

Macroeconomic Variables Impact on Stock Market Performance in the Short & Long Run: A Pakistan Perspective

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Abstract:

This study, based on 128 monthly observations, examines the impact of 11 macroeconomic variables on stock market performance in short and long run. The Johansen's Co-integration test, Granger Causality test and Correlations test are used for empirical purposes. The timespan of study range from January 2005 to August 2015. The results states positive long run relationship between Stock Index and CPI, Money supply and oil prices. The negative long run relationship is found between stock returns and Exchange Rate, Foreign exchange reserve, Gold prices and Interest rate. However the results of Foreign Direct Investment, Index of industrial production, Imports and Exports are found insignificant for Johansen's Co-integration. The Granger causality results states that causality runs from exchange rate to Index to FDI, Foreign exchange reserve, interest rate and exports. The only bidirectional causality is found between Crude oil prices and Index. To conclude, Stock index shows short and long run relationship with macroeconomic indicators and these can be used to predict each other.

Keywords: Johansen's Co-integration test, Granger Causality test, Karachi Stock exchange, Macroeconomic Variables

1. Introduction:

In Pakistan during last ten (2005-2015) years stock market has performed in many ways. Market has seen all time high and big crises during the period. Capital market of Pakistan has performed tremendously in recent years as international rating agencies improved their grading (outlook from stable to positive), Pak govt. has made historic agreement with China on CPEC (China Pak Economic Corridor) and Ijara Sukuk bond has been issued after a decade bring remarkable cash Inflow. PSX (formerly KSE100 index) remained World's 5th Best Performing Index in 2013, which was up 49.4% (37% in US\$ terms) in 2013, beating all but four stock indices in the world. The KSE100 Index dropped by 1375 points in just one day during 2014's anti-government protest which is the Pakistan's history biggest shortfall in one day.

In preceding fiscal year (2014), KSE100 Index showed improvement of 6870 points generating 27% percent returns for investors. While in current fiscal year, a return of 13.75% generated in first 10 months although it is less than previous period but remained better than South Asian and other renowned markets. The progress is not stopped here, it is improving continuously. Currently PSX is touching, it's all time high and trading above 36500 points. In April 2015, market capitalization reached at \$71.8 billion showing improvement of 40% from 2013. It is due to economic liberalization, increasing awareness of public regarding stock market trading, high investment returns and better performance of economic indicators of country.

Efficient capital markets are the platforms for generating long term resources to boost the economic development and prosperity in the country. Through capital markets, the new ventures can be set up as well as we can enhance the existing organizations. Hence stock markets are the integral part of the economy and their importance cannot be ignored. So there is a need to identify the determinants of the stock market index which enhance the investors' wealth or ruined it. Many studies identified that this behavior of stock markets is due to the change in the economic indicators.

Generally investors take their decisions based on the relationship of individual economic indicator with Stock Returns. Sometimes the changes in individual indicator has great impact and many a times it has no impact on Index because of several other correlated Indicators. Therefore the present study would attempt to explore the impact of selective multiple economic indicators on the performance of stock Index. It would also explore the inter-relationship between the indicators and impact of these relationships on the PSX. The study is envisioned to facilitate the investor in taking the right decision while investing.

Currently PSX (formerly Karachi Stock Exchange) is only most liquid stock exchange of the Pakistan. By the end of July 2015, 560 companies were listed having paid up capital of Rs. 1,177,765.5 million. Market capitalization have been increased from PKR 6,655,294.8 million to PKR 6,760,759.5 million showing an increase of PKR 105,464.70 million.

Table 1 Profile of Pakistan Stock Exchange

<i>Description</i>	2005-06	2012-13	2013-14	2014-15
Total Listed Companies	658	569	557	560
New Companies Listed	14	4	5	6
Fund Mobilized (PKR in Billion)	41.4	29.5	47.6	29.1
Listed Capital (PKR in Million)	496,000.0	1,116,005.0	1,100,340.9	1,177,765.5
Total Market Capitalization (PKR in Million)	2,801,000.0	5,154,738.0	6,655,294.8	6,760,759.5
Average Daily Shares Volume (Million)	319.6	221.0	229.1	185.7

Source: Economic Survey of Pakistan 2014-15

2. Hypotheses Formulation:

In literature, the relationship between the economic indicators and stock returns was widely discussed and Pakistan experience might not be exceptional. We hypothesized each independent variable's relationship with dependent variable as follows: CPI and stock returns hypothesis is based on the Dividend Discount Model. They argued that inflation rate is negatively associated with nominal rate of return. As increase in nominal rate of return will ultimately increases the discount factor of the model. In asset (stock) valuation process, the higher of discount factor results the lower of asset (stock) value and vice versa. It might be argued that increase in inflation also bring the increase in cash flows relating to asset and would negate the impact of each other. But the cash flows may not go up with inflation as the pre-existing contracts would deny any immediate adjustments in the firm's revenues and expenses. (R.H., 1991).

Filis (2009) examined the relationship among various macro-economic indicators in Greece using VAR approach. He suggested that stock market received negative significant influence from CPI. Moreover shocks from the CPI required 3 years to absorb by stock market. Hsieh (2013) results using data from New Zealand stock Market by applying GARCH model, Hsing (2014) results from Estonia stock market, Chen (1986) findings in US economy and Christopher Gan et al. (2006) results from NZSE40 also depicted the negative relationship between CPI and stock prices. In Pakistani context, few studies were conducted in respect of macro-economic indicators and stock market association, Hauque et al. (2012) using data from 1998 to 2009, Nishat et al. (2004) by using quarterly data from 1973 to 2002 by applying VECM approach and Sohail et al. (2009) by using monthly data from 2002 to 2008, found out the similar inverse relationship.

Contrary to above, many researches revealed the positive relationship between CPI and stock market. They argued that nominal rate of interest include the real rate of interest and expected inflation. As nominal rate of interest and inflation move in the same direction so increase in inflation also increase the return from stocks. Hence real assets like shares provide hedge against inflation (Fisher, 1930).

Patel (2012) carried out a study which showed the impact of selected macro-economic indicators on two stock markets namely Sensex and S&P CNX Nifty using VECM approach for empirical purposes. His findings stated the positive co-integration between CPI and stock market index. Moreover the studies of (Venkatraja, 2014; Kumar, 2014; Adam et al. 2008; Shahbaz et al. 2013) have found significant positive relationship between inflation and stock returns. However the results of Imran et al. (2010) and Arshad et al. (2008) are insignificant. Our hypothesis is based on Dividend discount model.

Researchers have controversy about the relationship between stock market index and money supply. Some researcher suggested that money supply and stock returns are negatively related as money supply causes inflation which will ultimately increases the discount rate. The higher discount rate means the lower stock value and vice versa. Other researcher argued that the increase in money supply also stimulate the cash flows in economic activity (corporate earnings effect) will resultantly increases the stock prices (Chaudhri et al. 2004).

Asmy et al. (2010) conducted a research in Malaysia to find the effects of economic indicator in pre (1987-1995) and post (1999 to 2007) crisis period. He found negative co-integration between Money supply and stock prices in both pre and post crises period. Onneetse et al. (2014) and Rahman (2009) also found the similar results and confirm the negative relationship between stock prices and money supply.

Naik (2013) studied about stock market response to economic fundamentals in Indian economy. The time period of study was 1994 to 2011 and Vector error correction model used to explore the long term relationship. He confirmed the positive relationship between money supply and stock prices. Ramin et al. (2004) study in Singapore stock exchange, Patel (2012) study in Indian stock exchange (SENSEX) and Ratanapakorn et al. (2007) study in US economy also confirmed the positive correlation between the money supply and stock market indices. Faisal et al. (2014) and Sohail et al. (2009) also found positive relationship between stock returns and money supply in Pakistan. We hypothesized the negative relationship between these two.

The association of exchange rate with stock returns is depending upon the dominance of economy i.e. import or export dominant. If economy is import dominant then appreciation in local currency will strengthen the economy and also show potential of local currency. It will reduce the burden of trade balance. If the economy is

export dominant then depreciation of local currency will lead to increase in demand for Pakistan's product and improve its competitiveness in international market, assuming that demand for exports is sufficiently elastic.

Robert (2008) conducted a study for BRIC countries using ARIMA model to explore the relationship between stock returns and macroeconomic indicators. The results revealed the positive association for Brazil, India and China, but in case of Russia negative trend was observed. Donatas et al. (2009) studied about the short term relationship between economic variables and stock indices in Lithuania. The results indicated that exchange rate was negatively influence the stock prices in short term. Acikalin et al. (2008) tested the effects of economic indicators on Istanbul stock exchange. The findings indicated that exchange rate could be used to predict the stock prices. Moreover the negative co-integration was observed between exchange rate and stock index.

The studies of Mohanamani et al. (2014), Parmar (2013) and Patel (2012) also support the fact that appreciation in local currency will strengthen the economy while Onneetse et al. (2014) study depicted the negative relation between these. Moreover Imran et al. (2010) and Izedonmi et al. (2011) studies stated insignificant findings between these two variables. We hypothesized the positive relationship between exchange rate and stock returns.

The various studies argued that interest rate represent the opportunity cost to invest the money in another interest bearing instruments. Moreover the rise in interest rate also rises the required rate of return (RRR) and in case of asset valuation process, the improved required rate of return will reduce the value of existing stock in market (Mukherjee et al. 2010). While others stated that most of the companies fulfill their finance requirement through borrowings. If the interest rate increases, the cost of borrowings will increase and profit will decrease automatically. Moreover the substantial buying of stock is made through borrowing so if the interest rate increase the risk will also increase to lose the money so investor will hesitate to invest.

Pramod (2013) tested the relationship between macroeconomic variable and stock returns. No co-integration was found between stock indices and Interest rate in India by using data from 1994 to 2011. However they found unidirectional causality from interest to stock returns. Quadir (2012) studied about causal relationship between economic indicators and Dhaka stock exchange returns using ARIMA model. His findings negate the above theory and results. But the coefficient of study was statistically insignificant. Ahmed (2008) studied about the effect of aggregate economic variables on stock prices in Indian economy. He found causality run from stock indices to economic variable in all cases except for interest rate. In case of interest rate the causality move from interest rate to market indices. Parphan et al. (2002) identified the association between stock indices and economic indicators of 5 Asian countries. The results stated that negative long run association exist between these variable in Singapore, Thailand and Philippines. However in case of Indonesia and Malaysia the positive result was observed. Our hypothesis suggests the interest as opportunity cost.

The enhanced industrial production will increase the firm's profit and will portray the positive impact of economy in the international market. Moreover the increased production will also improve the balance of payment and surplus cash flow will be used to import the necessary items for the economy.

Mohanamani et al. (2014) mentioned highly positive correlation between BSE Sensex and index of industrial production among the selected group of economic variable. Moreover Index of industrial production also showed the highest correlation between IIP and Money supply i.e. 91%. Further no causality was found for IIP. Chittedi (2015) carried out a study in BRIC countries, he found only Index of Industrial production had impact on Russian stock market. It is also mentioned that increase in industrial production, the corporate profit of organization also enhanced that will ultimately impact on the positive view of economy. Vashishtha et al. (2013) found out the moderate correlation between Index of industrial production and Sensex for a period of 2006 to 2011. He also found negative relationship between IIP and BSE Sensex. He stated investor must beware while investing and reliable tool used to predict the Index.

Ramin et al. (2004) carried out a study in Singapore. He found positive relationship between Singapore's All-S Sector Indices and Index of industrial production. Imran et al. (2010) found the positive association between Index of industrial production (IIP) and stock Indices. He found no causal relationship between macro variables and index. We hypothesized the positive relationship between index of industrial production and stock returns.

Gold has been considered as a substitute of investment against stocks. Due to less awareness of stocks investment in underdeveloped economies, most of the savings are invested in Gold by small investors. Moreover the news about Gold prices increment will turn the investment to Gold from stocks which will negatively affect the stock prices. Gold may also be used as hedge against inflation.

Buyuksalvarci (2010) carried out a study in Turkey in which relationship among various economic indicators and stock prices had been determined. The findings stated that Gold price does not have any significant impact on stock prices in Turkish economy. Ghosh et al. (2010) results depicted significant impact of gold prices along with other macroeconomic variables (oil price, dollar price and CRR) on the stock market returns. Sharma et al. (2010) findings revealed that gold prices have heavily influence on the stock prices among the group of variables. Ray (2012) tested the Granger causality test and multiple regression model to identify the

impact of different macroeconomic variables on stock market. The empirical results showed that gold price and oil price have significant negative effect on stock returns in India. Hina et al. (2011) conducted the research regarding the gold and KSE100 index relationship. Johansen's co-integration test was applied the results revealed that there was long run relationship between gold and KSE100 Index.

Sulaiman et al. (2012) judge the positive relationship between KSE100 Index and gold prices using Arbitrage pricing Theory (APT). Dirk G. et al. (2010) carried out a study to analyze that whether gold is hedge or safe haven against stocks and bonds. The results stated that gold is hedge against stock but safe haven for only shorter period of time (15 days) and in extreme time period. The study further indicated that gold is not a safe haven against bonds. So we hypothesized that gold provide hedge against stock movements.

Pakistan is the crude oil importing country so the changes in oil prices in international market affect the local economy a lot. The changes in Crude oil prices have heavy effect on energy and ultimate effect on cost of production. The high oil prices also reduced the economic activity due to increased cost of production and reduced profit margins. So the future cash flows are affected and share prices of manufacturing industries fluctuate heavily due to it. (Kumar, 2014)

Filis (2009) conducted a comprehensive study in Greece stock market. The main findings suggested that stock market was negatively influenced by Oil prices. Moreover the oil prices did not have any influence on industrial production and Consumer price index. Nandha et al. (2008) had been documented the negative relationship between oil prices and stock returns. They further added that apart from changes in oil prices, the oil price volatility also impact on the stock price movements. O'Neill et al. (2008) also confirmed the similar results in their study. Agren (2006) conducted a study in 5 developed economies to know the impact of oil prices on these stock markets. They VAR-ABEKK model to examine the results. The results stated that stock markets own shocks tend to have more impact on stock indices of these countries than the oil prices changes. Maghyereh (2004) identified the relationship between oil market shocks and stock returns in 22 emerging markets. The results stated that relationship between oil prices and stock returns was weak in emerging economies as compare to developed economies.

Davis et al. (2008) stated that oil prices have negative influence on the stock returns. He further argued that determinant of oil price shock, i.e. supply driven or demand driven. The concluded supply driven shock have more significant impact on the stock prices than demand driven shocks. Negating the results of Davis et al. (2008), Kilian et al. (2007) results stated that demand driven shocks caused negative effects on US stock market. Moreover, they stated that increment in oil prices due to world expansion have positive impact on the stock prices in the US Economy.

Although there is not a comprehensive literature backed by the concept of co-integration between import or export and stock returns but there are some studies that used the import or export as an independent variable among the other economic variable who explained the stock returns. The export of surplus items brings foreign exchange and increases the profits of export oriented firms. The production capacity of firms enhanced, cash flows increases. Moreover, the import and export oriented economy also have a large impact on other variables movement like Oil prices, exchange rate etc. Import and export are the main factor for balance of payment determination. The favorable and unfavorable balance of payment reflect the economy condition in the international market and attract the foreign investments.

Faruque (2011) carried out a study in Bangladesh to empirically test the Arbitrage pricing theory. He also used import and export along with the other variables to identify the impact on stock market, the results revealed the negative impact of imports and exports on the stock market. Zhu (2012) and Ruta et al. (2014) also confirmed the results for exports but in case of imports insignificant results were found. However Sohail et al. (2012) findings are contradicts with others. Yavuz (2005) found no causality in either direction. We hypothesized positive and negative relationship with exports and imports respectively.

Foreign exchange reserves create the strong position of the country to intervene in the international market for imports payment and to balance the exchange rate. Mookerjee et al. (1997), Maghayereh (2003) and Turgut et al. (2008) found the long run association of FXR with stock returns. Rahman et al. (2009) and Hussain et al. (2012) concluded the positive relationship while Akbar et al. (2012) and Onneetse et al. (2014) suggested the negative relationship between FXR and Stock returns.

The role of foreign Direct Investment in country depending upon its nature whether it's have a complementary role or substitution role in the host economy. If FDI acts as a substitution then negative impact is expected as it will adversely affect the existing corporate structure, financial etc. It will also increase the level of competition. On the other hand, If FDI acts as a complementary then positive impact is expected as it remove the scarcity of capital, technology, managerial skills, human capital etc. As Pakistan is emerging economy, so complementary role is expected (Shahbaz et al., 2013).

Pilinkus (2010) analyzed the impact of 10 major economic indicators on Baltic State's (Lithuania, Latvia and Estonia) stock market performance. These indicators explained proportionately 37%, 39.9% and 36.4% fluctuations of stock market indices of Lithuania, Latvia and Estonia respectively. The results more

revealed that FDI (lagged by one period) is significant in case of Lithuania and FDI (lagged by two period) is significant in case of Lithuania and Latvian states. Ahmed (2008) results revealed that foreign direct Investment (FDI) have long run association with Nifty stock Exchange while in case of Sensex no long run association have been depicted in study. The results of Hetamsaria (2008), Adam et al. (2008), Babayemi et al. (2013) Al-Halalmeh et al. (2010) and Shahbaz et al. (2013) concluded the positive co-integration in different economies. Kumar (2014) used 164 monthly observations to investigate the dynamic relationship between Indian stock market and its determinants. He found that long run association of foreign direct investment with stock market performance was not supported by data and its co-integration coefficient was found insignificant. Issahaku, H. et al. (2013) conducted another study in Ghana to know the causal relationship between economic indicator and stock returns. His findings stated significant relationship between stock returns (Index) and foreign direct investment (FDI).

3. Research Methodology:

The study is conducted to identify the impact of macroeconomic variables on stock market performance in emerging economy. The time series data is used which is based on 128 monthly observations consisting of 10 years from January 2005 to August 2015. We use the analytical research methodology as facts and figures are already available and we only analyze those to make our judgment on the basis of that data. This study is conducted in non-contrived settings as all data is collected from natural environment. As well as the time horizon is concerned, it is a cross sectional study as data is collected in one shot. For empirical purposes we use the secondary data, collected from various recognized and reliable resources namely Monthly Bulletins of Pakistan Bureau of Statistics, Statistical Bulletins of State Bank of Pakistan, Economic Survey of Pakistan and WDI (World Development Indicators). The data is available in different units of measurement. We convert all data in Logs except Foreign Direct Investment because FDI consists of some negative values and if we convert those values cannot be converted into logs and these will be excluded from the data. Moreover, we convert the data because original values create long residuals in calculations and bigger chances of errors in results. So we convert all the variables. The data consists of 11 independent variables and 1 dependent variable. The Table 2 describes the symbols, variables used, their units of measurements and variables used as proxy for empirical purposes.

Table 2 Description of Data

Symbol	Variable	Units of Measurement	Proxy
CPI	Inflation	Index (2004-05=100)	Consumer Price Index
M2	Money Supply	PKR Billion	Broad Money
EXR	Exchange Rate	PKR/US Dollar	Monthly Average Rupees/US \$
INR	Interest Rate	Percentages	Weighted Average Deposit Rate
IIP	Index of Industrial production	Index (2004-05=100)	Quantum Index of Large Scale Manufacturing
GOLD	Gold Price	PKR/10 Grams	Karachi Average Price Rupees/ 10 grams
OIL	Oil Price	US\$/Barrel	International Crude Oil price
M	Imports	US \$ million	Amount of monthly imports
X	Exports	US \$ million	Amount of monthly exports
FXR	Foreign Exchange Reserve	US \$ million	Gold & Foreign Exchange Reserve
FDI	Foreign Direct Investment	US \$ million	Foreign Private Direct Investment
INDEX	Stock Returns	Index (1991=1000)	KSE100 Index (Currently PSX)

There are various techniques used for empirical purposes to know the long run and short run relationship between macroeconomic indicators and stock returns as well as other correlation techniques are used.

Before applying Co-integration, we check whether data is Stationary or not. The OLS regression results might deliver the spurious regression if the data series don't stationary. Stationary data series means that firstly its mean & variance are constant overtime, secondly its value of covariance between two time intervals depends only on the distance between two time intervals and not on the actual time at which it is computed.

Stationary Test: To check data is stationary or not, we use Augmented Dicky Fuller Test. The ADF test has the null hypothesis (H0) that time series exists the unit root (Non Stationary data) and alternative hypothesis (H1) that unit root does not exist (Stationary data). If the critical value is more than the ADF test statistic, then the null hypothesis (H0) is rejected means data stationary or otherwise accepted. If the data is stationary at level then the test will be attempted at first difference and afterward second difference.

Correlation: Correlation test has been applied to identify the multi-collinearity among the variables. The correlation coefficient lies between -1 to 1. If correlation coefficient -1, it means the perfect negative correlation exist between both variables or vice versa. On the other hand, if correlation coefficient is greater than 0.8 it reveals the multi-collinearity between variables.

Co-integration Test: For identifying the long run relationship between Macroeconomic variables and stock returns. For this purpose, we applied the Johansen's co-integration test (Johansen & Juselius, K., 1990). Under Johansen co-integration approach two test statistics can be used i.e. Trace Statistic and Maximum Eigenvalue statistic. The trace test can be formulated as:

$$Trace(r, K) = -T \sum_{i=r+1}^K \ln(1 - \lambda_i) \quad (1)$$

Where r represent the number of co-integrating vectors, k is the number of variables in group, λ_i is the i th largest eigenvalue of the matrix Π , and T is the number of observations in the system. The hypothesis of Trace test is as follows:

H0: The number of distinct co-integrating vector(s) is equal to or less than r

H1: The number of distinct co-integrating vector(s) is more than r

The Maximum Eigenvalue can be formulated as:

$$\lambda_{\max}(r, r+1) = -T \ln(1 - \lambda_{r+1}) \quad (2)$$

The hypothesis of Maximum Eigenvalue test is as follows:

Ho: The Number of co-integrating vector is r

H1: The number of co-integrating vector is r+1

Model

To examine the long run relationship between macroeconomic variables and KSE100 Index, the following econometric model is specified.

$$LINDEX = \beta_0 + \beta_1 LCPI + \beta_2 LM2 + \beta_3 LEXR + \beta_4 LINR + \beta_5 LIIP + \beta_6 LGOLD + \beta_7 LOIL + \beta_8 LM + \beta_9 LX + \beta_{10} LFXR + \beta_{11} FDI + \varepsilon_t$$

Granger Causality: In last the Granger Causality test is applied to establish the short run relationship between stock returns and macroeconomic indicators. This test is proposed by the C. J. Granger in 1969. If the computed value of F Statistic exceeds the critical value, the null hypothesis is rejected at given level of significance. The Granger cause state that the variable can be used to predict each other.

4. Empirical Results:

For identifying data normality various techniques like Kurtosis, Jarque-Bera and Skewness is used. These test check that whether data is normally distributed or show randomness.

Table 3 Descriptive Statistics¹

	CPI	EXR	FDI	FXR	GOLD	IIP	INR	M	M2	OIL	X	INDEX
Mean	146.4	81.34	249.02	14979.0	30359.0	121.27	5.69	2859.6	6121.4	80.28	2823.2	14940.9
Std. Dev.	36.75	16.21	464.47	3100.4	14930.8	29.85	1.91	603.5	2450.1	20.334	3940.01	8061.97
Skewness	-0.19	-0.143	6.438	-0.101	-0.084	2.304	-0.57	-0.207	0.441	0.130	3.903	1.183
Kurtosis	1.697	1.590	50.525	2.477	1.522	7.951	2.55	1.829	1.986	2.416	17.756	3.283
Jarque-Bera	9.869	11.040	12930.7	1.678	11.799	244.06	8.23	8.226	9.640	2.178	1486.35	30.308
Probability	0.007	0.004	0.000	0.432	0.002	0.000	0.01	0.016	0.008	0.336	0.000	0.000

Table 3 depicts the results of Data normality. The results of skewness reveal that Foreign direct investment, Index of industrial production, money supply, Crude Oil prices, Exports volume and Index are positively skewed which means the mean of the observations is more than the median while others negatively skewed. CPI, Exchange Rate, Foreign exchange reserve, gold prices, Interest rate, money supply, imports and oil prices had platykurtic distribution, while foreign direct investment, Index of industrial production and exports had leptokurtic distribution while Stock Index had Mesokurtic distribution.

Jarque-Bera statistic have the null hypothesis that data follow normal distribution. As well as, our results of this test is concerned the null hypothesis of all variables is rejected at 5% level of significance except for Crude oil and foreign exchange reserve. It means except these two indicators all variables show randomness and inefficiency of market.

¹ E-views 8 statistical Package has been employed to analyze the data.

Table 4 Pair wise Pearson Coefficient of Correlation

Correlation	INDEX	CPI	EXR	FDI	FXR	GOLD	IIP	INR	M	M2	OIL	X
INDEX	1.0000											
CPI	0.7247	1.0000										
EXR	0.6856	0.9833	1.0000									
FDI	-0.174	-0.181	-0.197	1.0000								
FXR	-0.037	0.1161	0.0124	-0.019	1.0000							
GOLD	0.5273	0.9086	0.9166	-0.197	0.2373	1.0000						
IIP	0.0394	0.0780	0.0986	-0.046	-0.027	0.1434	1.0000					
INR	-0.021	0.5438	0.5132	0.0411	0.1952	0.5533	0.0247	1.0000				
M	0.6007	0.7767	0.7391	-0.063	0.0975	0.7785	0.0271	0.4806	1.0000			
M2	0.8703	0.9568	0.9403	-0.203	0.0707	0.8488	0.0831	0.3432	0.7726	1.0000		
OIL	0.1002	0.3263	0.2912	0.0241	0.0632	0.4647	0.0585	0.3751	0.6424	0.2624	1.0000	
X	0.6343	0.4423	0.3979	-0.117	0.1604	0.2517	-0.016	0.0003	0.2634	0.5500	-0.233	1.0000

Table 4 represents the correlation coefficient results. It indicates that except foreign exchange reserve, interest rate and foreign direct investment all variables are positively correlated with the Stock Index. Further only money supply crosses the limit of 0.8, indicating that multi-collinearity between these two. Foreign direct investment is negatively correlated with all the variables under consideration except interest rate and oil prices though all correlation co-efficient are weak. CPI also have positive relationship with all indicators except FDI. From the above findings we can conclude that, most of the variables have low correlation coefficient so little chances of multi-collinearity exists.

Table 5 Augmented Dickey Fuller Test

Variables	ADF Statistics			Order of Integration
	Level	First Difference	Second Difference	
Consumer Price Index	-0.558355 [-2.884856]	-4.038899 [-2.884856]	-	I (1)
Exchange Rate	-0.680565 [-2.884477]	-7.067733 [-2.884477]	-	I (1)
Foreign Direct Investment	-11.00233 [-2.884291]	-	-	I (0)
Foreign Exchange Reserve	-1.352829 [-2.884291]	-9.917831 [-2.884477]	-	I (1)
Gold Prices	-1.492914 [-2.884291]	-9.117875 [-2.884477]	-	I (1)
Index of Industrial Production	-11.24068 [-2.884291]	-	-	I (0)
Interest Rate	-2.283849 [-2.884291]	-13.16169 [-2.884477]	-	I (1)
Imports	-1.926477 [-2.884665]	-12.60832 [-2.884665]	-	I (1)
Money Supply	4.906684 [-2.885249]	-2.385750 [-2.886509]	-5.621294 [-2.886509]	I (2)
Crude Oil	-2.797640 [-2.884477]	-8.430682 [-2.884477]	-	I (1)
Exports	-0.675200 [-2.886732]	-10.48658 [-2.886732]	-	I (1)
Stock Index	1.033525 [-2.884477]	-15.81781 [-2.884477]	-	I (1)

[Critical Values at 5% level are in the brackets]

The null hypothesis of unit root is rejected at their level for foreign direct investment and index of industrial production, as their ADF test statistic value is lower than the critical value. It means that FDI and IIP are I (0). Afterward unit root is checked for first difference, the results reported that null hypothesis for all macro-economic indicators is rejected except money supply. It means these variables are I (1). The null hypothesis for money supply is rejected at second difference so it is I (2).

In time series analysis, the selection of lag length is quite important. Different methodologies are used to select the lag length i.e. Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan-Quinn information criterion. We used the Schwarz Information Criterion (SIC) as it suggests the lag length of 1.

Table 6 Results of Johansen Co-integration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Test			Maximum Eigenvalue Test		
		Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.684261	531.0939*	358.7184	0.0000	145.2579*	79.97865	0.0000
At most 1	0.472332	385.8360*	306.8944	0.0000	80.55021*	73.94036	0.0113
At most 2	0.432683	305.2858*	259.0294	0.0001	71.42143*	67.91026	0.0225
At most 3	0.341160	233.8644*	215.1232	0.0045	52.57660	61.80550	0.2899
At most 4	0.331214	181.2878*	175.1715	0.0229	50.68874	55.72819	0.1465
At most 5	0.255539	130.5990	139.2753	0.1434	37.18200	49.58633	0.5115
At most 6	0.185007	93.41703	107.3466	0.2852	25.77652	43.41977	0.8709
At most 7	0.168899	67.64051	79.34145	0.2737	23.31056	37.16359	0.7115
At most 8	0.120608	44.32995	55.24578	0.3162	16.19413	30.81507	0.8363
At most 9	0.098853	28.13581	35.01090	0.2244	13.11499	24.25202	0.6677
At most 10	0.097425	15.02083	18.39771	0.1395	12.91540	17.14769	0.1862
At most 11	0.016571	2.105425	3.841466	0.1468	2.105425	3.841466	0.1468

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Table 6 provides the results of Johansen's co-integration test. The null hypothesis of Trace statistic is rejected that state no co-integrating vector against the alternative hypothesis as the results reveal the 5 co-integration equations at 5% level of significance. However the results of maximum Eigenvalue statistic reveals the 3 co-integration equations. The null hypothesis of Maximum Eigenvalue statistic is also rejected up to at most 2 co-integration equation against the alternative hypothesis of r+1 co-integrating vectors at 5% level of significance. So it can be concluded that system has at least three co-integration relations. Furthermore we can say that there is long run association between Stock Index and selected macroeconomic variables and both of these move together in longer period.

Further inspection of Johansen co-integration depicts the positive and negative association between economic indicators and Index. All variables are in log form except foreign direct investment as it include the negative values and log will not transform the negative value.

Table 7 Results of Co-integration Coefficient

Dependent Variable: INDEX		
Variable	Coefficient	t-Statistic
CPI	79.94576**	1.437630
EXR	-452.0016*	-3.610394
FDI	-0.100431	-0.262097
FXR	-0.194798**	-1.702424
GOLD	-0.196576*	-3.425195
IIP	0.028665	0.197936
INR	-600.1887*	-3.548396
M	-0.350886	-0.507806
M2	5.834165*	13.43529
OIL	14.20221**	1.920951
X	-0.018595	0.066950
Constant	16531.96*	5358.566

To explore the nature of co-integration, we calculate the co-integration coefficients of each independent macroeconomic variables with Stock Index as dependent variable. The findings of Co-integration coefficients are presented in Table 7. The co-integration coefficient equations is present as:

$$LINDEX = 16531.96 + 79.94LCPI + 5.83LM2 - 452LEXR - 600.18LINR + 0.028LIIP - 0.196LGOLD + 14.2LOIL - 0.35LM - 0.018LX - 0.19LFXR - 0.10FDI + \epsilon_t$$

Consumer Price Index reveals the positive relationship with Stock Index. So our results confirm that real assets like share provide hedge against inflation (Fisher 1930). Our results is similar with (Patel, 2012; Parmar, 2013; Venkatraja, 2014; Kumar, 2014; Asmy at el. 2010 and Adam 2008). In Pakistan (Shahbaz at el., 2013) also confirmed this finding but the results of (Imran at el., 2010) and (Arshad at el.,

2008) are insignificant.

The increase in exchange rate means depreciation of local currency against US\$. Pakistan economy is import oriented so the depreciation of local currency will adversely affect the economy. It means that every increase in local currency will ultimately improve the stock index. So the negative relationship with exchange rate and KSE100 Index is experienced. Our results confirmed the findings of (Donatas at el. 2009; Sezgin at el. 2008; Hsing, 2014 and Onneetse at el. 2014).

The Co-integration Coefficient of Foreign Direct Investment with Stock Index is insignificant. It means that FDI do not affect the Index in long run. Our results are similar with (Kumar, 2014) and (Ahmed, 2008) in case of Sensex. However mostly studies found the significant results. Foreign Exchange Reserve depicts the

negative relationship with stock returns at 10% level of significance. Our findings confirm the findings of Onneetse (2014). In Paksitan, Akbar at el. (2012) also found out the similar results. However the findings of Rahman at el. (2009) and Hussain at el. (2012) are contradicts with our findings.

Gold prices also depicts the negative relationship with stock index but the value of coefficient is too much low. The notion that Gold is used as substitute, confirmed from this result but the low coefficient value stated that very minor investors avail this opportunity against stocks. So little influence is received from the Gold Prices. The findings of (Ray, 2012 and Hina at el. 2011) are consistent with our results. However the findings of Patel, (2012) and Deep at el. (2010) were stated that Stock market is heavily influenced by the Gold prices.

The Index of industrial production is positively associated with stock index but the results are insignificant. It means the real economic activity does not push up the Stock index in effective way in Pakistan Scenario. The studies of (Venkatraja, 2014; Quadir, 2012; Filis, 2009) also found the similar results. However some researchers also found the significant results for the relationship of index of industrial production and stock index. (Mohanamani at el. 2014; vashishtha at el. 2013)

The interest rate have highly negative association with stock index in long run. The result confirmed that interest rate represents the opportunity cost to invest the money in another interest bearing instrument. Moreover the decrease in interest rate also decrease the required rate of return and in case of asset valuation process, the decreased required rate of return will increase the value of stock just like the case in Pakistan. The Index is going to towards boom as interest rate decreases (Parphan at el. 2002). For imports and exports negative coefficient is found but the results are statistically insignificant. It means that imports and exports do not have significant influence on the movement of stock index. The findings of (Hsieh, 2013; Kumar, 2014; Patel, 2012) are consistent with our results. However many researchers also found the significant results for their studies (Faruque, 2011; Sohail 2012).

For money supply, our results are consistent with the logic that increase in money supply also stimulate the cash flows in economic activity (corporate earnings effect) will resultantly increase the stock prices. Our findings are similar with (Naik, 2013; Ramin at el. 2004). Contrary to our results negative relationship also found between these two variables. (R.H., 1991; Kumar, 2014; Asmy at el. 2010 and Onneetse at el. 2014). Crude oil shows postive association with stock returns. The results are in contradiction with our hypothesis and theory. The following studies confirmed our results Kilian, (2007) , Patel, (2012) and Parmar, (2013). Researchers found the results in contradiction of our findings i.e. (Filis, 2009; Nandha at el., 2008; Miller at el., 2009 and Davis at el., 2008).

Table 8 Results of Granger Causality Test

Null Hypothesis:	Observations	F-Statistic	Probability	Decision
EXR does not Granger Cause INDEX	121	3.53661	0.0019	Reject
INDEX does not Granger Cause FDI	121	3.12128	0.0049	Reject
INDEX does not Granger Cause FXR	121	4.30719	0.0003	Reject
INDEX does not Granger Cause INR	121	2.41363	0.0248	Reject
OIL does not Granger Cause INDEX	121	2.71596	0.0125	Reject
INDEX does not Granger Cause OIL	121	2.77601	0.0109	Reject
INDEX does not Granger Cause X	121	2.70443	0.0128	Reject

Pair wise Granger Causality test is applied among all the variables to determine the direction of causality. The lag length is selected under Schwarz Information Criterion (SIC) that is 7. The similar test is applied by the (Patel, 2012) and (Mohanamani at el., 2014). We find different indicators are cause of Stock Index. We also find the causality runs from Stock Index to various indicators. If causality exist between any of these variables, it means that these variables can be used to predict other variable. Only rejected null hypothesis are presented in Table 8. We find various unidirectional causalities, only bidirectional causality finds between oil and Index.

5. Limitation and Future Direction:

The influencing factors of index do not include only the economic indicators but also the political conditions, law and order situations, economic policies, Govt. behaviors, regulatory bodies working, international market performance, world economic slumps and speculative activities. These individual factors have their own unit and method of measures. Pakistan is an underdeveloped economy, so these factors are undocumented. The Index fluctuate on daily basis, so the variables that influence the index are needed to be documented on daily basis which required too much attention. The future research avenues after these findings include using weekly or daily basis data whatsoever is possible for economic indicators and impact of indicators on individual sector indices. Moreover various research approaches like ARDL approach, ARIMA model is used to identify the relationship using weekly or daily observations. The determinants of each indicator is also needed to be explored in Pakistan's environments like FDI determinants etc.

6. Conclusion and Implication of Study:

This study test the relationship between 11 macroeconomic variables and stock index. The Johansen's Co-integration test, Granger Causality test and Correlations test are used for empirical purposes. The time period of study range from January 2005 to August 2015. The results stated that positive co-integration between index and CPI, Money supply and oil prices. The negative long run relationship is found between Stock index and Exchange Rate, Foreign exchange reserve, Gold prices and Interest rate. However the results of Foreign Direct Investment, index of industrial production, imports and Exports are found insignificant. The Granger causality results states that causality runs from exchange rate to Index to FDI, Foreign exchange reserve, interest rate and exports. The only bidirectional causality is found between Crude oil prices and Index. . To conclude, Stock index shows short and long run relationship with macroeconomic indicators and these can be used to predict each other. The study reveals some important policy implications. The CPI needs to be controlled by the regulatory authority as it have significant coefficient to project Index. Exchange rate empirical results also encourage the regulatory body like SBP to maintain the healthy exchange rate to control the uneven fluctuations in the stock Indices. Moreover Gold Prices and oil prices also have influence on the stock index. In Pakistan economy, Gold and Oil are imported and their prices are determined in the international markets but these can be controlled by employing import duties and import taxes. Interest rate needs to reduce as it increase the opportunity for investors to invest their surplus money in banks and other fixed interest based securities. So regulatory bodies need to keep eyes on this important factor. The Index represents the economic conditions in international financial markets to attract foreign investments. So it needs to keep growing to boost the foreign investment in countries like Pakistan. In last money supply is also identified as significant influencing factor. So it needs to manage according to maintain the healthy index.

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