeconomic factors. The relationship between macroeconomic variables and stock market has been investigated by many researchers since 1990. The first ever major study for Pakistan has been conducted by (Khilji,1993) to investigate the time series performance of monthly stock returns on the overall stock price index and the indices of major industries listed in the stock market for the period of 1981 to 1992. The risk beta estimate for various sector were found close to unit, implying that portfolio of investment diversified across different industries are subject to the same amount of risk as those diversified within a specified industry. The study showed that the monthly return were same and equal to the long run expected returns, indicating that the stock market in Pakistan is efficient. The research also found that the distribution of returns were positively skewed, leptokurtic and centered on constructive means. Chin et al. 1996) examined macroeconomic variable influences on stock prices as well as risk premium and also proved that Inflation and GDP effect equity premium.Arnott(2002) conduct a research and find that macroeconomic variables like GDP growth and Inflation had a major influence on equity risk premium in USA during the period 1802-2002. Another study of macroeconomic variables and stock returns has been conducted in USA and Japanese stock returns showed a positive relation with GDP and negatively related with inflation and interest rate. Similarly Money Supply has negative relationship with Japanese stock while no significant relation with US stock. In the study of (Chapman and Maskay, 2007) they obtained results in support that money supply effect equity premium and stock overall returns. The finding of different research reveals that macroeconomic variables have an effect on stock returns and equity premium and these can be used to explain the short term stock returns.

Several studies e.g. Ahmed and Rosser (1995) and Hussain (1997) analyze the same studies and analyzed volatility structure of stock return by using ARCH family models and other statistical techniques. The industry specific policies in Pakistan are observed either as a part of their form package during 1988 and early 1990s, or as an additional policy measure to further boost the private investments in priority sectors. These policies included incentivesfor foreign investment through permission for repatriation of profits, the easing of investment and banking sector regulations and easy access to loans and tax exemptions on priority sectors like power, exports and agriculture based industries. In addition, the government encouraged equity participation to avoid instability through growing leverage. Some sectors like Islamic and institutional investors were regulated to make the investment more competitive during their form period. For borrowers as well as lending units these policies are important for estimating the alternative cost of capital and comparing it with the risk premium of the firms to value their future cash flows(Nishat,1999).

The purpose of the study is to investigate the relationship between market premiumandmonetary variables. The study is an attempt to examine to explore the hidden return component i.e. equity premium with macroeconomic determinants that how each variable can explain the change in market/equity premium.The objectives of the study is to calculate the equity premium for the KSE100 Index of Pakistan stock exchange and examine the macroeconomic variables as determinants of equity premium.

The study will answer the following research questions:

Is there a long term relationship exist between market premium and macroeconomic variables?

How the macroeconomic variables effect the market premium of Pakistan stock exchange?

The rest of the paper is organized as follow. Section 2 provide detail literature review. Section 3 presents the research methodology and description of variables. The results are explained in Section 4. Section 5 presents the conclusion of the study.

2. Literature Review

Several authors have studied the association among the equity premium and the role of macroeconomic and fundamental variables. In order to formulate our hypothesis for this study, many papers in the same area are studied to locate meaningful variables in the area of macroeconomic variables. Smith (1926) perhaps conducted the first ever study on the long run return on stock for the most actively stock in the stock market covering the data period of 1901 to 1922 and found that the equity investors are out performed than bond investor over this period of time. In 1929 just after three years of the publication of (Smith, 1926) study, the market crash occurred. Benjamin Graham blamed Smith's book for inspiring "orgy of uncontrolled speculation" and make him responsible for the loss of those who diverted their investment from bond market into equity market. After this study (Cowles, 1939) conducted his research on the performance of equity market. Cowles use the data for 1872 to 1937 and documented a positive long term stock performance.

This paper contains a short overview on the literature that has been identified as potentially interesting for being used in writing this research paper on the topic defined above.The choice of the macroeconomic variables was not a random selection. It was motivated by number of factors/articles that have investigated the matter and obtained worldwide recognition. Roll and Ross (1986) investigated macroeconomic influences on stock price (as well as risk premium) and proved that GDP and inflation do influence risk premium. Arnott (2002) in his research about historical risk premium in USA pointed out that following macroeconomics factors as inflation and GDP growth have had big influence on risk premium value in USA during 1802-2002.Lettau, et al. (2006) used the term "macroeconomic risk", which is volatility of the aggregate economy, in their research about risk premium. They pointed out that changes in GDP were the most important factor in economic changes, which in its turn influenced risk premium. Neely (2011) found also that inflation rate has strong correlation with changes in risk premium. According to (Kizysand Spencer,2007) long term government bonds can explain perception of investors about inflation much clearer than short term interest rate and also inflation is more influential in long

investment horizons than the short one. A study of macroeconomic influences on US and Japanese stock returns showed a positive relation with industrial production and a negative relation with inflation and interest rate. However, Japanese stocks were negatively related to the money supply, while US stocks had no significant relation (Macmillan, 2007). Maskay and Chapman (2007) obtained results supporting hypotheses about money supply effect on risk premium and stock returns. The findings of the research reveal that most of macroeconomic variables can be used to explain the short term stock returns. However, industrial production remains the only variable which explains the stock return for even longer periods (Chou et al, 2007). Furthermore, the literature is divided into two sections.

2.1 Market Premium

The difference between the expected market return and the expected risk free securities return is called market premium. This is a fact that market premium is an important factor in calculating total return of an asset accompanied by some extra risk. Examining the process behind the ERP is itself a very interesting topic due the confusion that is associated with it. Damodaran (2010, 2011, 2012) explored that considering the importance of equity market premium and risk premium it is amazing that how careless the ERP is usually treating while estimating it for a particular market or security.

Equity market premium is an important topic to discuss in the theoretical finance both as a result of investor risk aversion in general equilibrium models and as a key determinant in financial valuation. Therefore it is also important to estimate it empirically as it is used in many decisions like allocation of assets (including the decision to put the investment in risk free bonds or in the stock market for having high return). Similarly, it is also an important factor in calculating cost of capital that affects the outcomes of valuation estimation process that further affects the decision regarding the amount needed to meet future pension and health care requirements (Damodaran, 2011). The famous equity premium puzzle coined by (Mehra and Prescott, 1985) which implies that ERP value of around 6.2% is too high and non of the micro economic model or utility function will allow the investor to demand for such a high ERP that's translate into total return of the equity. Some economist are still wondering the ERP puzzle of (Mehra and Prescott,1985), after the poor performance of stock market in recent years like 2007-08 and 2009, when risk free bonds performs better than the stock market for some periods. Some researcher are still asking the question that whether the ERP even still exist, it mean that if risk free rate is almost equal to risk free rate definitely the ERP will be tends to Zero and the question of ERP existence will be raised. High ERP is witnessing by many authors but usually their estimates are based on long period of historical data of almost 100 years by using the Ibbotson associate data bank starting from 1926 (Damodaran, 2011). In several academic research papers explored the equity returns and equity premium for a very longer period, e.g. (Jorion and Goetzmann1999; Seigal 2005; Dimsonet al.2008). As for the long period is concern this is obvious that the return will be higher in longer period as compare to short time period. According to (Elton et al. 2011) ERP is one of the most important pillar of modern portfolio theory is the condition that most of the investors are risk averse and like to have return with less risk. Therefore, the investment over the long period produced higher returns. The fact can be support by literature of (Goetzmann and Ibbotson, 2006) explored that if 1 USD invest in U.S. blue chip stock in December 1925 would be reach to a worth of 2658 USD by the end of 2005. While if the same invest for the same period is made

in government risk free it will be worth only 71 USD. Elton et al. (2011) write that investor want high return from the less risky investment. The ERP is not guaranteed it is only just an expectation from investment to have excess return from their investment. The volatility of the stock market is the cause of premium in the first place. Due to this volatility of the stock market is healthy estimation of ERP is also a challenged.

2.2 Macroeconomic Variables

A set of macroeconomic variable have an effect on stock prices that lead to change in equity premium and translate in total expected returns. In Pakistan there is a long list of macroeconomic variables that can be investigated to check their effect on equity returns.The selection of the macroeconomic variables as determinant of market premium is not random. This is motivated by number of factors that have been examined by many researchers to investigate the topic and received worldwide acknowledgment. Roll and Rose(1986) explored macroeconomic pressure on stock price (as well as on market premium) and find that Inflation and GDP do influence equity risk premium. Arnott (2002) in his study about historical equity risk premium in USA and conclude that the below mention macroeconomics factors as GDP growth and Inflation have had big pressure on equity risk premium value in USA for the period 1802-2002.Lettau et al.(2006) used the term "macroeconomic risk", which is unpredictability of the total economy, in their research study about the equity risk premium. They conclude that a change in GDP is the most significant aspect in economic changes that change further translated into market premium.

The literature available, that how change in macroeconomic variables can cause change in stock prices and market premium. The studies of (Fama 1981;Cheski& Roll 1983; Ross 1986; Hassan and Javeed2009; Imran and Abbas 2013) will be of more consideration in our research. They all somehow used the relationship of different macroeconomic variables and stock returns. The variables are that most visible in a number of research are Inflation, GDP, money supply, industrial production, interest rate, balance of payment and employment.

3. Theoretical Framework

The security market line (SML) explains the reward-to-risk ratio for each security compared to overall market. Therefore, the expected rate of return of individual assets is equivalent to risk free interest rate (r) plus the risk premium multiplied by, where represents asset's sensitivity to market's movements (Levy 2005).

$$(Ri) = Rf + (Rm - Rf)\beta \ - - - - - - \ (1)$$

The reward-to-risk ratio is known as market risk premium (equity premium) and can be defined as:

$$(Ri) - Rf = (Rm - Rf)\beta \ - - - - - - \ (2)$$

In order to obtain the market risk premium as an endogenous variable, the equation (1) can rewrite as:

$$\frac{(Ri)}{\beta} - \frac{(Rf)}{\beta} = (Rm - Rf) - - - - - - \quad (3)$$

$$\text{Equity Premium} = \frac{(Ri)}{\beta} - \frac{(Rf)}{\beta} \quad - - - - - \quad (4)$$

Where $(Rm - Rf)$ is the market premium.

According to equation (2), and since authors assume that our indexes represent the market portfolios, so is equal to one. Risk premium is endogenous conducted by changes in stock returns and risk free interest rate as exogenous variables. Stock returns and interest rate are considered as two endogenous variables which are affected by other macroeconomic variables such as money supply, inflation, exchange rate, foreign direct investment and Industrial production as exogenous variable. Our approach is consistent with that of Arbitrage Pricing Theory (APT) proposed by (Ross 1976). The intention of this research is to investigate the relationship of these influences and hence their effects on risk premium.

3.1 Data Description & Methodology

In this study authors calculate the market premium Pakistani stock exchange using market return and risk free interest rate. The equity premiumsestimated for KSE100 index by taking the difference of stock returns and risk free rate of return utilizing the monthly observations for the period July 2001 to Dec 2014. Secondly, the researcher will check the impact of macroeconomic variables as determinants of ERP estimated in the first stage. Monthly observations will be collected for this research study.

The equity market premium and its relationship with macroeconomic determinant have has still a room toexploredwhile studying capital market in Pakistan. In order to analyze this relation a number of variables have been explored for the purpose listed above. Data for this research will be used from July 2001 to Dec 2014 of KSE100 to calculate market premium that will be regress with macroeconomic determinants.

The data for macroeconomic variables will be collected on monthly basis. The treasury bills rates will be used a proxy for risk free interest rate to compute historical equity premium, defined as the differential return of KSE100 index over risk free rate. And for the rest of variable other different sources will be use like economic survey of Pakistan for macroeconomic variables data like money supply, exchange rate, Inflation, interest rate, foreign direct investment and Industrial production.

3.2 Description of Variables

3.2.1 Interest Rate

Interest rate can be considered in nominal or real terms. The nominal interest rate of local currency shows the cost of one unit of borrowing to be paid in future on agreed terms and condition. Similarly, the real interest rate is the nominal rate of interest adjusted for Inflation (Blanchard, P.637). Risk free interest rate is the rate of return that can be received by making your investment in safer financial instruments like Bonds, Fixed term deposits, treasury bills which have no or minimum likelihood of defaulting. In this research the risk free interest rate is defined as the monthly average overnight rates. These are the Karachi Inter Bank Overnight Rate (KIBOR) fixed by the State Bank of Pakistan and charging for the funds available for short period like one-day or overnight. (Hodrick 1992) examine the relation of interest rate over equity premium. Similarly, (Ang and Bedaert, 2003) explore the impact of Interest rate and dividend on equity premium.

3.2.2 Inflation

The inflation uses in this paper will be consumer price index (CPI) calculated in Pakistan refers to the continuous rise in prices of general commodities over time. CPI is the fixed weight price index, which measures the average change in prices of goods, and services that can be purchased by and end user. There, the CPI shows the effect of inflation on the purchasing power of individuals. This is the most well-known and widely used indicator of inflation. (FATA and Schwert1977;Fama 1981;Kaim and Stambaugh1986) used Inflation as determinant of equity premium.

3.2.3 Exchange Rate

Exchange rate can be defined as the value of one currency in term of another currency. Exchange rate affect the stock return or market price of shares (MPS) as the MPS can be defined as the present value of expected future cash flows, this definition depends upon on cash flows and discount rate. Change in exchange rate directly affects those firms whose trade is involved in imports and exports. In order to calculate the basic results of independent variable power of selected variables, the author examine the relationship by ordinary linear regression. In order to understand how much better is the OLS relation performs; therefor need to carry out the cumulative sum of square test in e-views. Also a step further need to run GARCH model for its estimations.

3.2.4 Foreign Private Investment

Foreign private investment refer to the foreign direct investment in this case which that the invest of one country into another country in the form of opening new projects, joint ventures, management, transfer of technologies and expertise etc is called foreign private investment. Increase in foreign private investment can be used to measure change in economic condition of a country. The stock is also influenced by a number of factors including foreign private

investment. This also depends upon the size of foreign private investment. If a huge amount of investment took place it directly translates into stock market prices and vice versa.

3.3 Model

The econometric model (equation) for the analysis can be written as follows:

$Y = F(x)$
Y = Dependent Variables
X_i = Dependent Variables
ε_t = Error Term

The following model will be used for estimation of the above relation between ERP and macroeconomic determinants

$$EP_{it} = \alpha + \beta_1(\text{Inflation}) + \beta_2(\text{Interest Rate}) + \beta_3(\text{ExchangeRate}) + \beta_4(\text{Foreign Private Invest}) + \varepsilon_t \text{----- (5)}$$

4. Results and Analysis

4.1 Ordinary Least Square (OLS) Assumptions

For convenience purpose the following two out of nineOrdinary Least Square(OLS) assumptions have to be check before applying the actual model on the data.

4.1.1 Multicollinearity

This is an implicit assumption of Multicollinearitythat is made when using the OLS estimation technique are that the explanatory variables are not correlated with each other.If there is no relationship between the explanatory variables, theywould be said to be orthogonal to one another. If this is the case then adding or removing a variable from the equation would not cause in changing the values of the coefficients on the other variables in the model.

The correlation matrix can be used for testing the multicollinearity of variables

4.1.2 Correlation Matrix

Correlation Matrix represents the correlation among different explanatory variables. Correlation matrix contain the results of Pearson correlation coefficients for quantitative.

4.1.3 Autocorrelation

The following tests has been used for checking the stationarity and autocorrelation of data. For this purpose unit root test can be applied.

4.1.4 Unit Root Test

In order to check the stationarity of time series variable unit root test developed in 2009 which can be applied using auto regressive model. In general the approach to unit root implicitly assumes that the time series to be tested $[Y_t]_{t=1}^T$ can be written as

$$y_t = TD_t + z_t + \varepsilon_t \text{---------(6)}$$

TD_t is the deterministic component
z_t isthe stochastic component

ε_t isthe stationary error process

The following two technique will be used to check the stationarity of the variables used in this research.

4.1.5 Augmented Dickey Pillar Test

Augmented Dickey Fuller model has been developed by Fuller (1979) for checking the stationarity of time series data. The general equation of ADF is written as:

$$y_t = \rho y_{t-1} + u_t \text{--------(7)}$$

Where

y_t is the variable of interest, t is the time index

ρ is the coefficient

u_t is the error term

4.1.6 Phillip Perron Test

The Phillip-Perron test developed in 1988 for time series data. The test hypothesize that

if $\rho = 0$ in equation $\Delta y_t = \rho y_{t-1} + u_t$, where Δ is the first difference operator.

Table 1 exhibit descriptive statistics: The average monthly return in percentage term of equity risk premium is 2.1%. This is equal to annualized return of 25.5% considering one of the best emerging growth market. Inflation is ranging from -23% to 34% for the given data period. However, the average is 0.6% in the same period. Similarly the percentage change in exchange rate is ranging from -0.45% to 28%. However, significant volatility has been observed between the equity risk premium and macroeconomic determinants. Major deviation has been observed in ERP itself and foreign private investment.

Table 1: Descriptive Statistics						
	ERP	R_CPI	R_EX_RATE	R_INTEREST	R_KSE100	R_FPI
Mean	0.0210	0.0009	0.0034	-0.0007	0.0203	0.0232
Median	0.0241	0.0060	0.0014	0.0000	0.0217	0.0556
Maximum	0.4294	0.3498	0.0609	0.2806	0.2411	2.4234
Minimum	-0.4488	-0.231	-0.0485	-0.4242	-0.4488	-1.7621
Std. Dev.	0.1227	0.0604	0.0120	0.0831	0.0818	0.7091
Observation	149	149	149	149	149	149

Table 2 Showing that very little correlation has been observed between the equity premium and macroeconomic variables except the equity premium and exchange rate. Equity premium showing negative correlation with inflation, interest rate and foreign private investment. When interest (risk free) rate increases it translate into increase in discount rates in the overall economy. As the price of stocks is theoretically equal to the present value of cash inflows, so higher discount rate translate into reduction in stock prices and its overall returns. In the meantime, the interest rate parity theory also confirmed by our results as the interest rate is negatively correlated with exchange rate. The maximum positive correlation was recorded between interest rate and exchange rate followed by interest rate and inflation. The maximum negative correlation was recorded between equity premium and foreign private investment followed by equity premium and interest rate. However, no serious problem of multicollinearity is detected in different macroeconomic variables. So, all factors under consideration will be used in same model.

Table 2: Correlation Matrix					
	CPI	ERP	EX_RATE	INTEREST	TOTAL_FPI
CPI	1				
ERP	-0.1947	1			
EX_RATE	0.2575	-0.0301	1		
INTEREST	0.6585	-0.1682	0.6692	1	
TOTAL_FPI	0.1872	-0.1866	0.0032	0.2349	1

In order to apply Co-Integration analysis, there is need to check the stationarity of the data. For this purpose Augmented Dicky Fullor test will be used, sometime the ADF test is not enough to confirm the stationarity of the data. In order to confirm the stationarity Phillip Perron test were also applied. The test results have been showed in the following table.

Table 3: Unit Root Test				
	ADF test		PP test	
	Level	1st Difference	Level	1st Difference
Ln ERP	1.003978	-11.35798	0.940293	-11.35719
Ln Ex Rate	1.765432	-7.82900	1.821698	-8.076342
Ln Interest	-1.086258	-8.967032	-1.290382	-9.371304
Ln FPI	-1.923145	-10.05342	-7.236421	-34.67983
Ln CPI	-1.586096	-4.093047	-1.469392	-8.248717
1% level	-3.476143	-3.476143	-3.474567	-3.474874
5% level	-2.881541	-2.881541	-2.880853	-2.880987
10% level	-2.577514	-2.577514	-2.577147	-2.577219

The Augmented Dicky Fullor test needs that the error terms must be statistically independent and data should be homoskedastic in configuration. However, sometime these assumptions may not stands assuredtherefore another important technique for the same purpose called Phillips-Perron (PP) test, to test the stationarity of the dataset included in this research. Table-3 showing the result of ADF as well as it also shows the results of the Phillips-Perron test, which endorsed that the results of ADF test, are true. Which confirms that the series are stationary atI(1).After fulfilling these criterions, cointegration analysis is used to check the impact of macroeconomic set of variable over the equity premium of KSE100 index. Johansen (1988, 1991) co-integration test and (Johansen-Juselius1990) technique is used to oversee the presence of cointegrating equations in this set of nonstationary time series data for the period mentioned earlier.

Table 4 shows the results of multivariate cointegration test for the whole sample period data.

Table4: Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	$\alpha = 0.05$	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.42622	144.5542	69.81889	0.0000
At most 1 *	0.230248	62.33869	47.85613	0.0013
At most 2	0.097239	23.60907	29.79707	0.2175
At most 3	0.049935	8.469083	15.49471	0.4167
At most 4	0.005981	0.887829	3.841466	0.3461
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				

This test confirms that there exist two co-integrating equation at α=0.05. Therefore, these results confirm that there exist long term relationship between macroeconomic variables and equity premium. According to representation theorem, if there exist any co-integrating equation there must be granger causality as well.

The results of Grangercausality are reported in Table-5. Rejection of the null hypothesis at 5% indicates that there exists unidirectional Granger causality between the Interest rate andequity premium returns at the 5% level. Similarly, unidirectional Granger causality also exists between the interest rate and inflation over equity premium.

Table 5: Granger Causality test			
Null Hypothesis:	Obs	F-Stat	Prob.
R_CPI Does not Granger Cause ERP	149	0.78066	0.3784
ERP Does not Granger Cause R_CPI		0.14588	0.7031
R_EX_RATE Does not Granger Cause ERP	149	1.66511	0.199
ERP Does not Granger Cause R_EX_RATE		2.46939	0.1183
R_INTERESTDoes not Granger Cause ERP	149	18.3796	3.0E-05
ERP Does not Granger Cause R_INTEREST		2.26373	0.1346
R_TOTAL_FPI Does not Granger Cause ERP	149	0.16154	0.6883
ERP Does not Granger Cause R_TOTAL_FPI		1.25832	0.2638
R_EX_RATE Does not Granger Cause R_CPI	148	0.00038	0.9845
R_CPI Does not Granger Cause R_EX_RATE		2.17208	0.1427
R_INTERESTDoes not Granger Cause R_CPI	148	0.23534	0.6283
R_CPI Does not Granger Cause R_INTEREST		0.87845	0.3502
R_TOTAL_FPI Does not Granger Cause R_CPI	148	0.00546	0.9412
R_CPI Does not Granger Cause R_TOTAL_FPI		0.00012	0.9911
R_INTEREST Does not Granger Cause R_EX	148	1.72375	0.1913
R_EX Does not Granger Cause R_INTEREST		3.98294	0.0478
R_TOTAL_FPI Does not Granger Cause R_EX	148	0.13209	0.7168
R_EX_RATE Does not Granger Cause R_TOTAL_FPI		0.25581	0.6138
R_TOTAL_FPI Does not Granger CauseR_INTEREST	148	1.23587	0.2681
R_INTERES Does not Granger Cause R_TOTAL_FPI		2.24836	0.1359

The effect of equity premium has also been investigated by using impulse response analysis in the VAR system and the results have been showed in the following figure. Impulse response analysis captures the effect of interest rates followed by exchange rate. It also showed some effect from inflation and foreign private investment but it is very little and negligible over the equity premium.

Figure 1 shows the impulse response of equity premium from one standard deviation shock to macroeconomic variable. The significance level of impulse response function has been investigated at 95% confidence bounds.

Figure 1: Variance Impulse Response Rate
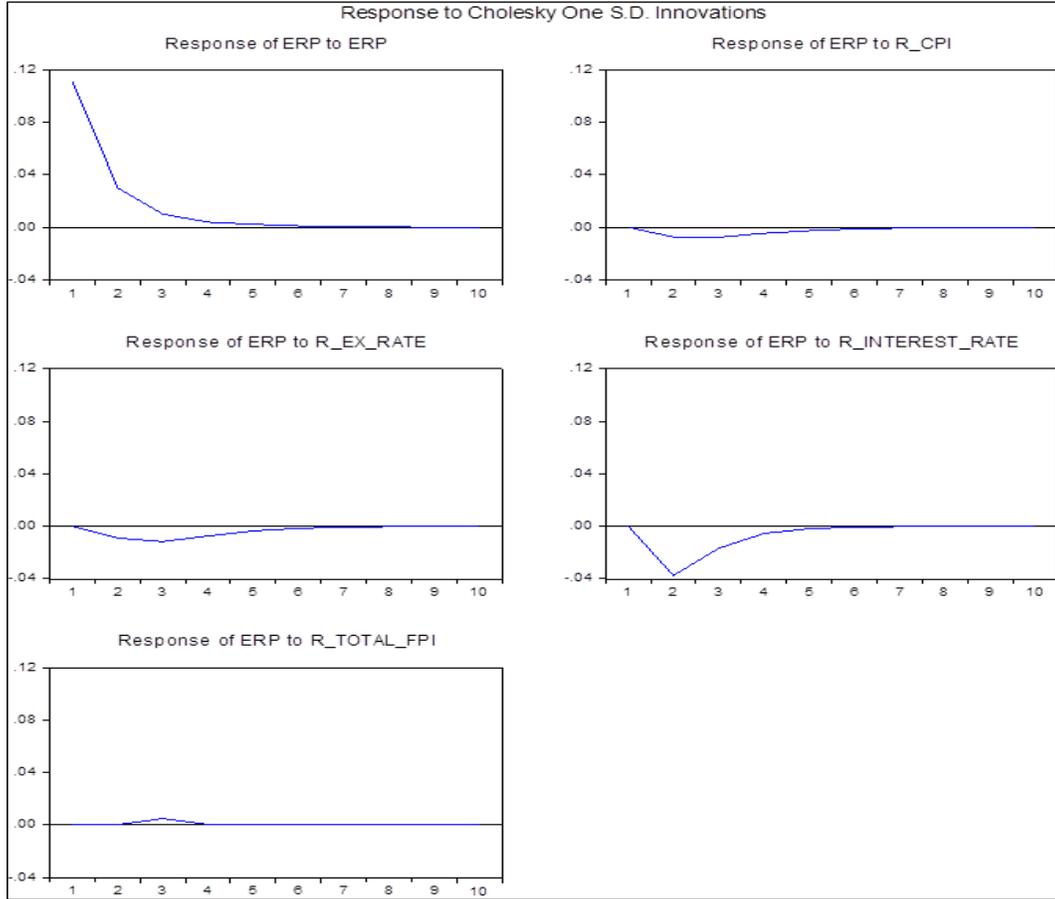
The response in change of equity premium has also been examined by using the analysis of variance decomposition showed in the below table # 06. The result from variance decomposition indicates that interest rate is one of the main macroeconomic determinants that cause change in equity premium. In order to measure the deviation this method has been used to measure the degree to which impulse to equity premium are explained by interest rate, inflation, exchange rate and foreign private investment. It also assists us to identify the trend of response transmission over time. When interest rate increases investor cannot afford borrowing from banks at high rate, which cause delay or no expansion of new projects. Similarly, investor put their cash in money market to hedge the purchasing power at least. The interest rate is followed by exchange rates that explain the change in equity premium. However, the inflation and foreign private investment don't have any significant effect on equity premium.

Table 6: Variance Decomposition of Market Premium					
Period	S.E.	ERP	R_CPI	R_EX_RATE	R_INTEREST	R_TOTAL_FPI
1	0.1116	100.0000	0.0000	0.0000	0.0000	0.0000
2	0.1221	89.5148	0.3726	0.5620	9.5504	0.0002
3	0.1246	86.6600	0.7323	1.4274	11.0267	0.1536
4	0.1251	86.0695	0.8650	1.7751	11.1370	0.1535
5	0.1252	85.9420	0.9077	1.8562	11.1380	0.1561
6	0.1252	85.9153	0.9179	1.8729	11.1379	0.1560
7	0.1252	85.9092	0.9204	1.8764	11.1380	0.1561
8	0.1253	85.9078	0.9210	1.8771	11.1380	0.1561
9	0.1253	85.9074	0.9211	1.8773	11.1380	0.1561
10	0.1253	85.9074	0.9211	1.8773	11.1380	0.1561

Variance Decomposition analysis suggests that the change in interest rates is the main source of volatility in market premium followed by exchange rate in Pakistani capital market. The investors need to consider the change in interest rate while taking any investment decision in the stock market.

5. Conclusion

The importance of stock market cannot be overlooked in detecting the economic growth of any country. It plays a vital rule in producing clear result about its industry growth that creates employment, generate revenue, and export the goods and attracting investments from abroad. At the same time the study of macroeconomic variable is also of great importance, because it plays an important role in driving the stock market. In the past many studies on stock market and macroeconomic variables has been done. However, the importance and calculation of market premium is an important factor that needs to investigate. Apropos to Pakistan very limited literature regarding the market premium is available and very scant in relationship with macroeconomic variables. In many countries this topic has been examined by using different series of variable and techniques. In this research study the impact of macroeconomic factors were investigated over the market premium. The study covers a period of July 2001 to Dec 2014. Co-Integration analysis has been used to find this relation. Before applying Co-Integration analysis all the pre requisite tests are checked like stationarity of the data, the stationarity has been checked by applying Augmented Dicky Fullor test and Phillip Perron test and found that the data is stationary on 1st level. After applying the co-integration analysis, found that there exist two co-integrated equation. It proved that there exist long term relation between macroeconomic variables and market premium. It also shows that there exist granger causality between interest rate and market premium. Also variance decomposition test applied to check that how much each variable explains the change in market premium and authorsfound that interest rate is the major cause of change in market premium followed exchange rate and inflation. However, there is no significant relation between foreign private investment and market premium. The study estimate the relationship between equity premium and macroeconomic variables in Pakistan stock exchange which is scant in the existing literature. During investment process the stock market investor need to observe the changes in the macroeconomic variables to predict the true returns of stock market investments.

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