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# Impact of Macroeconomic Variables on Stock Market Returns: A Case of Karachi Stock Exchange

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## ABSTRACT

The aim of this paper is to investigate the linkage between macroeconomic variables (inflation rate, exchange rate and interest rate) on stock market returns in Pakistan. We used the Pakistan Karachi stock exchange 100 index as a proxy to represent the stock market returns and the interest rate, inflation rate, and exchange rate were used as the macroeconomic variables. Secondary data was collected from the period of January 2007 to December 2012. A Multiple Linear Regression was performed for the purpose of data analysis. The study showed that there is weak connection between macroeconomic variables and stock market returns. The research validates the findings of earlier studies as well as conclusions and recommendations are discussed.

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## Introduction

Stock Exchange market plays a crucial role in economy of the country, which transfers investment fund from stock investors to stock borrowers which is necessary for healthy economy. A stock exchange market is simply a market where securities (stocks, bonds etc.) are traded.

Silber & Kenneth (2009) studied that stock exchange which gives services to stock brokers and traders to buy and sell financial securities like stocks and bonds. It also facilitates the redemption of securities, financial instruments and other issuing; securities which are being traded on stock exchange issued by firms (unit trusts, bonds and derivatives).

In stock market there are two types of investors have different sort of approaches regarding fluctuation of stock prices. One approach tells that stock market is insufficient markets in which investors use their own techniques to hit stock market prices. The second approach says that stock market is efficient market and provides same information to all investors. In this approach investors cannot beat stock market prices but all investor have same and equal information.

Efficient market is considered to be the one in which all information is fully disclosed for every investor regarding security prices. The availability of information is vital to stock a price which decreases the investor's level of risk.

Chong & Koh (2003) examined the efficient market hypothesis proposed that all related or necessary information to investors about macroeconomic variables and profit maximizing decreases the prospect of net income. Finally share prices replicate the current scenario of variables which help in increasing profits.

Fluctuation in stock prices reflects growth in the economy. When stock prices grow up it indicates positive growth in economic activities in any country, while on the other side, decline in stock prices shows decline in economic activities of any country. This provides that macroeconomic activities strongly impact on stock prices growth and stock price decline.

This concludes that market prices can be taken of the firm's future market activities.

Khan et al. (2012) investigated macroeconomic variables are very crucial as they affect the stock market performance. When investors value the stocks they deem macroeconomic variables. For the evaluation of stock market returns they used exchange rate, inflation rate and interest rate as indicators of macroeconomic variables which have greater effect on stock market.

Exchange rate has positive effect on economy of the country. Value of currency in expression of another is known as exchange rate. There are two conversion methods; in one method the domestic currency is converted into foreign currency & in other one the foreign currency is converted into domestic currency.

Lee & Wang (2012) identified that exchange rate and sock returns are positively correlated in Japan, Thailand and in Taiwan the exchange rate and stock return are negatively correlated while in Singapore no association was found.

Inflation rate is the general price at which the price level of services and goods are increased in an economy. Most of the economy inflation is affected by money supply. Increased money supply affects the value of existing circulatory money in an economy. Money supplies have impact on economy though it increases or decreases. It also decreases the purchasing power of buyers as money supply increases in a country economy. Thus monetary policy should be in closed balance with treasury funds to obtain the necessities of all equilibrium economy.

Mohamed et al. (2007) analyzed the impact of macroeconomic variables on stock returns in Malaysia which established a positive connection between stock prices and inflation.

Bollersley (1986) studied Arch and Garch methodology to calculate the inflation conditional variance equation for North Holland. The investors are very perceptive towards profit and

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extremely sensitive about red signal. There is negative association between interest rate and stock prices because more investors behave towards profit. They always think about profit which increases their investments in future.

A number of studies have been conducted in the past to test the impact of macroeconomic variables on the stock market return. However, the numbers of studies conducted in the context of Pakistan are very limited. Hence the intention of this paper is to investigate effect of macroeconomic variables on stock market returns in the context of Karachi stock exchange, Pakistan.

### Literature Review

This section is based on relevant research work previously done by different researcher for different countries at different time periods. Here both theoretical and empirical framework is mentioned for providing the cause of stock returns variations.

Khan et al. (2012) examined the effect of exchange rate, inflation rate, and interest rate on stock returns of KSE 100 index. They used three independent variables and one dependent variable. Khans et al. used data from 2001 to 2010 for their research and used multiple linear regressions for analysis. They concluded that interest rate and inflation rate have insignificant effect on stock returns and exchange rate has significant effect on stock returns of Karachi stock exchange.

Blanchard (1980) found the relationship between stock returns and interest rate. He concluded that changes in policy of increasing & decreasing the money supply in market effects on stock returns of KSE 100 index.

Rafy (2014) found causal relationship among KSE 100 index and consumer price index, interest rate, import and export, and exchange rate. To understand the association of these variables with stock market they use nineteen year data from 1992 to 2012. Implemented Regression analysis and Granger causality test to check the association. Their study demonstrated bi-directional relationship between interest and KSE 100 index while no causal relationship exists between export, consumer price index and KSE 100 index.

Attari & Safdar (2013) found the relationship between macroeconomic volatility and stock market volatility. They took data from December 1991 to august 2012 monthly wise. They used three variables; inflation rate, interest rate, and gross domestic Product and performed exponential generalized Autoregressive Conditional Heteroskedasticity technique. They concluded that stock prices affect the economics level of country.

Ozlen & Ergun (2012) took the data from February 2005 to May 2012 in their research studies and using exchange rate, inflation rate, interest rate, current accountant deficient and unemployment rate as independent variables and stock returns as dependent variable by using the Autoregressive distributed lag method they concluded that exchange rate and interest rate are the important variables in the stock price fluctuation and have significant effect on stock market returns.

Sohail & Hussain (2009) identified that there were positive relationship between money supply, industrial production, effective exchange rate on stock return and negative relationship between inflation on stock exchange returns.

Al-Mutairi & Al-Omar (2007) used Vector auto regression techniques in their thesis and concluded that money supply, interest rate, government expenditure and inflation rate has little effect on Kuwait stock exchange. For the study they used monthly wise data from 1995 to 2005.

Shahzadi & Chohan (2012) conducted research on Gold prices effect on stock exchange. The study applied on Karachi

stock exchange for the time from 2006 to 2010. To find relationship between stock exchange and Gold prices used statistical techniques such as Unit Root test of Augmented Dickey Fuller (ADF), Unit Root test of Phillip Perron, Johansen's Co Integration test and Granger Causality test (GCT). The paper concluded that the Gold price & stock exchange has negative effect on Karachi stock exchange.

Gan et al. (2006) conducted research on the connection between macroeconomic variables and stock market returns in New Zealand. For the study they took data of New Zealand stock exchange from January 1991 to January 2003. They concluded that inflation rate and stock exchange have negative relationship with each other.

Basit (2013) studied the impact of oil and gold prices on Karachi stock exchange (KSE) 100 indexes. In this research he used the secondary data for the period of 2005 to 2011. Simple linear regression model is for result evaluation. Where Karachi stock exchange worked as independent variable and while oil prices and Gold prices as dependent variables. He found that there is no relationship between these variables.

Mgammal (2012) investigated the result of numerous variables (interest, exchange rate and inflation rate) on stock prices. The study applied on two gulf countries; United Arab Emirates (UAE) and Kingdom of Saudi Arabia (KSA) for the time from January 2008 to December 2009. They found that for short term, the exchange rates influence positively on stock market price index for United Arab Emirates while having no relationship between them for Kingdom Saudi Arabia. The result of study in long term shared that exchange rate influence negatively on stock market price index for United Arab Emirates.

Ozlen & Ergun (2012) studied macroeconomic variables effects on stock returns. Study aspired the effects of variables (interest rate, inflation rate, and exchange rate and unemployment rate) on stock returns of 45 companies and 11 sectors. The result showed that the force of exchange rate and interest rate changed the economic position at all sectors and these are the main factors in stock price which fluctuate the companies.

Ouma & Muriu (2014) investigated impact of macroeconomic variables on stock market returns in Kenya from 2003 to 2013. The study revealed that money supply, exchange rate and inflation distress the stock market returns in Kenya and they are significant determinants of NSE while exchange rate have negative impact on stock market return.

Rjoub et al. (2009) analyzed effect of macroeconomic factors on stock returns for the period 2001 to 2005. They analyzed the performance of Arbitrage Pricing Theory in Istanbul Stock Exchange (ISE) to find out the risk premium point.

Saeed (2012) worked on the impact of macroeconomic variables on stock returns. The study consists of five macroeconomic variables in which short term interest rate has an important impact on returns of different sectors. Nine sectors are selected for the period of ten years from 2000 to 2010 to analyze the impact of macroeconomic variables.

Menike (2006) studied impact of macroeconomic variables on stock price in emerging Sri Lankan Stock Market. The data selected from 1991 to 2002 in which they used Multivariate regression on all variables for each stock. The study also finds out that there exists association between macroeconomic variables and stock price in the Colombo Stock Exchange. Exchange rate and inflation rate respond negatively on stock price in Colombo Stock Exchange.

Abdullah & Hayworth (1993) examined that interest rate responded negatively on stock returns while stock returns were positively linked with inflation rates and money growth. Bulmash & Trivoli (1991) established that interest rate has negative impact on stock prices. Higher interest rate magnetizes more ways of investments.

Engsted & Tanggaard (2002) found that there is positive connection between expected inflation and stock returns for United States and also showed positive linkage for Denmark. Marshall (1992) examined that there is pessimistic effect of inflation on stock market returns created by actual economics fluctuation or by monetary fluctuation.

Ngoc (2009) examined the effect of macroeconomic indicator of interest rate on Vietnamese stock returns prices. This paper also shows the relationship between US macroeconomic indicators and Vietnamese stock prices. To evaluate they took monthly wise data from 2001 to 2008. This methodology analyzes the association among stock price and macroeconomic indicator. He found statistically important involvements between the domestic production sectors, money markets and stock price in Vietnam while US macroeconomic significantly influences Vietnamese stock prices.

Bohl et al. (2005) investigated that the positive relationship depends on the heteroskedasticity in interest rate and stock returns. The covariance is positive between interest rate and stock returns when upset creates huge volatility in stock market.

Hypotheses of the study:

From the above literature review, we drive following hypotheses:

1. Null Hypothesis ( $H_0$ ): There is no association between stock market returns and exchange rate.

$H_1$ : There is an association between stock market returns and exchange rate.

2. Null Hypothesis ( $H_0$ ): There is no association between stock market returns and inflation rate.

$H_1$ : There is an association between stock market returns and inflation rate.

3. Null Hypothesis ( $H_0$ ): There is no association between stock market returns and interest rate.

$H_1$ : There is an association between stock market returns and interest rate.

## Research Methodology

### Theoretical Framework

Karachi Stock Exchange is the leading stock market of Pakistan. Investor uses this market as benchmark for the share prices. Karachi Stock Exchange 100 index consists of 34 listed sectors. KSE 100 indexes have market value of 1991 which were taken as 1000 points for comparison we use these points as a base year for the stock market performance of Karachi Stock Exchange 100 index. The Stock market performance is affected by many macroeconomic variables such as interest rate, inflation rate, current account deficit, unemployment rate, gold rate, money supply, government expenditure, exchange rate. All these macroeconomic variables are important but the most crucial variables are exchange rate, interest rate, and inflation rate. When investors make decision about their investment they take decision on these three variables (exchange rate, interest rate, and inflation rate). State Bank of Pakistan increases or decreases Federal Fund rate to handle money supply in the economy which distresses the businesses. Fluctuation of interest rate affects the value of investment, which changes the investment decision. When foreign currency depreciates and domestic currency appreciates in this case the profit of investor decreases due to change of exchange rate and vice versa. So we used stock

market returns as dependent variable and interest rate, exchange rate and inflation rate as explanatory variables.

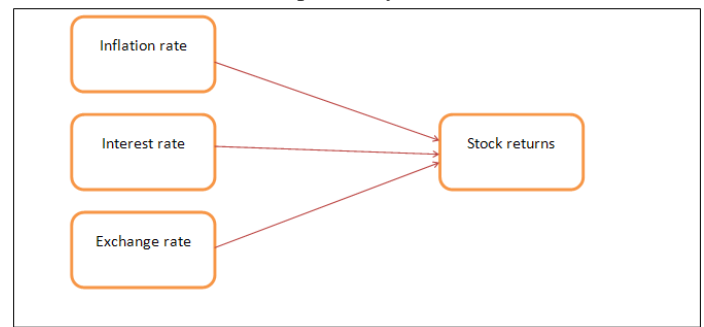


Figure 1. The conceptual framework

### Methodology

Multiple linear Regression model is used to find the relationship between the dependent variable and independent variables.

### Multiple Linear Regression Model

This study employed multiple linear regression analysis to check the hypothesis. The multiple linear regression models were:

$$S = \alpha + \beta_0 ER + \beta_1 INF + \beta_2 IR + \mu_t$$

S= Stock Market Returns

ER= Exchange Rate

INF= Inflation Rate

IR= Interest Rate

$\mu_t$ = Error Term

Stock market returns was calculated as:

$$S = (P_1 - P_0) / P_0$$

In the study, Pakistani rupee to US Dollar exchange rate was taken to evaluate the effect of exchange rate fluctuations on stock market returns. Most of investors invest money in foreign country and they convert their profit in domestic currency (PKR). Exchange rate fluctuate the profit of investor which is why it is important to find the association between exchange rate and stock market returns.

In Pakistan, Consumer Price Index (CPI) is considered as inflation indicator. Consumer's price indexes compare the value of the basket of goods and services with the base year (2000-2001) values. CPI measures average price levels in different cities of Pakistan which include three hundreds and seventy four goods and services items. CPI is the main indicator to measure the inflation rate.

Interest rates mean the cost of borrowing and have different categories such as nominal interest rate and real interest rate. In nominal rate inflation is also included while the real interest rate the inflation rate subtracted from market rate. The Treasury bill rates (six months) are selected for evaluation. Treasury bill rate is risk free rate.

### Data Description

The research applied to identify as regards the impact of exchange rate, inflation rate and interest rate on stock market returns of KSE 100 index. Secondary data is used in this study. The exchange rate and inflation rate data were taken from Federal bureau of Statistics of Pakistan website interest rate data from State Bank of Pakistan and the stock market returns data from the website of Karachi Stock Exchange of Pakistan. The research study covers the data from January 2007 to December 2012.

### Data Analysis

In this study Multiple Linear regression model is used as research model which accomplishes all the assumptions of

model. Results of analysis are summarized in the following section.

**Table 1. Summary Output**

Model	R	R Squares	Adjusted R Squares	Std. Error of the Estimate
1	0.264a	0.070	0.028	0.0763240

#### Summary of Regression Model

Regression Summary output shows that R square is 7% which describes that 7% change comes in stock market due to changes in inflation rate, interest rate, and exchange rate. Standard error of model is 7.6%. R square shows weak linkage between stock returns and explanatory variables (exchange rate, interest rate, and interest rate inflation rate).

**Table 2**

Coefficient B					
Model	Coefficients (Unstandardized)		Coefficients (Standardized)	T	Sig.
	B	Std. Error	Beta		
Constant	-.029	.066		-.434	.665
ΔER	.000	.001	-.023	-.164	.871
ΔINF	.000	.000	.165	1.396	.167
ΔIR	.004	.003	.208	1.473	.145
a. Dependent Variable: V1					

Table 2 shows that coefficient of exchange rate is 0.000 which shows that result is insignificant because ( $0.871 > 0.05$ ). Its verify that exchange rate has no relationship with stock market returns. Inflation rate is .000 similarly it also insignificant because ( $0.167 > 0.05$ ) so it confirm that inflation rate has not linkage with Stock returns. Last variable coefficient of interest rate is 0.004 which shows that result is insignificant because ( $0.145 > 0.05$ ). All the three variables (interest rate, exchange rate, and inflation rate) show insignificant relationship with stock returns.

#### Conclusions

The research paper examined that the impact of exchange rate, interest rate and inflation rate on stock market returns of Karachi Stock Exchange 100 index. The Multiple Regression Model shows that dependent and independent variables have weak linkage. The Exchange rate, interest rate, and inflation rate showed insignificant connection with stock market returns. Exchange rate is insignificant which shows that it has no impact with stock market return and foreign investors are free from risk. According to Khan et al. (2012) concluded that inflation rate and interest rate are insignificant while Lee & Wang (2012) exchange rate and stock market returns are insignificant in Singapore. In Pakistan exchange rate, inflation rate and interest rate have not association with stock returns of Karachi Stock Exchange 100 indexes.

#### Future Research

The future researchers can add gold rate and terrorism to find the relationship with stock market return. This study can also be implemented in other countries and time periods to check its validity. The data can also be taken for larger sample sizes to increase the generalizability of the findings.

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