

# **Impact of Financial and Macroeconomic Variables on Stock Market: A Case from Pakistan**

**<sup>1</sup>Muhammad Abdullah Idrees, <sup>2</sup>Ayesha Khan, <sup>2</sup>Insiya Abbas**

*Lecturer, Faculty of Management Sciences, KASB Institute of Technology, Senior Lecturer, Faculty of Business Studies, Bahria University*

## **ABSTRACT**

*The research evaluates the relationship and impact of Financial and Macroeconomic Variables on Stock Market Returns. The researchers evaluate the relationship and impact of various factors includes the Exchange rates, Inflation, Interest rates, Industrial Production, exports, worker remittances and finds different relationship in various economies based on market conditions and demand and supply factors. This Quantitative research conducted in Post Positivism Paradigm adopting the theoretical framework of Mishkin monetary policy mechanisms. The research selected the four major variables includes the Inflation, Treasury Bills 6 months rates, Exchange rates and Industrial Production to evaluate the impact of Stock Market returns. The PSX-100 index chosen as proxy of measuring the stock market return and 10 yearly month data from June-2008 to July-2018 taken to evaluate the relationship. The Correlation Analysis shows the negative relationship of Inflation, Interest rates and Exchange and positive relationship of Industrial Production with stock market returns. The Co-integration analysis that Interest rates, Exchange rates, Inflation and Industrial Production having long term relationship and evaluate the relationship and impact with stock market returns in Pakistan. The research is useful for the investor to evaluate the risk and return relationship while investing in stock market returns and research also useful for researcher to evaluate the variables and further research on relevant areas. The numerous tests applied to quantify the relationship and impact of macroeconomic variables on stock market returns. This research observed that macroeconomic variables co-integrated with prices of stock market. A decrease in exchange rate positively co related with higher inflation in future, and that make investors doubtful of the company's future performance and as outcome Stock prices begin to decline.*

**Keywords:** Exchange Rates, Inflation, Interest rates, Industrial Production and Pakistan Stock Market Returns.

## 1. INTRODUCTION

Stock Market reflects the economic conditions of an economy and have an intense impact on the economy and everyday people. Stocks reflect the ownership interest in the companies and are very important to customers and businesses. Stocks are a significant component of individual portfolios. Businesses use the stock markets to grow capital for their strategic and operational motives. Stock prices affects consumer and as well as business confidence which affects the economy and stock markets. Financial specialist accepts that Stock market demonstrates the situation of nation by limit of created and creating economy (Robert, 2016). The Pakistan Stock Exchange as of now working as complete substance in the interest of all trades together, with 950 organizations and market capitalization of 37 million in Pakistani money.

Among many others, (Muhammad and Shahid Ali, 2008) also investigated the link of macroeconomic variables and the Karachi Stock exchange returns. Their study determined that macroeconomic variables co-integrated with prices of stock market. It also advocated that in the short-term, a positive association was found with Industrial Production and interest rates contrary to a negative association found with foreign exchange investments and inflation. (Akbar and Kundi, 2009) verified the correlation of stock returns with regulatory policy variables like: (interest rate, Industrial Production, industrial production inflation).

Buyuksalvarci, 2010) direct an examination of macroeconomic factors and securities exchange returns of Turkey. They were utilized as reliant factors to be specific inflation, money market interest rate, oil value, gold value, cash supply and swapping scale and ward variable was securities exchange returns of Istanbul stock trade (ISE) 100 index. They examined through numerous regression models. Examined results about demonstrated that there is negative connection between mechanical generation, loan fee, conversion standard and oil costs on ISE 100 record, and Industrial Production is decidedly effect on ISE 100 file. Inflation and gold costs

Pakistan's first stock exchange established on September 18, 1947 named as Karachi Stock Exchange (PSX) with five listed companies and having 37million Pak Rupees. In October 1970, Lahore Stock Exchange (LSE) was created and the third Stock Exchange named as Islamabad Stock Exchange (ISE) which was created in Islamabad in 1989. These three Stock Exchange were functioning as separate entity as profit making organization but due to several conflicts and rises in interest rate all of three stock exchanges merged and form a separate entity on January 11, 2016 which is named as Pakistan Stock Exchange (PSX). Moreover, now a days PSX has 577 (five hundred and seventy-seven) listed companies with market capitalization of 8079.598 billion (PKR). These companies are from various sectors like:

banking industry, energy sector, textile organization, fast food industry, and many others. After multiple problems PSX was affirmed as the 5th best performing market in the world in 2016.

The relationship between stock market and macroeconomic variables provides the challenge of examining this relationship from a multi-dimensional view. The arrangement of emerging stock market is totally different from the developed markets due to this emerging stock markets return respond in a different way to macroeconomic variables than those of the established/developed country. However, macroeconomic variables have influence upon the Stock Market Returns which includes Exchange Rate, Six months T-Bill Rates, Treasury Bills, Interest Rate, Industrial Production, Inflation and so on. This research considers the time series relationship of Macroeconomic factors with diminishing and as well as changing effect on Stock Market Returns with ten years monthly financial data PSX (Pakistan Stock Exchange).

The research objective is to analyze the relationship and impact of Inflation, Interest rates, Exchange Rates and Industrial production on Stock Market Performance. The research question is what are the relationship and impact of Inflation, Interest rates, Exchange Rates and Industrial production on Stock Market Performance? This research explains the relationship of financial and macroeconomic variables with stock market returns, and this study is based on time series data analysis. Few researches conducted in same domain the variables and data is different. This research based on time series analysis of variables from period of 2008 to 2018 based on monthly data and analysis of Macroeconomic factors performed.

As this research is based on Pakistan economy and based on 10 years' time series data so the research is limited in its scope. Selected variables taken into consideration to analyze the financial impact on Stock market performance and its fluctuations. The research paper accompanied with limited variables include, inflation, exchange rate, interest rate, and Industrial Production which are closely correlated with monetary portfolio that impacts on returns of stock market. This research paper is based on monthly data of previous ten years and conducted from Pakistani data and according to researchers that consider the moderating effect of macroeconomic variables on stock market returns.

## **LITERATURE REVIEW**

### ***Stock Market Returns***

Brealey et al., (2007), investor invested their money in capital markets, but they did not exactly know that what they receive in future. But through studied historical analysis of stock market prices, investors can estimate their future returns and risk of investment.

The Pakistan Stock Market job in monetary development has been developed through past years and it keeps up its situation as the fitting exchanging market south Asia in 2016 (Robert 2016). The securities exchange returns consistency look into has been led in US and Malaysia, anyway there is no such check in Pakistan Stock Market situation (Kheradyar, Ibrahim and Nor, 2011). The specialists in this manner endeavor to lead comparable research, so as to foresee the securities exchange returns, rely upon money related proportions. The financial exchange Returns consistency in conspicuous market is the most advances and testing issue (Fama and French, 2004). The securities exchange returns change can be foreseeing through money related proportions so as to gauge the legitimacy level and danger of speculation by assessing the gainfulness proportions (Fama and French, 1988).

The financial exchange returns have more prominent flightiness in variety and changes in the costs in evident markets. The Empirical inquiries about survey the discoveries dependent on different approaches to ascertain the securities exchange returns by include the diverse money related proportions. The monetary proportions additionally portray the varieties and strategy to assess the distinctive connection dependent on changes in financial exchange returns.

Pakistan's securities exchange give consideration more on ongoing improvements. Pakistan's financial exchange is littler in size but at the same time is a market with skyscraper exchanging action. In numerous angles Pakistan's securities exchange has all the earmarks of being proceed as a run of the mill developing business sector with significant yields, high instability, high market fixation and relative powerlessness to perform new venture.

Masood and Triki (2012), analyze the effect of macroeconomic factors on China's stock trade. Study is investigated through auto backward dispersed slack (ARDL). Free factors were swelling, loan cost, mechanical creation, import and fare sway on subordinate variable was China's financial exchange returns. Their outcomes demonstrated that swelling and stock returns are decidedly related and different factors as loan cost, modern generation, fare, imports and expansion are altogether identified with stock costs of China's stock trade.

(Padhi and Naik, 2012), explored on macroeconomic factors and Stock market of India incorporate a portion of the macroeconomic factors like: modern generation, conversion scale, loan cost, were utilized as autonomous variable, and Indian Stock Exchange Market was considered as reliant variable. Breaking down information from 1994 to 2010, by utilizing vector blunder connection model, reach at a resolution that cash supply and modern creation has positive effect on Indian Stock Exchange. Indian Stock trade is contrarily influenced by swapping scale, expansion, financing cost, etc.

The specialists in this manner endeavor to lead comparable research, so as to foresee the securities exchange returns, rely upon money related proportions. The financial exchange Returns consistency in conspicuous market is the most advances and testing issue (Fama and French,2004). The securities exchange returns change can be foreseeing through money related proportions so as to gauge the legitimacy level and danger of speculation by assessing the gainfulness proportions (Fama and French, 1988).

Olivier and Omar (2013), examined the relationship among macroeconomics variables and three big economies such as United states (US), Japan and China. In their study they were taken gross domestic product (GDP), money supply, exchange rate and interest rate as dependent variables and stock market exchange returns of US, Japan and China as dependent variable. They applied autoregressive distributive lag (ARDL) co integration model for analyzing. They concluded US was influenced by financial crises of 2007, Japan collapsed later 1990 and China was less influenced by financial crises.

Yousif (2014), contemplated that financial exchange return is influenced by factors to be specific government reserves, modern generation, cash supply and conversion standard emphatically. Furthermore, examined that securities exchange return is adversely influenced by financing cost and expansion

They conclude that these all variables have important impact on London stock exchange market returns. Every variable may impact differently on different type of industry. That means can one macroeconomic variable impact positively on one industry and impact of that variable may be negative on other industry.

### ***Macroeconomic Variables and Stock Market Returns***

Aisyah, Fauziah and Noor, 2009) investigated the influence of economic variables on stock market of Malaysia. They were used industrial production, Industrial Production, interest rate and exchange rate as independent variables and Malaysian stock market returns as dependent variables. They applied vector auto regression (VAR) model for analyzing. This model showed that relationship of Malaysian stock index with industrial production, Industrial Production, interest rate and exchange rate was co integrated.

Olivier and Omar (2013), examined the relationship among macroeconomics variables and three big economies such as United states (US), Japan and China. In their study they were taken gross domestic product (GDP), Industrial Production, exchange rate and interest rate as dependent variables and stock market exchange returns of US, Japan and China as dependent variable. They applied autoregressive distributive lag (ARDL) co integration model for analyzing. They concluded US was influenced by financial crises of 2007, Japan collapsed later 1990 and China was less influenced by financial crises.

## *Interest Rates*

Ahmad et al. (2010), the finance theory states a relationship among these variables both in the short and long run. For example, if the central bank increases the current interest rate, this would be an indication to investors to look for a money market for their investments considering other factors remain constant.

Macro economics variable have an effect the stock market performance. Mostly researchers are research them and find no result because they are less developed countries. Less developed countries have no established stock markets. Interest rate is the rate and percentage of money that charge to the borrower. As Interest rate is increase so stock prices decrease because the expected return of the stock is upward move so the stock prices is lower. Interest rate is key element and back bone of the Marco economics variables. Change in interest rate are causing problem in investors. Increase in interest rate in economy that investors do not invest in market because they pay higher interest rate. Lower rate of interest in stock market and economy both are the good sign of investors. Sudden and quick changes in interest rate have an effect in the possibility of increase stock returns and the stocks market.

(Blanchard ,1981), are analyzed and investigate the consequences of the interest rate on the stock market returns, conclusion of the research is that inflation rate is also co related in real interest rate and stock market is to be change in the up and down of the interest rate.

Lobo (2000) are also examining the relationship of interest rate changes on stock returns. They also investigate the behavior and nature of stock market. He investigates the nature of stock return after federal fund rate announcement. He concluded that the interest rate has an outstanding impact on the stock returns.

Mohammad Alam and Muhammad ghazi (2009) are research to the connection of interest rate and the stock markets in the developing and developed country. They collect 15 years monthly data of the stock returns and run regression to find the next year interest rate they concluded that the negative connection of interest rate and stock returns.

Ishan, Ahmed, Haq and Sadia (2007) analyzed the correspondence of Marco- economic variables in stock market returns. They research in the Karachi stock exchange and they wind up the research and say that the financial variable has some influences in the stock market and interest rate is also a part of financial variable.

*H1: There is significant association of Interest rate and Pakistan stock exchange (PSX) returns.*

## *Inflation Rates*

(Heinz Herrmann et al., 2006), collected data from US market and had an opinion that currency depreciation had decline in stock market but in short run. A diminishment in exchange rate proposed higher inflation later on, making financial specialists doubtful of the organization's future execution. Therefore, the stock costs start to decay.

Dinniah and Mansor (2009), conduct a study on macroeconomic factors and stock returns. They were taken stock returns from six Asian pacific countries. They were used as independent variables namely industrial production and inflation and dependent variable was stock market returns. Monthly data were used for all variables from January 1993 to December 2002.

(Uwubanmwun and Eghosa, 2015), numerous financial specialists studied about the inflation rate and stock market performance. Through increase in price level a unit of currency can buy numerous goods and as a result there is reduction in purchasing power parity. They found that the social effect of an economy's inflationary pattern is to visit and can negative or positive, however are primarily negative. A negative result of a foreseen expansion prompts a fall in the genuine estimation of cash and other money related articles as time goes on.

On the other hand, an unanticipated inflation might reduce savings and investments in addition to hurting citizens on fixed pensions. Similarly, a rapid inflation rate leads to scarcity of products as households begin hoarding increasing prices even further in the coming times.

In financial theory, rate of inflation reflected by consumer price index (CPI) which represents the associate degree of upward value movement of product and services. Inflation happens either once costs go up or once it takes extra money to shop for constant things. Researchers think that the rates of inflation can influence the stock exchange volatility and risk. In examining the information of historical result during the time of inflation fluctuation it would provide some clear vision for investors.

Inflation may be categorized as expected and unexpected. With the help of expected inflation rate economists and consumers are able to plan annually. When inflation is predictable people are likely to hold less money. Unanticipated inflation has more harmful impacts on economy as it makes the economy inefficient and also led to redistribution of wealth among traders.

(Padhi and Naik, 2012), explored on macroeconomic factors and Stock market of India incorporate a portion of the macroeconomic factors like: modern generation, conversion scale, loan cost, were utilized as autonomous variable, and Indian Stock Exchange Market was considered as reliant variable. Breaking down

information from 1994 to 2010, by utilizing vector blunder connection model, reach at a resolution that cash supply and modern creation has positive effect on Indian Stock Exchange. Indian Stock trade is contrarily influenced by swapping scale, expansion, financing cost, etc.

The fluctuation of stock prices creates various risk for potential investors due to which it affects the forces of demand and supply at stocks. Consequently, increase in prices in the general might also impact the decision regarding to investment of a potential investor as a result of which it implicates a negative effect on the overall return on stock. However, the economy of Pakistan has been through horrible conditions which affect economic performance but still its capacity development of major sectors which can't be doubted.

*H2: There is significant relationship of inflation on Pakistan stock market (PSX) returns.*

### ***Exchange Rates***

(Habibullah, and Law, 2006), they analyzed the impact of exchange rate on Malaysian stock prices. They analyzing during crises time and applied granger non causality test. At that time Malaysian currency (Ringgit) depreciated and US dollar was appreciated. So, the impact of exchange rate on stock prices of Malaysian stock exchange has been significant.

After turning into the seventh nuclear energy of the world and leading an atomic explosion on May 8, 1998, different financial authorizations were exacted on Pakistan by its principal benefactors. Along these lines, Pakistan's foreign trade saves fell pointedly. Following this, a two-level arrangement or double swapping scale administration (I-e. official conversion standard and drifting interbank swapping scale) was presented with impact from July 22, 1998.

The exchange rates aid in development of the fundamental stock market performance. Disorder can be prevented by keeping a tight check on the prevailing exchange rates. But if the stock returns impact the exchange rates in a country, steps can be taken to regularize the workings of the stock market back to the normal. Currency depreciation aids the competitiveness of firms involved in exporting since such stock prices are predicted to pursue a surging trend attracting foreign investors to the local market.

Every macroeconomic variable has an effect on stock return either some are positive or some are negative effects on stock return is fully depended on foreign exchange rate. There are several external and internal factors affect the stock return. Exchange rate is constructive connected to the stock market and growth of



stock prices in output and destructive connected in the price level. They analyzed that Exchange rate has effect long time and the current period exchange rate is the positive and helpful variable of the stock returns.

The learning of the Johnson research (2008) that exchange rate is the inversely related in the stock prices. Exchange rate does not only influence the policy maker and economist they also influence the investors for investment purpose because the returns of the stocks is depending on the upward and downward movement in foreign exchange rate. The Exchange rate sometimes goes upward and downward sloping with respect to the export and import of country. Exchange rate is upward move if stock price is increase and the dollar prices will be decreases. Currency depreciation in both negative effects in long term market returns.

*H3: There is significant relationship of Exchange rates with Pakistan stock Exchange (PSX) returns.*

### ***Industrial Production***

The Pakistan Stock Market work in financial improvement has been create through past years and it keeps up its circumstance as the fitting trading market in south Asia in 2016(Robert 2016). The protections trade returns consistency investigate has been driven in US and Malaysia, at any rate, there is no such check in Pakistan Stock Market circumstance (Kheradyar, Ibrahim and Nor, 2011). The experts thusly attempt to lead equivalent exploration, to predict the protections trade returns, depend upon cash related extents. The monetary trade Returns consistency in the obvious business sectors is the most progressive and testing issue (Fama and French,2004).

Each macroeconomic variable affects stock return either some are positive or some are a negative impact on stock profit it completely depends for the unfamiliar conversion scale. There are a few outer and interior factors that influence the stock return. The conversion scale is usefully associated with the securities exchange and development of stock costs in yield and ruinous associated in the value level. They broke down that the Exchange rate has an impact long time and the current period swapping scale is the positive and accommodating variable of the stock returns.

The conversion scale is conversely identified with stock costs. The conversion scale doesn't likewise impact the policymaker and financial specialist they additionally impact the speculators for venture purposes on the grounds that the profits of the stocks are relying upon the upward and descending development in the unfamiliar swapping scale. Swapping scale upward and descending slanting regarding the fare and import of the nation. The conversion scale is an upward move if the stock cost increments and the dollar costs will be diminished. Cash devaluation in both negative consequences for long haul market returns

The protection trade returns change can be anticipated through cash related extents in order to measure the authenticity level and risk of hypothesis by evaluating the benefit extents John beirne (2009) are investigate and visit the stock market they are analyzing the exchange rate is the probability of the financially stock return markets. Exchange rate is the risk factor of the stock market because of increase and decrease percentages of the exchange rate.

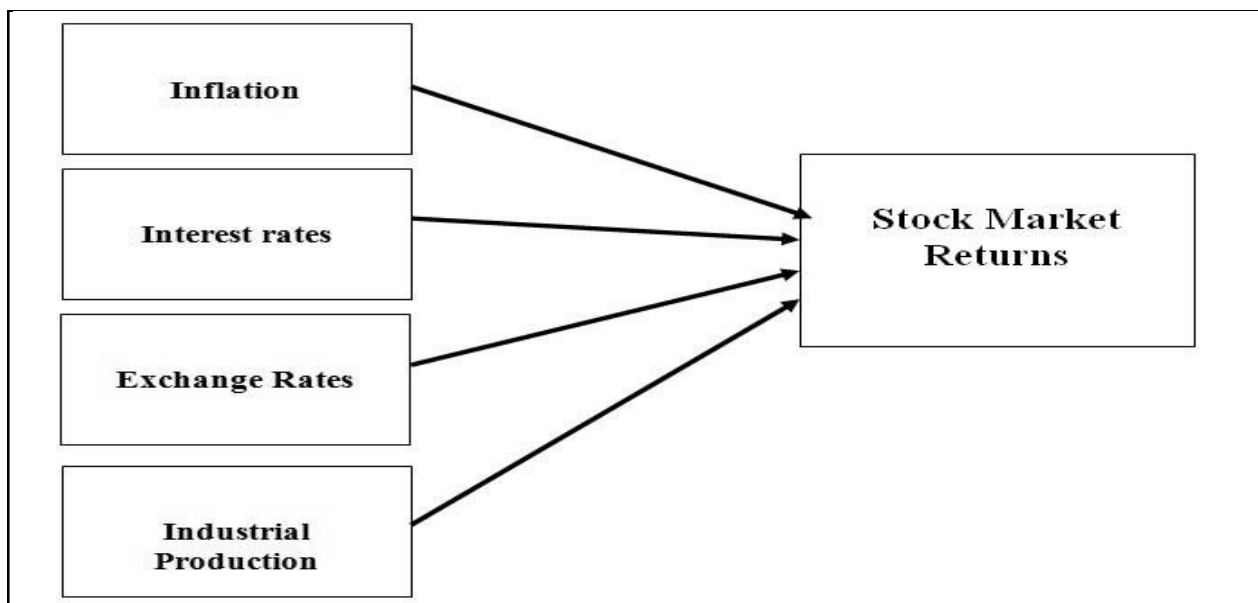
Manish Kumar (2008) investigate the impact of macroeconomic variable (exchange rate) and the stock return. They are collection of the daily data of prices through the state bank of Pakistan. He is working on the e-views program and used the unit test and co-integration test to run the long connection of the data.

Aurangzeb (2012) analyze and review the relationship of macroeconomics variables and the stock returns. They are suggested that exchange rate has beneficial for stock returns and has high profitability performance on stock returns. They also explain that interest rate and inflation rate are harmful for stock returns.

Granger, Husang and young's (2008) are also research to the stock market returns and the depreciations of money in term of currency. Currency of the country also effect and influences the stock returns. Devaluation of currency is deliberate downward adjustment of the value of the country against another currency.

*H4: There is significant relationship of Industrial Production on Pakistan stock exchange (PSX) returns.*

## **THEORETICAL MODEL**



## **DATA AND METHODOLOGY**

The research executed in the aspect of the epistemology. This philosophy explains how knowledge can be used and acquired. The Epistemology clarifies that phenomena can be described and understood through social sciences and theories.

The research approach illustrates the relationship between the theory and research work, there are two approaches to work deductive approach or inductive approach (Bryman and Bell, 2011). This study will be executed on the basis of deductive approach. The Deductive approach expresses the relationship of variables on the basis of theory as macroeconomic factors impact on asset pricing. Arbitrage pricing theory and CAPM model are using for analysis the impacts of macroeconomic variables on Pakistan stock market returns and execute the research to explain the relationship of different variables in stock market returns. This research conduct through secondary data that is why, this research is quantitative in nature. Also this research is explanatory in nature, and explanatory research is about quantitative research type. In this research conducted the study of causal relationship of macroeconomic variables on stock market returns. Last 10 years monthly data is used in this research from July 2006 to June 2016. Macroeconomic variables are based on Pakistani economy and having significant, positive or negative relation with stock market returns. The data is collected from different sources as stock market returns data will be collected from the Pakistan stock exchange (PSX). And macroeconomic variables data will be collected from State Bank of Pakistan (SBP) and Federal Bureau of Statistic (FBS).

There is high volatility in stock market returns because of financial and macroeconomic variables. There are two types of risks (1) systematic risk and (2) idio centric risk. Systematic risk can be minimized but idio centric risk cannot be minimized because of macroeconomic and financial variables volatility. The Mishkin theory of monetary channel transformation is applied to conduct the research and evaluate the impact of Financial and macroeconomic variables on Pakistan Stock Market. The Monetary channel of Output to impact of financial market is used with Tobins Q approach to analyze the market and its implications. Monetary channel transformation theory explained by Mishkin in US financial market to evaluate the financial markets and their impact in 1996.

### **Econometric Model**

The research conducted to evaluate the relationship of Inflation, Interest rates, Industrial Production and Exchange rates on Stock market performance. The research conducted through econometric analysis includes the Unit Root Tests, Correlation Analysis, Co-integration Analysis and Vector error correction

model applied. The research elaborates the purpose of these tests and results, the equation of Co-integration explained below;

$$PSX (Y)= B_0 + B_1(CPI)+ B_2(EXR)+ B_3(TBR)+ B_4(IP)+ E$$

*PSX* = Pakistan Stock Exchange

*CPI* = Consumer Price Index

*EXR* = Exchange Rate

*TBR* = T-Bills Rate

*IP* = Industrial Production

### Tools used for Data Analysis

The data which we collected from Pakistan Stock Market and Data of Macroeconomic Variable will be analyzed through SPSS and E-views software.

Tests	Purpose
Unit Root Test	Stationary of Data
Correlation Analysis	Relationship among I.V and D.V
Co-integration Analysis	Long term Relationship
Vector Error Correction Model (VECM)	Short Term Relationship

### Software Employed

The Procedure through the E-views and SPSS Software to examine the data and collected data managed and numerous tests applied to quantity the relationship and effect of macroeconomic variables on Stock market returns.

### FINDINGS AND RESULTS

The research investigated the relationship between macroeconomic variables namely inflation rate, exchange rate, interest rate and Industrial Production as independent variable on PSX 100 index as dependent variable in short run and long run. Time series monthly data of twelve years were taken from July 2008 to June 2018. The main purpose of the research is that to see the impact of macroeconomics

variable on PSX 100 index and verify the result through Unit Root Test, Descriptive Statistics, Correlation tests, Co-Integration and VECM Test.

### Unit Root Test (Stationary Analysis in Data)

The data for unit root test was non stationary and were taken from appropriate and reliable sources. Monthly data of twelve years were taken for all variables PSX 100 index, Inflation rate, exchange rate, interest rate and Industrial Production. Macroeconomics variables are highly volatile in nature so that is why there is shocks and impulses in data. Data were analysis through unit root test based on the Augmented Dicky Fuller test (ADF).

*H<sub>0</sub> = Series have no unit root (time series is stationary)*

Table 1: Unit root test ADF

Variable	At Level	Critical value of t at 5%	Decision of Null Hypothesis	At 1st Difference	Decision of Hypothesis
EX Rates	-1.99	-2.88	Rejected	-9.59	Accepted
Inflation Rates	-1.06	-2.88	Rejected	-6.46	Accepted
TBR Rates	-0.319	-2.88	Rejected	-10.57	Accepted
Industrial Production	-0.58	-2.88	Rejected	-6.96	Accepted
PSX-100 index	-0.15	-2.88	Rejected	-13.53	Accepted

The null hypothesis is not accepted at 5% confidence level in unit root test and after that the first difference were taken of all variables for converting into stationary data to further analyzing. The table shows the values at Level are significant to reject null hypothesis. Hence there is unit root in the data and through first difference ADF tests applied to convert in to normal Stationary Data. Non stationary time series data create problem in empirical analyzing. That is why it is necessary to all data is stationary for analyzing. For the stationary of data ADF test was applied.

The null hypothesis was that the variable to be studied has no unit root.

Descriptive statistics

Table 2: Descriptive Analysis

	<b>EX Rates</b>	<b>Inflation Rates</b>	<b>TBR Rates</b>	<b>Industrial Production</b>	<b>PSX Index</b>
Mean	89.91297	9.039172	9.546207	1121.024	20245.93
Median	94.52000	8.220000	9.450000	1134.700	15125.89
Maximum	108.3800	25.33000	14.01000	2072.970	39505.28
Minimum	60.33000	1.320000	5.750000	377.0100	5377.420
Std. Dev.	15.45007	5.412825	2.644637	453.4025	10402.71
Skewness	-0.734983	1.087255	-0.048418	0.091566	0.330912
Kurtosis	2.294841	4.013384	1.795015	1.897400	1.468029
Probability	0.000326	0.000000	0.012100	0.022964	0.000222
Sum	13037.38	1310.680	1384.200	162548.5	2935660.
Sum Sq. Dev.	34373.47	4219.009	1007.151	29602627	1.56E+10
<b>Observations</b>	<b>145</b>	<b>145</b>	<b>145</b>	<b>145</b>	<b>145</b>

The table 2 shows the results of measurement of central tendencies. Here the analysis based on mean and variances data. The PSX 100 index mean is 20245.93 in last 12 years of data. The DLNINFL mean is 9.039172, the DLNTBR mean is 9.546207, the DM3 mean is 1121.024 and the DEX mean is 89.91297.

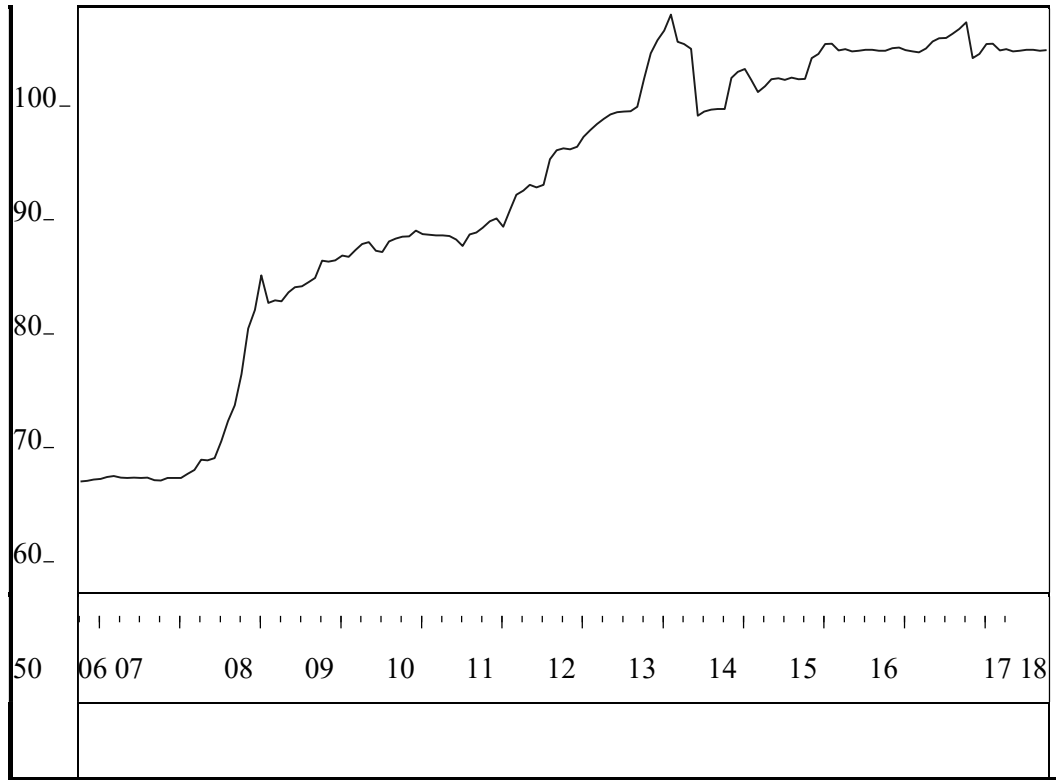
Descriptive analysis is the important step of statistical analysis; descriptive analysis is to help in the detection of outliers. Descriptive analysis is break down into measures of central tendency and measure of variability.

To measure the central Tendency, we calculate Mean, Median and Mode. With the help of mean we calculate the average, by mode we get the value appearing most often and by median we get the middle value of data set. To measure the Differences, we have Standard Deviation, Variance, and kurtosis. Standard Deviation use to measure the outliers. With the help of kurtosis, we measure the length or limitation of data set.

Behavioral Trends of Data

**Figure 1: Graph of monthly Data of last 12 Years EX Rates**





**Source:** Authors Work The above graph summarizes the volatility in Rates of Pakistan in last 12 years.

In above graph Trend take place in which we put Number of years in X-axis and value of Exchange on Y-axis. We notice that as the Number of years increase the trend of Exchange rate also effect and change their behavior over time. In 2006 the Rate of Exchange is 60 then it increases yearly because of Country position positively. It Influence the Stock market performance in a long run, as it is the important Macro-economic variable which influence the stock market performance.

By this graph we examine the Exchange rate positively effect on performance of stock returns, as in 2013 the exchange rate is on peak which significantly effect on our Pakistan economy. Minor change came in 2013 and 2014 mid by decreasing in value of exchange rate but over till 2018 the exchange rate positively affects toward the Stock Returns.

**Figure 2: Graph of monthly Data of Inflation Rates**





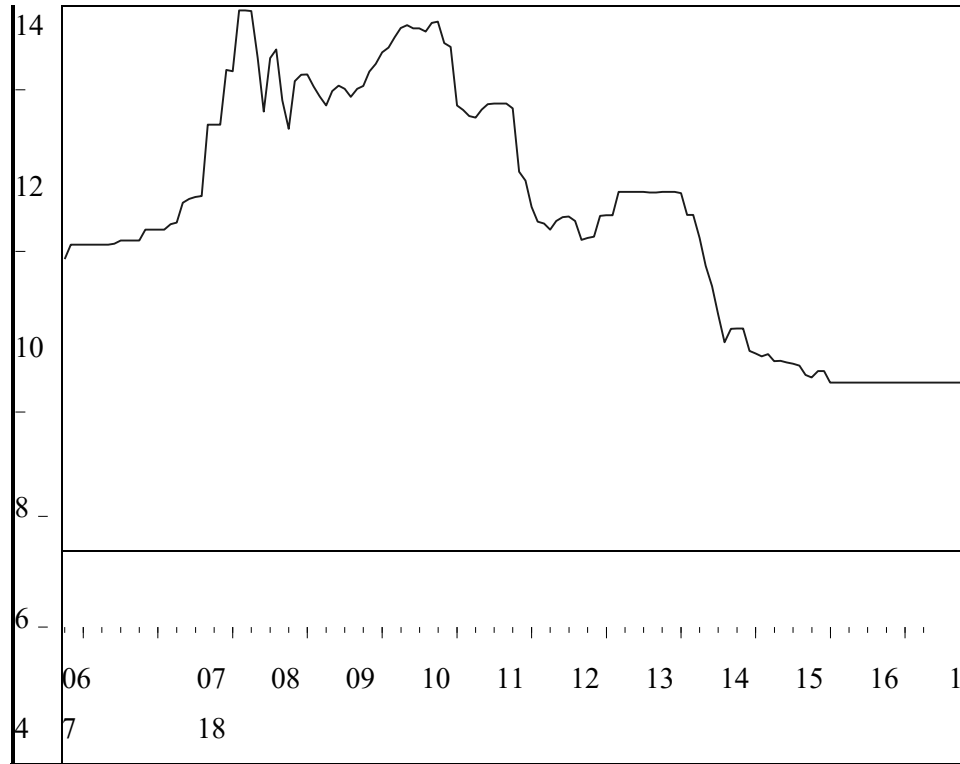
**Source:** Authors Work The above graph summarizes that the volatility in Inflation rates of Pakistan in last 12 years.

In above graph we put Rate of Inflation in Y-axis and Number of years in X-axis and notice that the Fluctuation take place. In 2006 the rate of Inflation is 7, in 2009 the inflation rate increases quickly as it is negatively impact on our Stock returns because as inflation rate increase the prices change over time. The sudden increase in inflation is generally considered the worst for the economy position. As we notice that in 2013 the graph goes upwards which is bad news for Investors and overall impact negative on stock market performance.

**Figure 3: Graph of monthly TBR Rates**



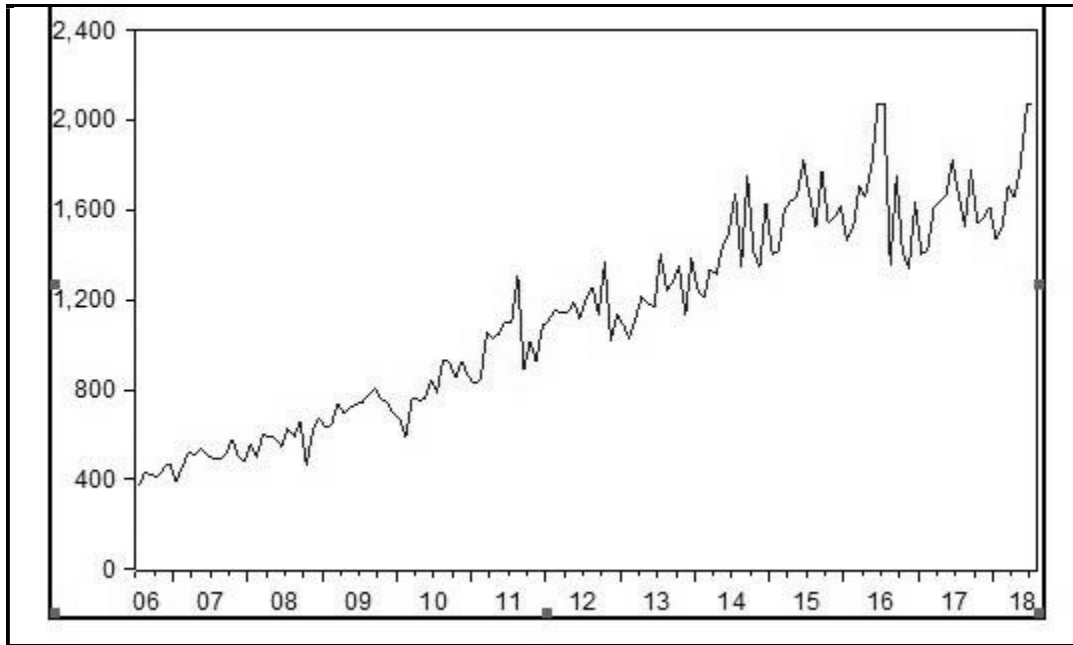




**Source:** Authors Work The above graph summarizes that the volatility of TBR Rates of Pakistan in last 12 years.

In above graph we put Interest rate of Treasury bills in Y-Axis and number of years in X-Axis and conclude that in 2006 the rate of Interest is 8.3%, come toward the 2008 the interest rate increases highly which is bad for the company. By graph we are able to take financial decisions. Interest rate are the key element and back bone of the Marco economics variables. The Stock Market Returns are indirectly proportional to Interest rate because as Returns increases the Interest rate decreases. In 2017 and 2018 the Interest Rate is same.

**Figure 4: Graph of monthly Data Industrial Production**

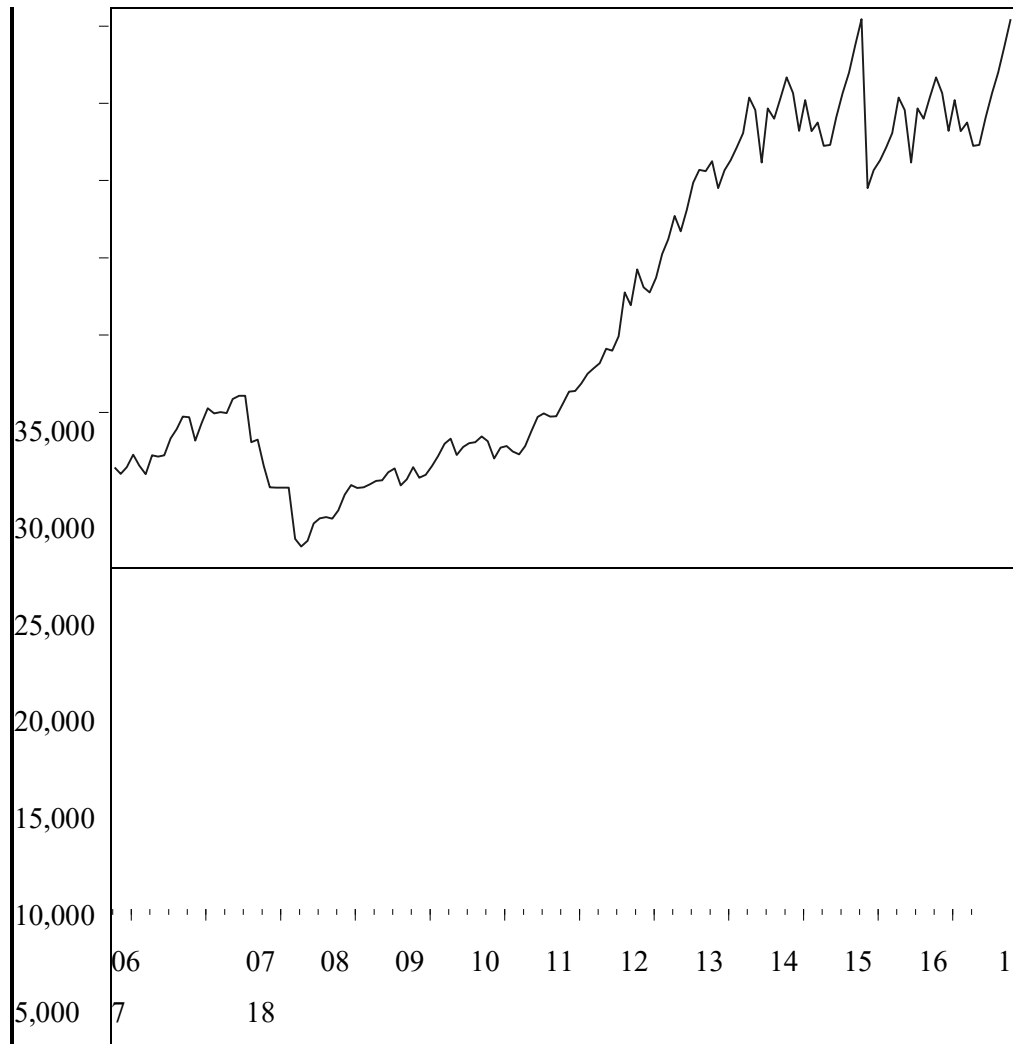


**Source:** *Authors Work* The above graph summarizes the Industrial Production of Pakistan in last 12 years.

In above graph in which we put Number of years in X-Axis and Industrial Production in Y-Axis, it is noticed that the fluctuation take place. In 2006 the Industrial Production is 400, In 2007 the Industrial Production increases from 400 to 500, In 2011 the graph shifts upward to 1400, as Number of years increase the Industrial Production increase which impact positive on stock market performance.

**Figure 5: Graph of monthly data of PSX-100 index**





**Source: Authors Work**

The last 12 years' data from July 2006 to June 2018 were taken from Pakistan Stock Exchange. The graph shows the investor's investment graph. Investors are investing in the stock market so the historical graph is to estimate the future returns and risk of investment. It is necessary that the investors of the stock market know about the influences of the macroeconomics variables on the stock returns its help in decision making.

In above graph in which we put Number of years in X-Axis and Stock Market Performance in Y-Axis, it is notice that the fluctuation takes place. In 2006 the PSX lie on 10000 then in 2008 and 2009 mid the PSX directly drop down which is bad for the Economy. In 2016 we summarize that the Index is increase toward the 40000 which is positive for our Economy Returns and for Investors.



## Correlation Analysis

### Correlation Matrix

		LNDINF	LNDTBR	DIP	DEX	DPSX
<b>LNDINF</b>	Pearson	1	.763**	.381**	.549**	-.715**
	Sig. (2-tailed)		.000	.000	.000	.000
<b>LNDTBR Rates</b>	Pearson	.763**	1	-.126	-.447**	-.745**
	Sig. (2-tailed)	.000		.171	.000	.000
<b>DIP</b>	Pearson	-.381**	-.126	1	.727**	-.601**
	Sig. (2-tailed)	.000	.171		.000	.000
<b>DEX Rates</b>	Pearson Correlation	-.549**	-.447**	.727**	1	-.835**
	Sig. (2-tailed)	.000	.000	.000		.000
<b>DPSX-100</b>	Pearson	-.715**	-.745**	.601**	.835**	1
	Sig. (2-tailed)	.000	.000	.000	.004	

In correlation analysis we see the relationship among dependent and independent variables. Here is PSX 100 index is dependent variable and independent variables are DLNINF, DTBR, LM3 and LEX. The PSX 100 index have strong negative relationship with all independent variables. There is 5% margin error which hypothesis is accepted at 95% confidence interval.

In correlation analysis we see the relationship among the dependent variable PSX-100 and the independent variable (inflation rate (DLNINF). Exchange rate (LEX), interest rate (DTBR) and Industrial Production (LM3). Inflation rate and interest rate is the negative relates in the stock returns. Exchange rate and the Industrial Production is the positive relates in the stock returns. In correlation analysis Pearson is to calculate the magnitude and direction of the date and sig. 2 tailed is to check the probability of the data and error.

## Hypothesis Testing – Correlation Hypothesis

**Table 4: Alternative Hypothesis**

<b>Alternative Hypothesis</b>	<b>Accepted / Rejected</b>	<b>Significant level (0.05 at two tailed)</b>
H1: There is significant relationship of Inflation rate with PSX 100 index stock market returns.	<b>Accepted</b>	<b>0.000</b>
H2: There is significant relationship of Interest rates with PSX 100 index stock market returns.	<b>Accepted</b>	<b>0.000</b>
H3: There is significant relationship of Industrial Production with PSX 100 index stock market returns.	<b>Accepted</b>	<b>0.000</b>
H4: There is significant relationship of Exchange rate with PSX 100 index stock market returns.	<b>Accepted</b>	<b>0.004</b>

As we have total 4 Independent variables and 1 Dependent variable in which the significant level of 5% in 2 tailed The Alternative hypothesis show the significant relationship of Independent Variables over Dependent variable and it is decided that we accept the Alternative Hypothesis because dependent and independent variable have significant Relationship. Inflation rate is significant relationship in PSX-100 index because the Pearson test is less than 0.05 that why H1 is accepted.

Interest rate is significant relationship with PSX-100 index. Exchange rate and the Industrial Production is the positively relationship with the PSX-100 index and the data analysis and literature also proved that they are accepted.

Co-integration Analysis

Co-integration Rank Test

Table 5: Co-integration Test PKR and PSX

Date: 12/06/19 Time: 15:36

Sample (adjusted): 2008M12 2018M07

Included observations: 140 after adjustments

Trend assumption: Linear deterministic trend

Series: PSX\_INDEX EX\_VALUE INFLATIONRATES INTEREST\_RATES M3

Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

<b>Hypothesized</b>		<b>Trace</b>	<b>0.05</b>	
<b>No. of CE(s)</b>	<b>Eigenvalue</b>	<b>Statistic</b>	<b>Critical Value</b>	<b>Prob.**</b>
None *	0.222291	75.79676	69.81889	0.0154
<b>At most 1</b>	<b>0.142261</b>	<b>40.60036</b>	<b>47.85613</b>	<b>0.2017</b>
At most 2	0.070399	19.11667	29.79707	0.4845
At most 3	0.046147	8.896695	15.49471	0.3750
At most 4	0.016170	2.282234	3.841466	0.1309

Max-eigenvalue test indicates 1 co integrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

It is the basic Econometric Test. In Co- Integration Analysis We Evaluate the long-Term relationship of Independent Variables and Dependent variables. There are two criteria in which first are Eigen and other is Trace Statistics. If Trace Statistics is less than or equal to Critical value and probability Value is less than or equal to 0.05 than Co-Integration is present. Co integration rank test analyze the non-stationary time series processes that have variance and means that vary over time. Co integration is a time series data. Co integration is the indication and relationship of long-term data between two and more variable and we are evaluating 12-year data.

At most 1 trace value is 40.60036 which is less than critical value 47.85613 but probability is 0.2 greater than 0.05 which is not significant.

At most 2, 3 and 4 trace value are less than critical value but probability is greater than 0.05 which shows no significance level and Co- integration is not present.

Applying VECM (Vector Error Correction Model)

Table 14: VECM Model Analysis

Vector Error Correction Estimates	
Date: 12/30/20 Time: 02:25	
Sample (adjusted): 2008M10 2018M07	
Included observations: 142 after adjustments	
Standard errors in ( ) & t-statistics in [ ]	
Co integrating Eq:	CoIntEq1
PSX_100(-1)	1.000000
MONEY_SUPPLY(-1)	-69.38514 (20.7472) [3.34431]
EX_RATE(-1)	1023.358 (505.408) [ 2.02482]
CP_INFLATION(-1)	-5334.052 (1027.28) [-5.19241]
T_BILL_6M_YIELD D(-1)	6317.291 (2134.28) [-2.95992]
C	-48559.54

Vector Error Correction (VECM) model is a restricted VECM applied for use with nonstationary series that are known to be co integrated. The purpose of this test is to evaluate short-term Relationship between Independent Variable and Dependent Variable. The Criteria of this test evaluate that the trace Value is greater than or equal to 1.96 and Probability value is less than or equal to 0.05. when we run this test, we evaluate that t- value of exchange rate is 2.02 which is greater than 1.96, the t-value of Inflation is -5.19 which is greater than 1.96, the value of treasury bills rates is -2.95 which is also greater than 1.96 and the last variable Industrial Production t-value is 3.34 which is also greater than 1.96. The overall test evaluates that there is Significant Short-term relationship between selected variables Macroeconomic factors and Pakistan Stock market returns.





## **DISCUSSION**

The results of the Research similar to Patra and Poshakwale (2006), studied the relationship between macroeconomic variables and Athens stock exchange general index. They used variables namely inflation rate, exchange rate, Industrial Production and stock returns. Their test results showed that in short run inflation rate, Industrial Production and trading volume have been significant impact on returns of Athens stock exchange. (Gunsel and Cukur, 2007) studied the relationship between macroeconomic variables and London stock returns from 1980 to1993. They used seven macroeconomics variables and they conclude that these all variables have important impact on London stock exchange market returns. This research explains the relationship among Stock market returns and Macroeconomic variables (Inflation rate, exchange rate, interest rate and Industrial Production). There is a strong relationship of macroeconomic variable and stock market returns. . Stock Market Returns are affected by macroeconomic/financial variables like: exchange rate, inflation rate, Industrial Production interest rate and change in investment and saving decisions. Some of the studies (mentioned in literature review) suggested that there is negative relationship between industrial productions, interest rate, exchange rate, oil prices with PSX 100 index, Industrial Production has positive impact on PSX 100 index and inflation rate lead to a decline in the stock market.

## **CONCLUSION**

This research paper examines the relationship between macroeconomic variable and stock market returns. Stock Market Returns are affected by macroeconomic/financial variables like: exchange rate, inflation rate, Industrial Production interest rate and change in investment and saving decisions. Some of the studies (mentioned in literature review) suggested that there is negative relationship between industrial productions, interest rate, exchange rate, oil prices with PSX 100 index, Industrial Production has positive impact on PSX 100 index and inflation rate lead to a decline in the stock market.

The results of the study similar to Patra and Poshakwale (2006), studied the relationship between macroeconomic variables and Athens stock exchange general index. They used variables namely inflation rate, exchange rate, Industrial Production and stock returns. Their test results showed that in short run inflation rate, Industrial Production and trading volume have been significant impact on returns of Athens stock exchange. (Gunsel and Cukur, 2007) studied the relationship between macroeconomic variables and London stock returns from 1980 to1993. They used seven macroeconomics variables and they conclude that these all variables have important impact on London stock exchange market returns.

This research is quantitative in nature and based on secondary data of last 12 years which is collected from Pakistan Stock Exchange and as well as from State Bank of Pakistan. The Quantitative Techniques like: Correlation Analysis were used to measure the relationship between macroeconomic variables and stock market returns. Pakistan exchange rates are non-stationary at level and converted into normality at first difference and with the help of first difference we remove the outliers.

### **RESEARCH IMPLICATIONS**

This research explains the relationship among Stock market returns and Macroeconomic variables (Inflation rate, exchange rate, interest rate and Industrial Production). There is a strong relationship of macroeconomic variable and stock market returns. The data which we collected from Pakistan Stock Market and State Bank of Pakistan are analyzed through E-views Software by applying, ADF (Augmented Dicky Fuller) Co-integration test, t-statistics test and Hypothesis testing. These numerous tests applied to quantify the relationship and impact of macroeconomic variables on stock market returns. This research is also observed that macroeconomic variables co-integrated with prices of stock market. A decrease in exchange rate positively co related with higher inflation in future, and that make investors doubtful of the company's future performance and as outcome Stock prices begin to decline.

### **AREAS OF FURTHER RESEARCH**

This research paper not only identified the relationship of Stock Market Returns and Macroeconomic Variables on PSX but also explicate the effect of monetary policies on stock market return. This research lead with correlation and co-integration method, where correlation specifies the correlation between the macroeconomic variables and co-integration classify the influence of macroeconomic variables on stock market return. This research can be done on numerous aspects as quantify the direction of variables with different tests and also analyze the impact of different macroeconomic or financial variables on stock market returns. The further research should be possible to assess the effect of diversified risk through portfolios and financial specialist sentiments to examine the effects of investment choices in stock returns and execution of Stock Market in Pakistan.

### **REFERENCES**

- Acikalin, S. Aktas, R. &Unal, S. (2008). Relationships between stock markets and macroeconomic variables: an empirical analysis of the Istanbul Stock Exchange. *Investment Management and Financial Innovations*, 5(1), 8-16
- Ahmad, M. I., Rehman, R., &Raouf, A. (2010). Do Interest Rate, Exchange Rate effect Stock Returns? A Pakistani Perspective, *International Research. Journal of Finance and Economics*, 50, 146-150.
- Ake, B. &Ognaligui, R. (2010). Financial Stock Market and economic growth in developing countries the case of DOUALA Stock Exchange in Cameroon. *International Journal of Business and Management*, 5(5), 82-88.
- Akhtar, D. S. (2006). *Pakistan's Financial Services Sector – A Future Prospective*. Karachi: Statistics Department, State Bank of Pakistan, 1-9.
- Aslam, W. (2014). Relationship between Stock Market Volatility and Exchange Rate: A Study of PSX. *Journal of Public Administration, Finance and Law*, 5, 62-72.
- Beck, T., & Levine, R. (2004). Stock markets, banks, and growth: Panel evidence. *Journal of Banking & Finance*, 28(3), 423-442.
- Masood, O., &Triki, R. (2012). Economic forces and stock exchange prices: pre and post impacts of global financial recession of 2008.
- Brealey, R., Myers, S.C., & Marcus, A.J. (2007). *Fundamentos de Finanzas Corporativas*. Madrid: McGraw-Hill.
- Bryman, A., & Bell, E. (2011). *Business research methods*. Oxford: Oxford University Press.
- Creswell, J.W. (2006). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (2nd edition). Thousand Oaks. CA: Sage.
- Gunsel, N., &Çukur, S. (2007). The effects of macroeconomic factors on the London stock returns: a sectoral approach. *International Research Journal of Finance and Economics*, 10, 140-152.
- Humpe, A. & Macmillan, P. D. (2005). *Can Macroeconomic Variables Explain Long Term Stock Market Movements? A comparison of the US and Japan*. CRIEFF Discussion Papers 0511. Centre for Research into Industry, Enterprise, Finance and the Firm.
- Bandt, O., Herrmann, H., & Parigi, G. (Eds.). (2006). *Convergence or Divergence in Europe? Growth and Business Cycles in France, Germany and Italy*. Springer Science & Business Media.
- Jaradat, M., Khrawish, H. A., Siam & W. Z., (2010). The relationships between stock market capitalization rate and interest rate: Evidence from Jordan. *BEH - Business and Economic Horizons*, 2 (2), 60-66.

Liu, M. H., & Shrestha, K. M. (2008). Analysis of the long-term relationship between macroeconomic variables and the Chinese stock market using heteroscedastic cointegration. *Managerial Finance*, 34(11), 744-755.

Mishkin, F. S. (2004). Inflation targeting in transition economies experience and prospects. In the *Inflation-Targeting Debate* (pp. 353-422). University of Chicago Press.

Naik P.K., &Pdhi P. (2012). The Impact of Macroeconomic Fundamentals on Stock Prices Revisited: Evidence from Indian Data. *Eurasian Journal of Business and Economics* 2012, 5 (10), 25-44.

Serkan, Y. (2008). Macroeconomic Variables, Firm Characteristics and Stock Returns: Evidence from Turkey. *International Research Journal of Finance and Economics*, 16,69-76.

Tripathi, V., Seth, R. (2014). Stock Market Performance and Macroeconomic Factors: The Study of Indian Equity Market. *Global Business Review*, 15(2), 291-316.