

Macroeconomic Factors and the Pakistani Equity Market: A Relationship Analysis

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ABSTRACT: The paper examines the relationship among stock market returns (KSE-100 Index) and exchange rate, real interest rate, gross domestic product, money supply (M1). In order to respond the queries, this study used monthly data of all variables from 2003 to 2013. And the applied tools of analysis are descriptive statistics, unit root test (Phillips-Perron Test) and ARDL approach to co-integration. ARDL approach results revealed that exchange rate, money supply, and real interest rate have no statistically significant impact on stock market returns. However, there is a significant positive impact of current GDP on stock market return and a significant negative impact of lag term of GDP on stock market return. In the short-run, there is a significant positive impact of gross domestic product on stock market return. The positive impact of GDP on stock market return is consistent with some previous studies. This study concludes that GDP is the most important factor among the selected macroeconomic variables to influence the Karachi Stock Exchange returns (KSE 100 Index). The gross domestic product should be in focus in order to increase shares' value of Pakistani firms. The study helps investor in taking appropriate investment decisions by assessing the movement of GDP and consequently the movement of stock market returns. This study also helps to understand the behavior of stock market returns on the arrival of new information and potential business performance.

KEYWORDS: Karachi Stock Exchange (KSE) 100 Index, Macroeconomic variables, GDP.

1 INTRODUCTION

Stock markets and economic activity of a country are interlinked as economic factors have a significant impact on the performance of stock markets. Many research studies like Kpanie, Vivian and Sare (2014); Ullah, Hussain and Rauf (2014); Attari and Safdar (2013); Haque and Sarwar (2012); Shah, Kouser, Aamir and Saba (2012); Ting, Feng, Wen and Lee (2012); Mohammad, Hussain, Jalil and Ali (2009); Pilinkus and Boguslauskas (2009); Hasan and Nasir (2008); Menike (2006) and Fama (1970) have examined the association of stock markets' performance with economic activity and identified the important factors. The fluctuations in stock markets' performance indicate the variations in economic activity. Stock markets play a dynamic role in the economic development and the development of a stable and well-organized financial structure of an economy (Patel, 2012). Haroon and Jabeen (2013) stated that the stock market is a well-organized body that facilitates the exchange of different securities between savers and borrowers. Business entities approach the stock market to purchase funds to meet their financial needs (Mankiw, 2011). Stock market operates as an intermediary between investors and borrowers to smooth the funds reallocation process. Issahaku, Ustarz and Domanban (2013) stated that stock market mobilize both domestic and international funds to meet needs of lenders and borrowers. Further, the performance of stock market induces investors by signaling positive messages about the stock returns' behavior.

Variation in stock prices influences the wealth and investment behaviors of households and business units (Hsing, Phillips & Phillips, 2013). Unfavorable variations in stock prices make it difficult for businesses to induce investors. Stock market performance is an indicator for foreign investors seek the strength of the stock market (Elly & Oriwo, 2012). Further, Rashid (2008) argued that an efficient equity market is an integral part of economic and financial environment of a country. Stock prices' behavior reflects the future performance of a firm and economic direction of a country. Stock prices and firm performance broadly draw a picture and scenario of economic activity direction (Janor, Halid & Rahman, 2005). In addition,

share prices have a great deal with available monetary and non-monetary information in the stock exchange market (Nazir, Khalid, Shakil & Ali, 2010). The concept of "efficient market hypothesis or theory," says that a security's price represents all the available public information. It means that prices are supposed to reflect the intrinsic value of a security. Fama (1970) mentioned an efficient capital market theory. Theory grasps that, in an efficient market there are wise investors, professional and stock prices fully represent all the available information. Economic theories suggest that stock prices reveals potential business performance, and business profits usually reveal the intensity of economic activities (Singh, 2010). Haroon and Jabeen (2013) reported that investigators and analysts carefully watch stock prices and forces drive variations in prices. These forces include macroeconomic forces such as exchange rate, inflation, money supply, gross domestic product and interest rates. Familiarity with these indicators is very important for all the investors while selecting among investment options because of the peculiar nature of the relationship between macroeconomic forces and stock returns (Attari & Safdar, 2013).

Shah et al. (2012) stated that the stock market in Pakistan is in a growth phase and need further evolution to enhance its impact on economic activity. Further, it is witnessed that the stock market was unstable during the last 10 years and observed financial crises in 2005, 2006 and 2008 (Haroon & Jabeen, 2013). Macroeconomic information such as money supply, interest rate, exchange rate and gross domestic product plays a vital role in stocks' price determination. *The main objective of this paper is to examine the impact of selected macroeconomic variables on the stock market returns in Pakistan (KSE 100 Index).* This study tends to help investors and securities analysts in forecasting the nature of the association between macroeconomic factors and stock returns in the Pakistan equity market. This study will help investors make appropriate purchase decisions about stocks available in the market. The study will also help the policy makers to pay attention to the macroeconomic variables that predicts the direction of economic activities in Pakistan.

2 LITERATURE REVIEW

Different academic and professional researchers have conducted the empirical investigation to find out the association between behavior of stock prices and macroeconomic forces in developed countries. Now they have started to analyze these trends in the developing countries due to their significant and attractive profit potentials. The study has analyzed the impact of selected macroeconomic variables (exchange rate, gross domestic product, interest rate and money supply) on stock market returns.

Issahaku et al. (2013) founded that in the long-run there is a significant negative association between money supply and stock returns, while in the short run there is a significant negative association between money supply and stock returns. Hussin, Muhammad, Abu and Awang (2012) investigated the nature of the association between stock returns and selected macroeconomic variables. The study has revealed a positive relationship between share prices and economic growth (Industrial production Index) whereas a negative relationship among share prices and money supply (M3), exchange rate.

Kpanie et al. (2014); Ullah et al. (2014); Attari and Safdar (2013); Zafar (2013); Hsing et al. (2013); Haque and Sarwar (2012); Shah et al. (2012); Ting et al. (2012); Mohammad et al. (2009); Pilinkus and Boguslauskas (2009); Hasan and Nasir (2008) and Menike (2006) studies revealed that interest rate has a significant negative impact on stock prices. Whereas, Gowriah, Seetanah, John and Keshav (2014) and Akbar, Ali and Khan (2012) studies revealed that interest rate has a significant positive impact on stock prices. Khan (2014); Jasra, Azam and Khan (2012) and Sohail and Hussain (2012) founded that interest rate has an insignificant impact on stock returns.

Gowriah et al. (2014); Kpanie et al. (2014); Ullah et al. (2014); Ahmad, Ahmad, Khan and Javaid (2012); Akbar et al. (2012); Hasanzadeh and Kianvand (2012); Jasra et al. (2012); Pilinkus and Boguslauskas (2009); Hasan and Nasir (2008) and Menike (2006) studied relationship between macroeconomic variables and stock return. Studies revealed that the exchange rate has a significant negative association with stock prices. Whereas, Khan (2014); Hsing et al. (2013); Issahaku et al. (2013); Haque and Sarwar (2012) and Sohail and Hussain (2012) founded that the exchange rate has a significant positive association with stock prices.

Gowriah et al. (2014); Hsing et al. (2013); Akbar et al. (2012); Hasanzadeh and Kianvand (2012); Sohail and Hussain (2012); Ting et al. (2012); Pilinkus and Boguslauskas (2009); Hasan and Nasir (2008) and Menike (2006) studies revealed that money supply has a significant positive association with stock prices. Haque and Sarwar (2012) founded a significant negative association between money supply (M1) and stock returns. Ahmad et al. (2012) revealed an insignificant positive association between money supply and stock prices.

Gowriah et al. (2014); Hsing et al. (2013); Rafique, Amara, Naseem and Sultana (2013); Haque and Sarwar (2012); Hasanzadeh and Kianvand (2012) and Pilinkus and Boguslauskas (2009) founded a significant positive association between gross domestic product and stock prices. While Attari and Safdar (2013) founded that there is no association between gross

domestic product and stock returns. Ahmad et al. (2012) founded an insignificant positive association between gross domestic product growth and stock prices.

The literature review provides insight into important macroeconomic variables and their association with market returns. Thus, this study has tried to examine the association between stock market return and macroeconomic variables (Exchange Rate, Interest Rate, GDP and Money Supply).

3 METHODOLOGY

The purpose of the study is to investigate the relationship between stock market return and selected macroeconomic variables (Exchange Rate, Interest Rate, GDP and Money Supply). In order to respond the queries of the study monthly data from 2003 to 2013 is used. Data is collected from the World Bank database, OANDA and Yahoo Finance. Tools of analysis used are descriptive statistics, unit root test and ARDL approach to co-integration.

Descriptive statistics provide the view of the general pattern of the data. Before going for applying sophisticated tests to derive the result of study to achieve the intended objectives a look on descriptive statistics helps to have an idea about the behavior of the data to be used for analysis. Stationarity of time series has been examined by using unit root tests. Augmented Dickey Fuller Test and Phillips-Perron Test are usually employed to test the Stationarity. The Dickey-Fuller tests assume that the error term is statistically independent and have a constant variance, which is a rather strict assumption. However, Phillips-Perron test allows the error term to be weakly dependent and heterogeneously distributed. Therefore, the results of Phillips-Perron test surpass that of Augmented Dickey Fuller Test, if there is any difference the recommendation of both tests. Because of the supremacy of Phillips-Perron over Augmented Dickey Fuller test, study used Phillips-Perron test in the study to check the Stationarity of the variables. If variables are stationary at level then simple OLS is applied for analysis. However, in case series are non-stationary at level then Co-integration technique of analysis is used. Co-integration analysis requires that time series should be integrated of the same order. However, if series are integrated of different order, means if some series are stationary at level and some at 1st difference then ARDL approach to co-integration is used for analysis.

The ARDL modeling approach was originally introduced by Pesaran and Shin (1999). This approach has numerous econometric advantages in comparison to other Co-integration methods. One major advantage of ARDL approach is that it can be applied irrespective of degree of integration. Secondly, ARDL approach provides robust results in small sample sizes and estimates of the long-run coefficients are well consistent in small sample sizes (Pesaran and Shin 1999). Furthermore, a dynamic error correction model (ECM) can be derived from ARDL that integrates the short-run dynamic with the long-run equilibrium without losing long run information. In view of the above advantages, we use an ARDL approach for co-integration analysis and the resulting ECM. The variables in the conceptual framework in the representation of ARDL equation are mentioned below.

$$\Delta MR_t = \beta_0 + \sum \beta_1 \Delta MR_{t-i} + \sum \beta_2 \Delta \ln GDP_{t-i} + \sum \beta_3 \Delta \ln MNS_{t-i} + \sum \beta_4 \Delta RIR_{t-i} + \sum \beta_5 \Delta EXR_{t-i} + \mu_t$$

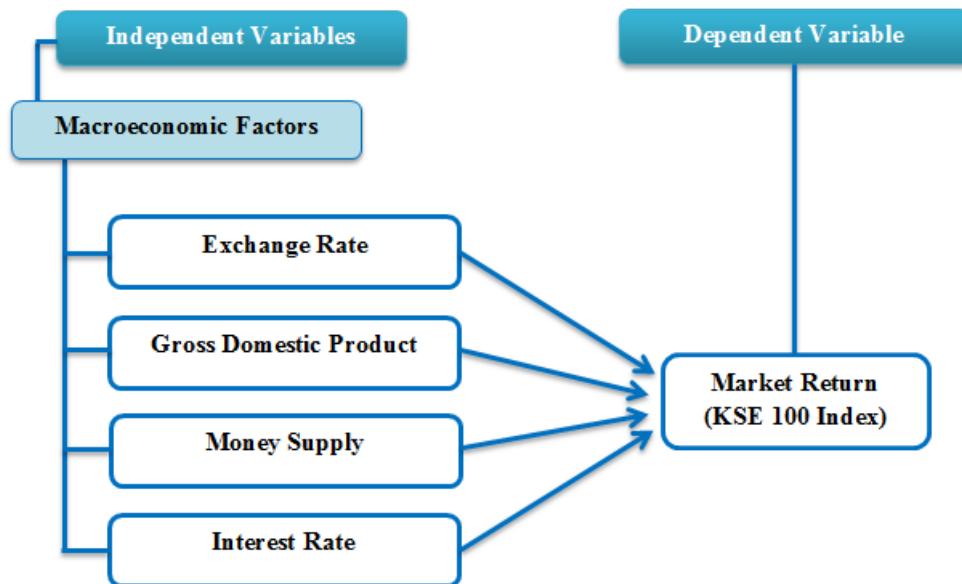
Table 1. Description of Data

Variables	Symbols
Exchange Rate- Monthly Average Pak Rupee Per Unit of US\$	EXR
Economic Growth-Gross Domestic Product (LCU)	GDP
Money Supply- Narrow Money (M1)	MNS
Real Interest Rate	RIR
Market Returns- Karachi Stock Exchange 100 Index	MR

After reviewing the appropriate literature related to macroeconomic variables and stock market return study selected the variables shown in Table 1. In this study stock market return (MR) KSE-100 Index is used as dependent variable, whereas the exchange rate (US\$/Rs), real interest rate, gross domestic products (GDP LCU) and money supply (M1) are used as macroeconomic variables (Independent variables). The exchange rate is the conversion rate of one currency into another currency (Jeff Madura, 2009). While, gross domestic product is the market value of all goods and services produced within a country during a period (Mankiw, 2011). Narrow money (M1) is a proxy of money supply that includes money in circulation

and demand deposits. And the real interest rate is the rate, eliminating the effect of inflation. All these variables explain the economic well-being and economic performance of a country.

3.1 CONCEPTUAL FRAMEWORK



4 RESULTS DISCUSSION

4.1 DESCRIPTIVE STATISTICS ANALYSIS

Table 4.1

	EXR	GDP	MNS	RIR	MR
Mean	0.014	11454.730	3550.804	0.308	0.020
Median	0.015	9997.028	3361.720	0.532	0.021
Std. Dev.	0.003	5585.664	1624.669	3.050	0.075
Maximum	0.018	22909.080	7222.955	7.464	0.224
Minimum	0.009	4487.904	1138.658	-6.774	-0.362
Skewness	-0.077	0.497	0.416	0.115	-1.090

The mean exchange rate is 0.014 and the standard deviation is 0.003. Standard deviation indicates the behavior of exchange rate fluctuations from its mean value. Skewness result shows the clustering of exchange rate data on the negative side. GDP mean value is 11454.730 and the majority of the data is congested at the positive side. Whereas maximum and minimum indicates the large difference between the GDP values. Money supply value and real interest rate have positive skewness values, whereas market return data have a negative skewness value.

4.2 UNIT ROOT TEST

Table 4.2. Phillips-Perron Test

Variables	At Level	At First Difference
EXR	0.2083	-8.3319
LN(GDP)	-0.0762	-3.1295
LN(MNS)	7.2291	-----
RIR	-2.2898	-3.4025
MR	-9.4824	-----
Critical Value 5%	-2.8836	-2.8836

At level with critical value 5% Phillips-Perron test shows that data of money supply and market return is stationary. In addition, the data of rest of variables is non-stationary. The stationarity of data of exchange rate, gross domestic product and real interest rate is found at first difference. Result of unit root test shows that not all series under observation are integrated of the same order; some series are stationary at level and some are at first difference. So, assumptions of the ARDL approach to co-integration are fulfilled.

4.3 AUTOREGRESSIVE DISTRIBUTED LAG ESTIMATES

Table 4.3

Dependent Variable is MR				
Regressor	Coefficient	Standard Error	T-Ratio	(Prob)
EXR	.045116	.055770	.80896	.420
GDP	2.7586	.89992	3.0654	.003
GDP(-1)	-2.8097	.88770	-3.1651	.002
MNS	38.0763	25.6414	1.4850	.140
MNS(-1)	-39.5337	25.5608	-1.5466	.124
RIR	.9708E-3	.0021484	.45184	.652
R-squared		.1240	R-Bar-Squared	.088985
S.E. of Regression		.0719	F-Stat	3.5396
Mean of Dependent Variable		.0206	Prob. F-Stat	.005
DW-Statistic		1.821		

Results reveal that exchange rate, money supply, and real interest rate have no statistically significant impact on stock market returns. However, there is a significant positive impact of current GDP on stock market return and a significant negative impact of past GDP on stock market return. The current GDP level increases stock market return because the prosperity level of the business activity in the country is increasing.

4.4 LONG RUN COEFFICIENTS

Table 4.4

Regressors	Coefficients	Standard Error	T-Ratio	Prob
EXR	0.045116	0.055770	0.80896	0.420
GDP	-0.051071	0.062719	-0.81428	0.417
MNS	-1.4573	1.9635	-0.74222	0.459
RIR	0.001	0.0021484	0.45184	0.652

As per the results of long run coefficients there is no significant relationship between macroeconomic variables (EXR, GDP, MNS and RIR) and stock market return because the probability values of all the variables are above than 0.05.

4.5 ERROR CORRECTION MODEL

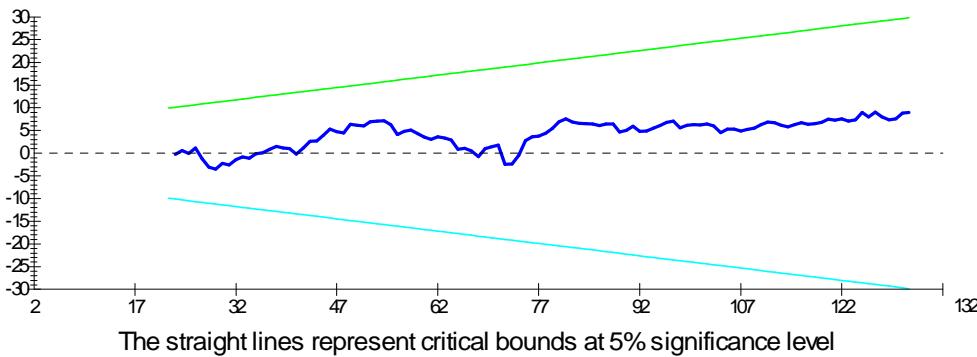
Table 4.5

Regressor	Coefficient	Standard Error	T-Ratio	Prob
EXR	0.045116	0.055770	0.80896	0.420
GDP	2.7586	0.89992	3.0654	0.003
MNS	38.0763	25.6414	1.4850	0.140
RIR	0.0010	0.0021484	0.45184	0.652
ECM(-1)	-1.0000	0.2005	2.2502	0.03

R ²	0.1240	Adjusted R ²	0.44692
S.E. of Regression	0.0719	F-Stat	27.511
Mean of Dependent Variable	0.7405	Prob. F-Stat	0.0000
DW-Statistic	1.821		

Results reveal that EXR, MNS and RIR have insignificant impact on stock market return in short-run. The Error Correction Model (ECM) confirms that in the short-run, there is a significant positive relationship between GDP and stock market return as P value is 0.003. The coefficient of ECM is significant. ECM coefficients -1.00 show that 100 percent disequilibrium in the short-run between stock market return and macroeconomic variables is adjusted in one time. The R-squared values of ECM show that explanatory variables in the model explain 12.40% change in stock market return and F-stat & probability F-stat values confirm model good fit.

Plot of Cumulative Sum of Recursive Residuals

**Figure 4.1**

Above-mentioned figure is indicating that the functional form of the model is quite stable as line indicating the functional form of the model is well between the critical bonds.

5 CONCLUSION

The purpose of the study is to investigate the relationship between stock market return and selected macroeconomic variables (Exchange Rate, Interest Rate, GDP and Money Supply). In order to respond the queries, the study used monthly data of all variables from 2003 to 2013. Tools of analysis used are descriptive statistics, unit root test and ARDL approach to co-integration. ARDL approach results revealed that exchange rate, money supply, and real interest rate have no statistically significant impact on stock market returns. The insignificant impact of interest rate on stock market return is consistent with the studies of Khan (2014); Jasra, Azam and Khan (2012) and Sohail and Hussain (2012). And the insignificant impact of

money supply on stock market return is consistent with the studies of Ahmad et al. (2012). However, there is a significant positive impact of current GDP on stock market return and a significant negative impact of past GDP on stock market return. In the short-run, there is a significant positive relationship between gross domestic product and stock market return. The positive impact of GDP on stock market return is consistent with studies of Gowriah et al. (2014); Hsing et al. (2013); Rafique, Amara, Naseem and Sultana (2013); Haque and Sarwar (2012); Hasanzadeh and Kianvand (2012) and Pilinkus and Boguslauskas (2009). This study concludes that GDP has a significant impact on the market return of Pakistani firms listed on Karachi Stock Exchange. Therefore, GDP is the most important variable among the selected macroeconomic variables. The gross domestic product should be in focus in order to increase shares' value of Pakistani firms. The study helps investor in taking appropriate investment decisions by assessing the movement of GDP and consequently the movement of stock market returns. This study also helps to understand the behavior of stock market returns on the arrival of new information and potential business performance. The sample size is limited and the period of investigation is short in this study. It is a suggestion for further study to observe macroeconomic variables constituting extended time period and different sample size.

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