

Does Macro-Economic Indicators Effect on Pakistan Stock Exchange?

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Abstract

Stock market is a great reflection of economics development of country. The main purpose of stock market is to perform as moderator among investor and borrowers. In this study, macro-economic indicators are taken as independent variables (Inflation, Money supply, Foreign direct investment, GDP per capita, GDP saving, Balance of trade, interest rate) and stock exchange prices as dependent variable. To analyzing this relationship, we used 11 years data of selected macro-economic indicators and further to elaborating this relationship, descriptive statistic, correlation analysis, granger causality test and regression analysis have been used. The finding of the study has shown that the 76% economic indicators are involved for bring variation in stock market movement and to cover rest of scenario other forces are involved (political and business influences). In a continuity of finding description, expect that FDI all other variable has positive effect of dependent variables. Hence, it is recommended that government should obtain counteractive policies (Fiscal & monetary) to manage macro-economic influences for country development.

Keywords: Macro-Economic, Pakistan Stock Exchange

1. INTRODUCTION

The economy of any country is standing on different pillar that play very critical role to development. In recent scenario, every aspect are important from economic and non-economic. Stability in a country is more important than any other economic indicators. The Pakistan already faced such crises and still facing but in his recovering point. But this study we talk about economics issues and describe how they effects the stock market performance. Stock market plays an important role in the economic development of a country. A number of studies have been investigated on the causal relationship between macro- economic indicators and stock exchange prices. But in the context of Pakistan, not many studies can be traced in literature, moreover this study has used the set of macro-economic indicators which has not been previously used by researchers in Pakistan. It has examined the causal relationship between macro-economic indicators and stock market prices in Pakistan. The data is taken as annually basis from 2010 ~ 2020 to analyze the causal relationship between various macro-economic variables and stock exchange prices. The set of macro-economic indicators includes; inflation, money supply, foreign direct investment, GDP per capita, GDP saving, balance of trade, interest rate, whereas the stock exchange prices have been represented by the general price index of the Pakistan Stock Exchange.

Stock market play vital role 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.

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.

2. LITERATURE REVIEW

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. Khalid, W., & Khan, S. (2017) the impact of inflation on stock market returns is becomes an important issue for many years especially in long run context. Due to the presence of higher rate of inflation in Pakistan, this effect becomes more important. To support this indicator performance a large numbers of studies are available. Chaengkham, S., & Wianwiwat, S. (2021) 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 and money supply that considered as less risky assets increased. It is also disturb the foreign direct investment and create the imbalance in trade and alternatively effect the GDP. That is the reflection of economic growth of country. The stock markets can enhance the GDP by providing a path to developed economies to boost up capital at less expenditure.

In addition to this, numbers of studies have been conducted to examine the effects of macroeconomic variables on stock market of industrialized economies. The emphasis in now being extended towards the analysis of stock markets of developing economies, due to their enormous profit potentials. Naseem, S., Rizwan, F., Abbas, M. Z., Mohsin, M., & Zia ur Rehman, D. (2019), Khan Z. Khan S., Rukh L., Imdadullah and Rehman W (2012) highlighted such factors as industrial production, risk premiums, inflation, interest rate, money supply and so forth as being important in explaining stock prices.

Ogawa, S. (2020) specified that monetary growth some time increased the amount of supposed ambiguity. The investor's hopes are based on price level of financial assets, Verma, R. K., & Bansal, R. (2021) proposed that changes in uncertainty of money supply will affect prices of financial instruments and it is suggested that changes in monetary uncertainty modify the stock prices risk premium to repeat the added expected prices that investors demand for assuming the risk of keeping stocks. In this way, uncertainty is supposed to depict a negative association with stock prices. He, Y. (2017) looks at meeting two objectives firstly, to test for the subsistence of a correlation between the uncertainties linked with the unevenness of growth in money supply and the equity market prices.

Viphindartin, S., Ardhanari, M., Wilantari, R. N., Somaji, R. P., & Arianti, S. (2021) note significant interactions between M2 money supply and foreign exchange reserves and stock prices for the case of banking sector, Indonesia. However, Maysami and Koh (2000) document significant input of interest rate in the long-run relationship between Singapore's stock prices and various macroeconomic variables. Amassoma, D., Sunday, K., & Onyedikachi, E. E. (2018) Inflation is one the most important macroeconomic indicators to analyze the economic conditions of the economy. Few studies address the linkage among the stock market and inflation, Famma (1990); suggests that macroeconomic variables have projecting power for the stock exchange performance, although they do not consent to the anticipating authority of stock performance for the economy. Bhattacharya and Mukherjee (2002) note the type of causal relationship between stock prices and macroeconomic factors in India. He applied methodology of Toda and Yamamoto for the period of 1992-1993 to 2000-2001, stating that change in industrial production affects the stock prices. Nishat and Shaheen (2004) found industrial production having largest positive relationship stock prices in Pakistan.

Ray, S. (2012) has also examined positive relationship between industrial production and stock prices using Granger causality test and observed uni-directionality from industrial production to stock prices in India. Balance of trade has also been taken by many researchers to analyze its effects on stock exchange prices; however it is observed that it has no significant effects on stock exchange prices, for instance Bhattacharya (2002) found negative relationship between trade balance and stock exchange prices in India. In previous studies on the linkages between stock market and macroeconomic variables on industrialized economies have extended the analysis to the cases of developing economies. In studies have been identify such factors as industrial production, inflation, interest rate, money supply and so forth as being important in explaining stock prices.

However, Maysami and Koh (2000) document significant contribution of interest rate and exchange rate in the long-run relationship between Singapore's stock prices and various macroeconomic variables. In the Pakistani context, the studies by Aziz, T., Marwat, J., & Mustafa, S. (2021), Rehman, K. U., Shaikh, A. U. H., & Yasir, A. S. (2021), Siddiqi, M. M., Abdul Aziz, D., & Maria, M. H. M. (2021), Nishat and Shaheen (2004) is notable. However, mixed results have been found by different researchers regarding causal relationship between macroeconomic indicators and stock exchange prices for the case of Pakistan. This study will use more recent available data of macro-economic variable to analyze their causal relationship with stock market prices in Pakistan. Most representatives of macro-economic variables have been included in the study for this pursuit.

3. Data and Research Methodology

Data: It is important for analyzing the relationship between different macroeconomic variables and stock returns. In view of this secondary data collected from different sources. In this study 11 years from 2010-2020 data is utilized. For initially analyzed the linkage between main macroeconomic variables on stock prices. The study has examined the causal relationship between Pakistan stock exchange (PSX), inflation (CPI), money supply (M2), balance of trade (BOT), GDP per capita, GDP of saving, money supply (MS), interest rate (IR) and foreign direct investment (FDI). The data for all independent variables are collect from World Bank, business recorder, State Bank of Pakistan, Pakistan statistic bureau websites. To get consistency in the research analysis, accessible Pakistan Stock Exchange 100 Index data, and Exchange rate had been changed into annual records. To evaluate the relationship among dependent and macroeconomics indicators, it is important to process the data in statistical way. E-Views software is used as statistical package to analyze the relationship.

Procedure: In this study, the data is used as annually basis. The objective behind collection of data was to have in-depth analysis of these variables. The data was entered into MS Excel sheet, which was then exported to E-Views software for analysis purposes. Firstly, the descriptive analyses were conducted through E-Views to know the mean, median, standard deviation, skewness, kurtosis and the like statistics. Then Unit Root Augmented Dickey Fuller (ADF) test proposed by Dickey and Fuller (1979, 1981) was applied to check the stationary status of the data, in order to have good analysis. Apart from this to measure multicollinearity in data, use correlation test. Subsequently, regression analysis test is run to get the final output of data.

Explanation of Variables:

S#	Type of variables	Description
1.	Dependent Variable	<ul style="list-style-type: none"> • Pakistan Stock Exchange: Pakistan Stock Exchange is a stock index performing as a standard to evaluate prices on the Pakistan Stock Exchange over a period. In determining representative companies to calculate the index on, companies with the maximum market are preferred. In oppose to this, to make sure full market demonstration, the company with the maximum market capitalization from each sector is also integrated.
2.	Independent Variables	<ul style="list-style-type: none"> • Inflation: If we talk about inflation in simple word is just, increasing of price of

S#	Type of variables	Description
		<p>commodities and continuously increasing. Inflation is increase in value of products and service resulting falling the purchasing power of the people. Consumer price index (CPI) and retail price index is used to evaluate the Inflation. The Inflation affects the economy positively and negatively and even adversely some time. 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.</p> <ul style="list-style-type: none"> • 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: The state/center bank are responsible to monitor cash flow in country. For this purpose they made monetary policy on quarterly/annually basis. Money supply is consist on coins, cash carry in saving accounts and also in checking accounts. In a simple word the total amount of monetary 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. • Balance of Trade: Balance of trade (BOT) is the difference between the value of a country's imports and exports for specified period and is the largest element of a country's balance of payments (BOP). A country that imports more goods and services than it exports in terms of value has a trade deficit while a country that exports more goods and services than it imports has a trade surplus. The formula for calculating the BOT can be simplified as the total value of exports minus the total value of its imports. Economists use the BOT term to measure the relative strength of a country's economy. • Foreign Direct Investment: A foreign direct investment (FDI) is an investment made by a firm or individual in one country into business interests located in another country. For instance, FDI takes place when investors introduce their foreign business operations or acquires foreign business assets in a foreign company. • Interest Rate: The interest rate is the amount that charge from lender on principal amount for certain time period. The interest rate have different category, but in typically noted on an annual basis know as annual percentage rate.

Testing of Hypothesis: The hypotheses of this research are given below:

H1 = The inflation has positive and significant impact on PSX.

H2 = FDI show positive significant impact on PSX.

H3 = The GDP per capita have positive and significant effect on PSX.

H4 = The influence of GDP savings on PSX is positive and significant on PSX

H5 = The impact of money supply is positive and significant on PSX.

H6 = Balance of Trade is positive impact on PSX.

H7 = Interest rate has positive impact on PSX.

Model Equation:

$$PSX = \beta_0 + \beta_1 \text{Inflation} + \beta_2 \text{FDI} + \beta_3 \text{GDPPC} + \beta_4 \text{GDPS} + \beta_5 \text{M2} + \beta_6 \text{BOT} + \beta_7 \text{IR} + \mu$$

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

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

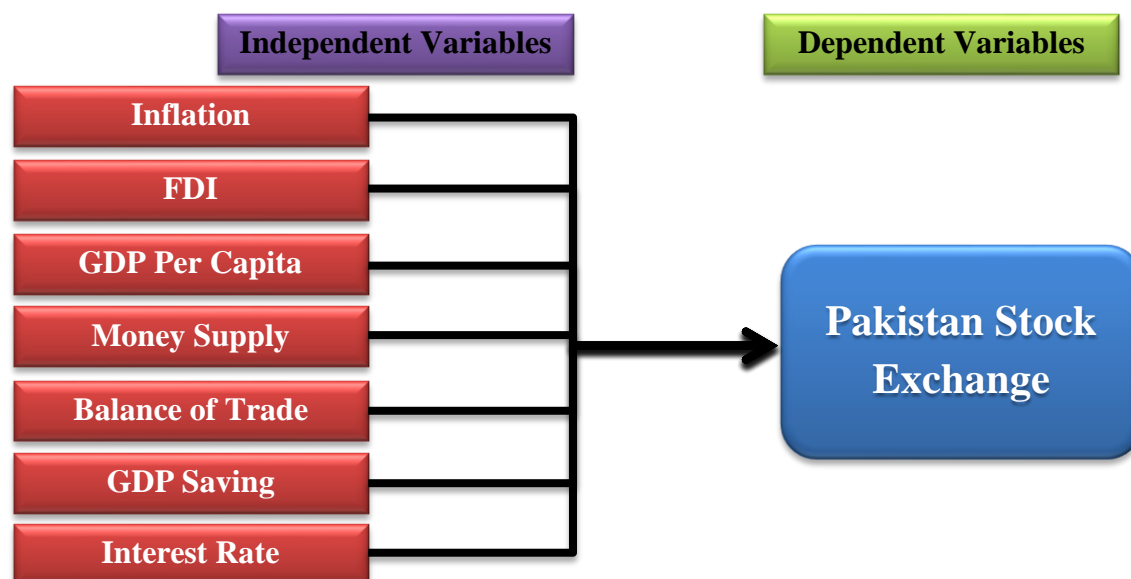


Figure1 : Conceptual Framework

4. RESULT AND DISCUSSION:

Descriptive Statistic: To check the normality of the data descriptive statistic was used. Table 1 has proof the descriptive analysis related toward Pakistan economic scenario; it define the total worth, minimum and maximum value, mean, median and standard deviation values of entire data and present the data in summarize form. These numeric value in below table define the data in decent manner.

Descriptive Statistic								
	PSX	Inflation	FDI	GDPPC	GDP Saving	Interest Rate	Money Supply	BOT
Mean	15.68	1.953	7.539	7.330	2.645	1.535	3.996	-21.571
Median	16.00	2.001	7.516	7.340	2.685	1.474	3.976	-17.988
Maximum	52.20	2.617	8.367	7.771	2.766	2.118	4.078	-15.678
Minimum	-20.50	1.050	6.654	6.819	2.502	1.057	3.873	-34.928
Std. Dev.	23.48	0.484	0.501	0.298	0.105	0.335	0.068	6.353
Skewness	-0.119	-0.378	-0.094	-0.033	-0.320	0.314	-0.241	-0.983
Kurtosis	1.920	2.0889	2.334	2.116	1.460	2.014	1.887	2.661
Jarque-Bera	0.560	0.642	0.219	0.359	1.274	0.626	0.673	1.824
Probability	0.755	0.725	0.896	0.835	0.528	0.731	0.714	0.401
Sum	172.500	21.48	82.938	80.63	29.104	16.888	43.965	-237.288
Sum Sq. Dev.	5517.076	2.349	2.514	0.890	0.110	1.128	0.046	403.690
Observations	11	11	11	11	11	11	11	11

Correlation Analysis: correlation analysis is a appropriate way to define the relationship among the variables. It is important method to analyze the data for better outcome.

Correlation Analysis								
	PSX	Inflation	FDI	GDPPC	GDP Saving	Interest Rate	Money Supply	BOT
PSX	1							
Inflation	0.184570	1						
FDI	0.486957	0.250538	1					
GDPPC	0.795316	0.385985	0.63109	1				
GDP SAVING	0.763552	0.089451	0.618540	0.834616	1			
Interest rate	0.059658	0.528141	-0.313817	0.006974	0.127246	1		
M2	0.728202	0.539902	0.765637	0.863317	0.767330	0.062169	1	-
BOT	0.698113	0.347719	0.648581	-0.694704	0.836648	0.067406	-0.731684	1

Granger Causality Test: The finding have symbolizes experiential consequences of granger causality test among inflation and stock. The independent variable inflation has uni directional causality amount stock, its reflect that inflation rate and money supply have impact on stock market performance. The study conclude that the monitory growth do not guide to enhance savings in stocks. On the other side the money supply and inflation rate don't have any causal relationship. Rest of independent variables balance of trade, inflation, GDP saving, interest rate and money supply have uni directional causality. DP saving money supply and FDI, GDP saving have also uni directional causality. In addition to this GDP per capita and FDI, GDP saving and GDP per capita, interest rate and GDP saving have also uni directional causality. In oppose to this, following table has shown other variable have no causality.

Granger Causality Test				
Null Hypothesis:	Obs	F-Statistic	Prob.	Type of Causality
Inflation does not Granger Cause PSX PSX does not Granger Cause Inflation	9	3.53219 4.24043	0.1307 0.1027	Uni Directional Causality
FDI does not Granger Cause PSX PSX does not Granger Cause FDI	9	17.5542 1.85231	0.0105 0.2695	Uni Directional Causality
GDPPKR does not Granger Cause PSX PSX does not Granger Cause GDPPKR	9	3.16105 0.35615	0.1502 0.7205	No Causality
GDPSAVING does not Granger Cause PSX PSX does not Granger Cause GDPSAVING	9	0.44491 1.25569	0.6692 0.3774	No Causality
Interest rate does not Granger Cause PSX PSX does not Granger Cause Interest rate	9	1.63131 1.55247	0.3033 0.3170	No Causality
M2 does not Granger Cause PSX PSX does not Granger Cause M2	9	69.9643 2.53852	0.0008 0.1942	Uni directional Causality
BOT does not Granger Cause PSX PSX does not Granger Cause BOT	9	2.95706 1.60173	0.1628 0.3083	No Causality
FDI does not Granger Cause Inflation Inflation does not Granger Cause FDI	9	0.97427 3.20175	0.4522 0.1478	No Causality
GDPPKR does not Granger Cause Inflation Inflation does not Granger Cause GDPPKR	9	0.53143 2.07951	0.6242 0.2403	No Causality
GDPSAVING does not Granger Cause Inflation Inflation does not Granger Cause GDPSAVING	9	0.94626 2.02743	0.4608 0.2466	No Causality
Interest rate does not Granger Cause Inflation Inflation does not Granger Cause Interest rate	9	0.05578 0.07766	0.9465 0.9266	No Causality
M2 does not Granger Cause Inflation Inflation does not Granger Cause M2	9	1.23147 0.52066	0.3831 0.6296	No Causality
BOT does not Granger Cause Inflation Inflation does not Granger Cause BOT	9	1.97084 13.9209	0.2537 0.0158	Uni Directional Causality
GDPPKR does not Granger Cause FDI FDI does not Granger Cause GDPPKR	9	6.28813 4.44251	0.0582 0.0964	Uni Directional Causality

GDPSAVING does not Granger Cause FDI FDI does not Granger Cause GDPSAVING	9	0.34381 3.16467	0.7281 0.1500	No Causality
Interest rate does not Granger Cause FDI FDI does not Granger Cause Interest rate	9	4.85798 0.57520	0.0850 0.6032	Uni Directional Causality
M2 does not Granger Cause FDI FDI does not Granger Cause M2	9	65.8411 0.59741	0.0009 0.5929	Uni Directional Causality
BOT does not Granger Cause FDI FDI does not Granger Cause BOT	9	0.33475 1.29236	0.7338 0.3690	No Causality
GDPSAVING does not Granger Cause GDPPKR GDPPKR does not Granger Cause GDPSAVING	9	0.77888 1.84543	0.5180 0.2705	Uni Directional Causality
Interest rate does not Granger Cause LNGDPPKR GDPPKR does not Granger Cause Interest rate	9	0.10001 1.07736	0.9070 0.4224	No Causality
M2 does not Granger Cause GDPPKR GDPPKR does not Granger Cause M2	9	2.02081 0.24714	0.2474 0.7921	No Causality
Interest rate does not Granger Cause GDPSAVING GDPSAVING does not Granger Cause Interest rate	9	0.00994 5.59621	0.9901 0.0693	Uni Directional Causality
M2 does not Granger Cause GDPSAVING GDPSAVING does not Granger Cause M2	9	5.39233 0.49213	0.0732 0.6440	Uni Directional Causality
BOT does not Granger Cause GDPSAVING GDPSAVING does not Granger Cause BOT	9	4.46212 0.16554	0.0958 0.8530	Uni Directional Causality
BOT does not Granger Cause GDPSAVING GDPSAVING does not Granger Cause BOT	9	4.46212 0.16554	0.0958 0.8530	Uni Directional Causality
M2 does not Granger Cause Interest rate Interest rate does not Granger Cause M2	9	0.77422 1.36522	0.5197 0.3532	No Causality
BOT does not Granger Cause Interest rate Interest rate does not Granger Cause BOT	9	5.31367 1.11998	0.0748 0.4109	Uni Directional Causality
BOT_GDP does not Granger Cause M2 M2 does not Granger Cause BOT	9	0.19309 5.06155	0.8317 0.0802	Uni Directional Causality

Regression Analysis: The table No. 4 has indicated that independent variables (Inflation, BOT, GDP per capita, GDP Saving, Interest rate and money supply) have significant impact on stock market expect that FDI. There certain reason are involved that effect the FDI. The table has illustrative influence i.e. nearly 76% which define 76% variation due to movement in independent variables rest of impact on different reasons.

Regression Analysis				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
Inflation	0.088391	0.027925	3.165255	0.0054
FDI	18.89470	8.280017	2.281964	0.1067
BOT	4.856914	1.039625	4.671795	0.0185
GDP Per Capita	0.161936	0.061377	2.638363	0.0167
GDPSAVING	0.120819	0.035148	3.437424	0.0029
Interest Rate	5.593603	12.20836	4.553735	0.0198
M2	0.051600	0.0143662	3.592737	0.0021
R-squared	0.791830	Mean dependent var		8.68182
Adjusted R-squared	0.766101	S.D. dependent var		1.048846
S.E. of regression	0.717554	Akaike info criterion		1.940622
Sum squared resid	5.042144	Schwarz criterion		2.230000
Log likelihood	-15.17342	Hannan-Quinn criter.		1.818210
F-statistic	14.78535	Durbin-Watson stat		1.764654
Prob(F-statistic)	0.024616			

Conclusion:

Stock market is the best channel for financial perspective to attract and maintain the investment level by reflecting the good performance of economic indicators. In stock market performance can be easily measured by getting variation in its index which is inclined by different factors including macroeconomic, social and political. The objective of this research to analyzed the linkage between macroeconomic indicator and stock market performance. For such reason, collect 11 years (2010-2020) data and apply all related tests i.e. Descriptive Statics, Correlation Analysis, Granger causality test and Regression Analysis execute on annual data to understand in a better way. The finding of the study has shown that macroeconomic variables like inflation, money supply, GDP per capita, GDP saving, interest rate, balance of trade have positive impact on dependent variables except that foreign direct investment. All the results of relationship are authenticated by means of various research articles from whole world and have various proofs to sustain this outcome of research. Pakistan is standing in under developing countries list. Whereas lot of issue are existing that why development and economic growth of country is so slow and creeping, due to high rate of inflation, trade deficit, investment up and down due to certain reasons (FATF policies, money scams, terrorism etc). These indicators performance are interrelated to each other. In is indeed to maintain balance between them for better performance and economic growth of country. Apart from this Covid-19 is greater impact on economic situation of country. More and less its impact is bigger than any disaster in the world economic crisis list. It is different and need another platform.

This research gives not simply in deepness examination of PSX index although provides the actual proposal for the strategy originator. Some important recommendations are: If the strategy maker maintains the rate of inflation in the country they can enhance the PSX 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.

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