



# The Impact of Macroeconomic Variables on Stock Market Returns: A Case of Pakistan

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## Abstract

*The efficient stock market organizes the investments and triggers the savings development, which direct to economic actions in a countryside. The main purpose of stock market is to perform as moderator among investor and borrowers. The stock market and different macroeconomic variables are closely related with each other. Studies show that stock market is inclined by change in macroeconomic variables. This research project observes the influence of five macroeconomic variables i.e. Inflation, GDP Per Capita, GDP savings, Money supply and Exchange rate at KSE 100 index of Pakistan. The annual data of 23 years from 1991 to 2013 was used in this study. To achieve the objectives we used the Descriptive Analysis, Correlation Analysis, Granger Causality test and Regression Analysis. The consequences of Granger Causality test shows that the GDP savings and Exchange rate does unidirectional Granger Cause Money supply. On other side GDP savings also unidirectional Granger Cause the KSE. The results of Regression Analysis show that the Inflation, Exchange rate, Money supply, GDP per capita and GDP savings has positive significant impact on KSE 100 index. Hence, it is recommended that government should obtain counteractive actions to manage inflation. The consequences could give some upcoming to company executive, depositor and strategy manufacturer.*

**Keywords:** GDP per capita, GDP savings, inflation, exchange rate, money supply and stock returns.

## Introduction

**Background of the Study:** Stock market play very essential task in the economic growth and development. Efficient capital market can enhance the growth and wealth of the economy by maintaining the financial sector and with provision of a good channel for investment which play a very important role to engage domestic and foreign investors. The stock market performance can be measured by changes in its index which is inclined by different factors including macroeconomic social and political factors.

Stock exchange is a subsidiary market which assigns a policy for investors to easily buy and sell the stocks. The stock prices disclose all predictions of the upcoming representation of corporate houses. If the stock prices disclose all these predictions actually, then it will be used as a prime indicator for economic activities. As a result the active link between macroeconomic variables and stock prices can be used to establish macroeconomic policies for nation.

The concentration of research is to evaluate impact of different macroeconomic variables on stock market returns in Pakistan. Different macroeconomic variables have influence on stock market returns of Pakistan like money supply, exchange rate, inflation, interest rate and oil prices. But most important variables that can influence the stock market index i.e.

Exchange rate, inflation, GDP per capital, inflation and gross domestic savings.

The impact of inflation on stock market returns is becomes an important issue for many years. Due to the presence of higher rate of inflation in Pakistan, this effect becomes more important. Inflation is most important macroeconomic variable that have negative impact on economic activities. In case of higher inflation the interest rate will also higher and higher rates cause raised rate of returns on stock. In case of increase rates environment the Government bond supply that considered as less risky assets increased. To get the knowledge about the impact of inflation is very important for an investor if it became out of control then plans may destroyed.

Exchange rate and stock returns also have an association. Foreign depositor changes their profits on stocks in to their own cash. Foreign depositor get exaggerated when local cash gets stronger and changed into weaker cash. Exchange rate show negative relation with stock returns. Stock returns reduce when exchange rate enhances and reduces in exchange rate show positive impact on stock market prices.

The money supply show significant but positive relation with stock market prices. When the money supply is lower than the interest rates will be higher and investors feel hesitation to invest the money. There should be balance in supply of money

level to encourage level of investment. But there should be proper balance because increase in supply can cause inflation which will affect the economy unfavorably. The changes in stock market positively affect the economic growth and this relationship is usually very strong for growing countries. Stock market increases the economic growth by increasing the local savings and by improving the size and value of asset. The stock markets can enhance the GDP by providing a path to developed economies to boost up capital at less expenditure.

**Objectives of the Study:** The specific purpose of this research is to search out effect of macroeconomic variables including money supply, discount rate, gross domestic savings, inflation, and GDP per capita on stock returns. i. This project is considering money supply like one of the independent variables to get additional understanding how money supply impact stock prices to change in Pakistan. ii. To examine the correlation among stock returns and exchange rate in Pakistan cooperatively with other advisory variables. iii. This paper proposes to illustrate the significant relation among stock returns and inflation.

**Literature Review:** Naik and Padhi examine the relation among macroeconomic variables and Indian stock exchange by applying vector error co-relation model. To find out this relationship, data is collected from 1994 to 2011. They concluded that the industrial production and the money supply have positive impact however inflation has negative impact to the Indian stock market. On other hand interest and the exchange rates exert insignificant influence on stock prices<sup>1</sup>.

Aroni uses regression formula for the evaluation of the effect of macroeconomic variables at stock returns in Kenya. The data was collected from 2008 to 2010. They concluded that the inflation, rates of exchange and rates of interest have significant relation with stock market prices and money supply has positive and insignificant relationship with stock market prices. The results show that the rates of interest and rates of exchange have negative relationship to stock prices. Whereas money supply and inflation show positive effect on stock prices<sup>2</sup>.

Khan, Sangeen, Rukh, Imdadulla and Rehman investigate the relationship among macroeconomic variables and stock market returns inside Peshawar by applying multiple regression model. The data is used in this study from 2001 to 2010. They concluded that the inflation and interest rate exert insignificant influence at prices of stock. Rate of Exchange had negative influence at stock prices of KSE 100<sup>3</sup>.

Sohail and Hussain find out the relation among macroeconomic variables on stock market returns in Pakistan. The monthly data had used from 2002-2008. They concluded that inflation influence the stock prices negatively. On other side the industrial production index, money supply and real effective exchange rate had a positive effect on stock prices. While

Treasury bill rates of three months had insignificant positive effect on stock returns<sup>4</sup>.

In Ghana Kuwomu and Victor also observe the relation among macroeconomic variables and stock market returns. The data was collected from 1992-2008 and conclude that the inflation rate, exchange rate, Treasury bill rate and consumer price index have significant relationship to stock market prices. The inflation and buyer price index show a positive relation but Treasury bill rate and exchange rate show significant negative impact on prices of the stock market. While prices of crude oil have no significant effect on stock market returns<sup>5</sup>.

Pilinkus and Boguslauskas find out short term relation among macroeconomic variables and stock returns in Lithuania. Augmented Dickey Fuller test has been used in this study. The data is used from 2000 to 2009. They concluded that the money supply and gross domestic product positively affect the stock returns in SR. Despite the fact that rate of unemployment, rate of exchange and interest rate negatively affect the stock prices<sup>6</sup>.

Yogaswari, Nugroho and Astuti evaluate relationship between macroeconomic variables on stock returns in case of Indonesia. They apply multiple regression analysis to evaluate a relation among macroeconomic variables and stock market returns. The record is collected from 2007-2011. They concluded that the inflation, exchange rate and interest rate have significant relation among macroeconomic variables and prices of the stock exchange. Inflation has positive effect while the interest rate volatility comprises negative impact on stock prices<sup>7</sup>.

Bellalah, Masood, Darshini, Levyne and Triki investigate the link among macroeconomic with China's stock returns. Auto Regressive Distributed Lag (ARDL) approach is used in this paper. They concluded that the inflation has positive impact on stock prices. The interest rate, inflation, industrial production index, imports and exports have significant influence at stock returns<sup>8</sup>.

## Data and Research Methodology

**Data:** To evaluate the relationship between different macroeconomic variables and stock returns. This study faces 23 years from 1991-2012. The data for gross domestic savings, GDP per capita and money supply and inflation is collected from the World Bank website. To get consistency in the research analysis, accessible Karachi Stock Exchange 100 Index data, and Exchange rate had been changed into annual records. To evaluate the relationship among dependent and descriptive variables and to process the data the Statistical method has been used in this study. E-Views 7 is used in this study to analyze the data.

**Explanation of Variables: Dependent Variable: KSE 100 Index:** Karachi Stock Exchange 100 Index is a stock index performing as a standard to evaluate prices on the Karachi Stock

Exchange over a period. In determining representative companies to calculate the index on, companies with the maximum market are preferred. On the other hand, to make sure full market demonstration, the company with the maximum market capitalization from each sector is also integrated.

**Independent Variables: Inflation:** Inflation is increase in value of products and service resulting falling the purchasing power of the people. Consumer price index and retail price index is used to evaluate the Inflation. The Inflation affects the economy positively and negatively. The increase in opportunity cost of holding has negative impact on inflation. In case of increasing inflation the investors feel hesitation to invest the money.

**Exchange Rate:** The rate of exchange is existing marketplace cost for which one currency can be replaced for another currency. For example if the U.S. change rate for the Canadian Dollar is \$1.60, this shows that 1 American Dollar can be changed for 1.6 Canadian dollars.

**GDP Per Capita and GDP Savings:** Gross domestic savings can be determined as GDP deduct from final consumption expenditure. Higher the gross domestic savings means higher the economic growth and it also shows higher investments in capital and money market. To assess the average of existing people of any economy the GDP per capita is used. GDP per capita is used to compare one country's performance to another country performance. It can be calculated by adding the total significance of all merchandise and services produced in a country at one time.

**Money Supply:** Money supply contains coins, balances and cash carry in saving accounts and also in checking accounts. At identified time the total amount of monitory assets is money

supply. Economists developed policies to evaluate money supply for the purpose of controlling interest rate and money circulation in the economy. In case of increasing money supply mostly the interest is lower as a result it enhances the investments.

**Hypothesis Testing:** The hypotheses of this research are given below: H1= The GDP per capita have positive and significant effect on KSE 100 index of Pakistan. H2= The influence of GDP savings on KSE 100 index is positive and significant. H3= The inflation has positive and significant impact on KSE 100 index of Pakistan. H4= The impact of money supply is positive and significant on KSE 100 index of Pakistan. H5= Exchange rate show positive significant impact on KSE 100 Index of Pakistan.

**Model Specification:** The model used in this study is shown below:

$$KSEI = \alpha + \beta_1 GDPPC + \beta_2 GDPS + \beta_3 Inflation + \beta_4 ER + \beta_5 MS + \epsilon \quad (1)$$

Where: KSEI =Index of Karachi stock. GDPPC = GDP per capita (show positive effect on KSE 100 index), GDPS = Gross domestic savings is a % of GDP (show positive effect on KSE 100 index), Inflation= consumer price index (have positive influence on KSE 100 index of Pakistan), ER = Exchange rate (positive significant impact on KSE 100 index in Pakistan), MS = Money supply (Have positive influence at KSE index),  $\epsilon$  = stochastic variable or error terms.

**Conceptual Framework of Variables:** The research framework comprises the theoretical and conceptual frameworks, hypotheses, and Operationalization of the variables.

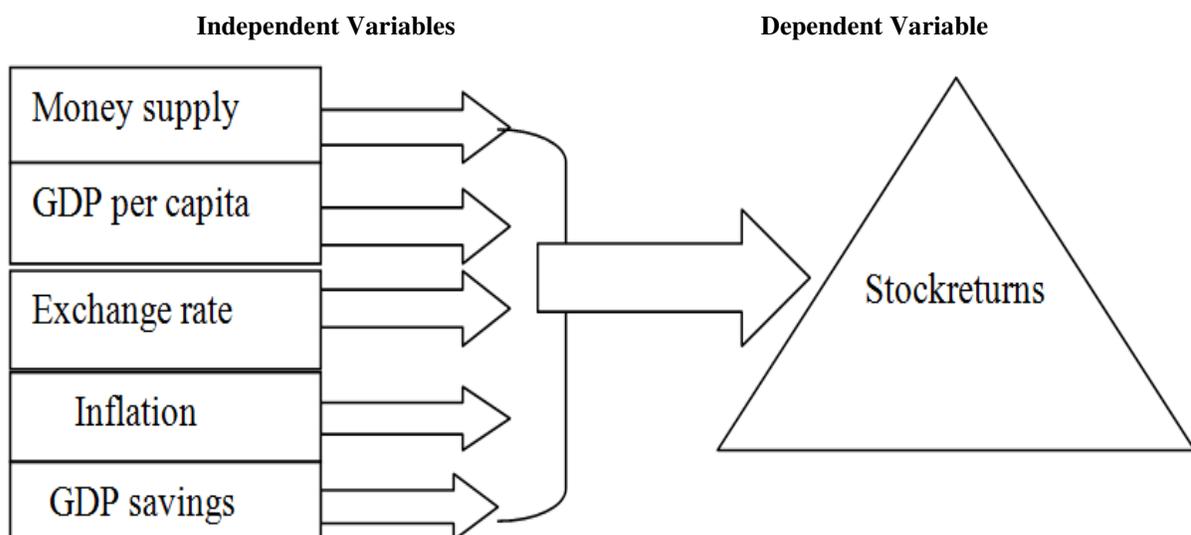
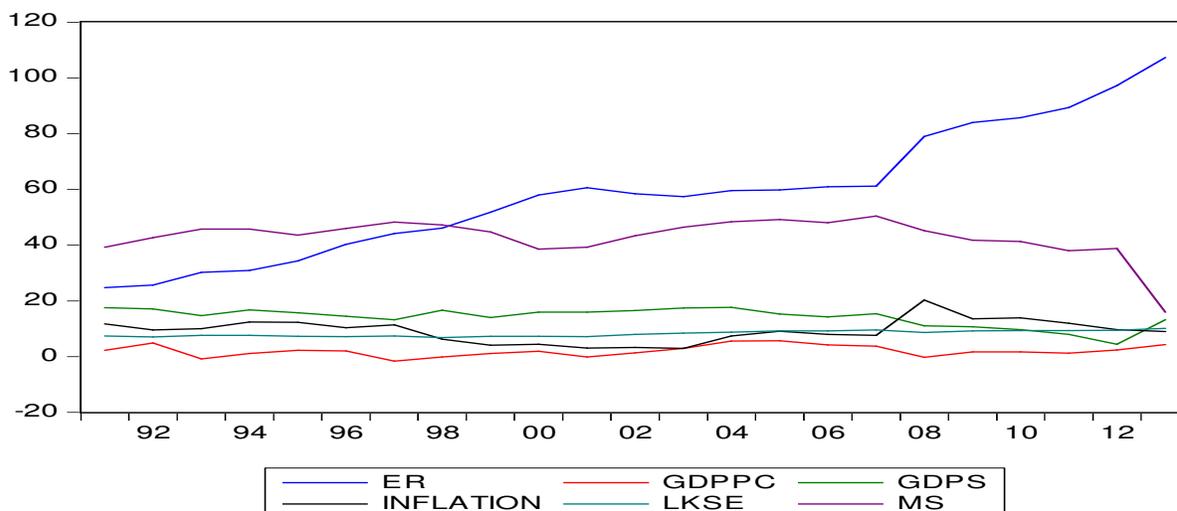


Figure-I  
 Theoretical Framework



**Figure-2**  
**Graphical Representation of Macroeconomic Variables**

**Results and Discussion**

The maximum KSE index is display in 2013 at 25283.96 while, in 1998, the minimum KSE index was display 945.24. The KSE was recorded more than 10000 in 2006, 2007 and 2010. From 2002 to 2007 it was in increasing market index. The highest inflation percentage was recorded in 2008 at 20.3. While in 2003 inflation percentage was lowest at 2.9. From 1997 to 1999 and from 2001 to 2003 inflation was decrease. The graph demonstrates various fluctuations. Gross domestic product savings percentage was recorded maximum in 2004 at 17.6 and recorded minimum in 2012 at 4.4. From 1991 to 2008 variations occur in GDP savings. On other side GDP savings was decrease from 2008 to 2012. The above graph shows fluctuation in different years. The per capita income percentage was highest in 2005 at 5.7 but in 1997 the per capita income percentage was minimum at -1.6. The per capita income was increase from 2001 to 2004. The graph shows various fluctuation in different years. The exchange rate percentage was lowest in 1991 at 24.71.

From 1992 to 2001 the exchange rate was increasing. Exchange rate was in decreasing trend from 2001 to 2003. The exchange rate was recorded highest in 2013 at 107.29. The highest money supply was recorded in 2007 at 50.5. While lowest money supply was recorded in 2013 at 15.91. From 1992 to 1999 and 2002 to 2010 exchange rate percentage was recorded more than 40.

**Descriptive Statistics:** Table 1 proves the descriptive analysis related toward Pakistan; it express total amount of explanation, minimum value, mean value, standard deviation and maximum value of the entire variables. These numeric figures will help to identify the data in appropriate way.

**Correlation Analysis:** It is habitually essential to observe the relation among two or more monetary variables. There are a lot of ways to inspect how set of data is associated. However the Correlation is most important method to analyze the data.

**Table-1**  
**Descriptive Statistics**

	ER	GDPPC	GDPS	Inflation	LKSE	MS
Mean	58.53261	2.060870	14.15078	9.226870	8.238134	42.94826
Median	58.41000	1.900000	15.20000	9.500000	7.901533	44.80000
Maximum	107.2900	5.700000	17.60000	20.30000	10.13793	50.50000
Minimum	24.79000	-1.600000	4.400000	2.900000	6.851439	15.91000
Std.daviation	23.12147	1.982134	3.371938	4.172946	1.012136	6.963726
Skewness	0.392999	0.174810	-1.352833	0.430977	0.263037	-2.592012
Kurtosis	2.351622	2.334292	4.306025	3.411899	1.577709	10.99111
Jarque-bera	0.994929	0.541843	8.5650234	0.874598	2.203845	86.95152
Probability	0.608071	0.762676	0.013232	0.645778	0.332232	0.000000
Sum	1346.250	47.40000	325.4680	212.2180	189.4771	987.8100
Sum seq.Dev	11761.26	86.43478	250.1393	383.0965	22.5372	1066.857
Observations	23	23	23	23	23	23

**Table-2**  
**Correlation Analyses**

Variables	ER	GDPPC	GDPS	Inflation	LKSE	MS
ER	1.000000					
GDPPC	0.128982	1.000000				
GDPS	-0.72450	0.192773	1.000000			
Inflation	0.133229	-0.17319	-0.45083	1.000000		
LKSE	0.804999	0.443556	-0.55581	0.254502	1.000000	
MS	-0.52459	-0.08988	0.266438	-0.01712	-0.30434	1.000000

**Table-3**  
**Granger Causality Test**

Null hypothesis	Obs.	F-statistic	Prob.	Types of Causality
LKSE does not granger cause MS MS does not granger cause LKSE	21	1.53521 2.52495	0.2455 0.1114	No causality
Inflation does not granger cause MS MS does not granger cause Inflation	21	0.25828 2.14017	0.7755 0.1501	No causality
GDPS does not granger cause MS MS does not granger cause GDPS	21	8.25164 0.85240	0.0034 0.4449	Uni directional causality
GDPPC does not granger cause MS MS does not granger cause GDPPC	21	0.02782 0.01022	0.9726 0.9898	No causality
ER does not granger cause MS MS does not granger cause ER	21	3.97539 0.30586	0.0397 0.7407	Uni directional causality
Inflation does not granger cause LKSE LKSE does not granger cause Inflation	21	1.04669 1.79951	0.3739 0.1973	No causality
GDPS does not granger cause LKSE LKSE does not granger cause GDPS	21	0.36695 3.61620	0.6985 0.0506	Uni directional causality
GDPPC does not granger cause LKSE LKSE does not granger cause GDPPC	21	0.53749 1.88363	0.5944 0.1842	No causality
ER does not granger cause LKSE LKSE does not granger cause ER	21	1.98556 1.41181	0.1697 0.2725	No causality
GDPS does not granger cause Inflation Inflation does not granger cause GDPS	21	0.26794 2.89231	0.7683 0.0847	No causality
GDPPC does not granger cause Inflation Inflation does not granger cause GDPPC	21	1.89370 1.11412	0.1827 0.3524	No causality
ER does not granger cause Inflation Inflation does not granger cause ER	21	0.71222 0.39122	0.5055 0.6898	No causality
GDPPC does not granger cause GDPS GDPS does not granger cause GDPPC	21	0.74410 0.41100	0.4909 0.6698	No causality
ER does not granger cause GDPS GDPS does not granger cause ER	21	0.39673 1.33000	0.6790 0.29212	No causality
ER does not granger cause GDPPC GDPPC does not granger cause ER	21	1.60012 0.28217	0.2325 0.7578	No causality

Study demonstrates the positive insignificant relationship of Exchange rate and KSE 100 index. The results show that the inflation has positive and insignificant relationship with KSE 100 index. Consequences demonstrate that there is positive and insignificant relation among GDP per capita and stock returns. The study shows that the GDP savings have negative and significant relationship with stock market returns.

**Granger Causality Test among Money Supply and Stock Returns:** The table 3 symbolizes experiential consequences of

Granger Causality among supply of money and stock returns. The Empirical findings of the research show that the money supply does not Granger Cause the stock returns. The study conclude that the monetary growth do not guide to enhance savings in stocks. On other side the money does unidirectional Granger cause GDP savings. In adding up money supply does unidirectional Granger Cause exchange rate. Therefore it can be assumed that money supply impact stock prices through GDP savings and exchange rate.

**Table-4**  
**Regression Analysis**

Variables	Coefficient	Std. Error	t- stat.	Prob.
ER	0.053805	0.004397	12.23578	0.0000
GDPPC	0.161936	0.061377	2.638363	0.0167
GDPS	0.120819	0.035148	3.437424	0.0029
Inflation	0.088391	0.027925	3.165255	0.0054
MS	0.051600	0.014362	3.592737	0.0021
R-squared	0.776202	Mean dependent var.		8.238134
Adjusted R-square	0.726469	S.D. dependent var.		1.012136
S.E. of regression	0.529349	Akaike info criterion		1.755324
Sum squared resid	5.043793	Schwarz criterion		2.002170
Log likelihood	-15.1862	Hannan-Quinn criter		1.817405
Durbin-waston stat	1.767524			

**Granger Causality Test among Inflation and Stock Returns:**

The conclusion of the study is conflicting. The research point out that the inflation does not Granger cause the stock returns. In addition money supply does not Granger cause exchange rate and GDP savings.

**Granger Causality Test among Exchange Rate and Stock Returns:**

As globalization enlarges employment, funds actions strongly boost in whole world; therefore, the exchange rate become one of the major determinants of business productivity and impartiality prices. The table 3 indicates the results of exchange rate to stock prices Granger causality test. It shows that the stock returns do not Granger cause exchange rate. However the exchange rate has unidirectional Granger cause relationship with money supply.

**Granger Causality Test among GDP Savings, GDP Per Capita and Stock Returns and Stock Returns:**

Table 3 indicates the empirical results of the GGP savings at stock returns. The results show that the stock prices have Granger Cause with GDP savings. Additionally GDP savings show unidirectional Granger cause with money supply. The results show that the GDP per capita do not Granger Cause the stock returns. Moreover the GDP per capita does not Granger Cause money supply.

**Regression Analysis:** The table shows that all selected variables (Exchange rate, GDP per capita, GDP savings, Inflation and Money supply) have significant impact at stock returns. The exchange rate show most significant impact. Table also shows high illustrative influence i.e. nearly 73% which shows 73% changes in KSE index clarify via exchange rate, GDPPC, GDP savings, inflation and money supply remaining is unsolved due to other reasons.

**Conclusion**

Stock market play very essential task in the economic growth and development. Efficient capital market can enhance the growth and wealth of the economy by maintaining the financial sector and with provision of a good channel for investment which play a very important role to engage domestic and foreign investors. The stock market performance can be measured by changes in its index which is inclined by different factors including macroeconomic social and political factors. The objective of this research is to search out effect of macroeconomic variables including money supply, discount rate, gross domestic savings, inflation, and GDP per capita on stock returns. The annual data of 23 years from 1991 to 2013 was used in this study. All tests i.e. Descriptive Statics, Correlation Analysis, Granger causality test and Regression Analysis execute on annual data. The results show that all selected macroeconomic variables like Inflation, Exchange rate, GDP per capita, Money supply and GDP savings intention 73% variations in KSE 100 index. GDP per capita, Inflation, Money supply, GDP savings and Exchange rate have positive significant relationship with KSE 100 index. All the results of relationship are authenticated by means of various research articles from whole world and have various proofs to sustain my results.

This research gives not merely in deepness examination of KSE 100 index although provides the concrete proposal for the strategy creator. Some important recommendations are: If the strategy creator maintains the rate of inflation in the country they can enhance the KSE 100 index close to distinct goal. Enhance the stock indicator will guide depositor motivation to spend in the stock exchange which is very supportive for economic and monetary reason of the government. Stock market is extremely responsive to the actions in inflation rate.

Conclusion of this research shows that positive relation survives among Karachi Stock exchange index and inflation. Government should acquire procedures to manage inflation through infrastructural improvement. There should be present recognized and minute inflationary situation. In the same way through rising the Per capita income and percentage to GDP could also raise KSE100 Index significantly.

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