

DETERMINANTS OF the STOCK MARKET INDEX IN PAKISTAN – A CASE STUDY OF THE KARACHI STOCK EXCHANGE INDEX (KSE 100) FROM 2000 TO 2014

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Abstract

This paper explores the causal links between nine fundamental variables and stock prices in Pakistan's Karachi Stock Exchange index – KSE 100. It contributes significantly to the study of the stock exchange performance in Pakistan since the findings of prior studies were mostly divergent. Monthly data from January 2000 to April 2014 are used to analyze the impacts of the Industrial Production Index, the money supply, the Pak-US interest rate differential, the real effective exchange rate, the balance of trade, the expected inflation, the government debt to GDP, the inflow of portfolio investment, and the earning yield on the KSE 100 Index. Multiple regression analysis and Granger Causality tests under VAR are employed for this purpose. The findings of this study have identified the Pakistan-US interest rate differential, the real effective exchange rate, the balance of trade, the expected inflation, the government debt to GDP, and the earning yield as significant predictors of the stock index. The KSE 100 Index is found to be a leading indicator for the M2 money supply growth in Pakistan. The results of this study imply that policy makers play a crucial role in Pakistan's stock market through the manipulation of fundamental variables.

Keywords: KSE 100 Index; Fundamental Analysis; Stock Market; Industrial Production; Money Supply; Interest Rate Differential; REER; Balance of Trade; Expected Inflation; Government Debt to GDP; Portfolio Investment; Earning Yield.

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1. INTRODUCTION

A well-organized stock market serves to turn the savings of the economy into investment capital, thereby enhancing economic activity. Consequently, stock exchange performance, especially the predictability of returns, has drawn wide attention in the study of stock markets. Previous studies on stock market performance postulated that any fluctuation in the stock market can be considered a reflection of the impact of macroeconomic activities (Ibrahim, 1999; Chakravarty, 2005; Adjasi and Biekpe, 2006). Considering the vital role of stock markets in the determination of economic vitality of a country, it is imperative to study the impact of fundamental indicators on stock index in Pakistan.

Prior studies conducted in Pakistan did not reach concurring results regarding the causal links between fundamental indicators and stock prices (Suhail and Hussain, 2009; Ali *et al.*, 2010; Zafar, 2013); hence, it necessitates further examination. This study includes some variables not covered by the previous studies, and uses available data from the most recent years. Since this study measures the influence of fundamental variables on stock market prices, it can be of assistance to investors and policy makers in Pakistan for decision-making. The findings of this research could be useful to domestic and foreign investors as well as portfolio managers in terms of risk management by pinpointing the factors significant in causing stock price fluctuation.

The KSE 100 Index, launched on November 1st, 1991, is generally acknowledged as an accurate indicator of the stock market conditions in Pakistan. In recent years, the stock market witnessed three major

financial crises, crashing first in March 2005, then in the second quarter of 2006, and finally in 2008-09, the last being the most severe. However, in the financial year 2013-14, the KSE 100 Index rose by 38 percent, which reflects investors' expectation of a positive economic outlook. Over the years, the government of Pakistan has introduced several reforms to encourage stock market development, including the investor moratorium introduced in January 2013, which permits foreigners to invest in the Pakistani stock market with no investigation regarding the source of their funds. In addition, privatization policies of the newly elected government have served to stimulate stock market investment.

Stock market investors use two main analysis forms to make investment decisions; these are the fundamental and technical analyses. Both analysis tools are aimed at predicting shifts in the supply and demand of equities (Turner, 2000). According to Ritchie (1996), fundamental analysis reflects the historical performance of the economy, the industry, and individual firms. It uses intrinsic information about an asset to forecast potential asset price fluctuations (Bodie *et al.*, 2008). Fundamental analysts believe that markets are weak-form efficient and therefore will, on their own, adjust for any difference between fair value and the current stock price. Investors can earn profits by buying the mispriced stock and selling it when the market adjusts the price to the fair value. Fundamental economic variables included in this study are the Industrial Production Index, the M2 money supply, the Pakistan-US interest rate differential, the real effective exchange rate, the balance of trade, the expected inflation, the government debt to GDP, and the inflow of portfolio investment.

In addition, the earning yield of the KSE 100 Index has been included as an indicator of fundamental ratio analysis.

2. OBJECTIVE OF THE STUDY

The purpose of this research is to study the determinants of stock index prices in Pakistan. The researcher aims to determine:

1. The causal links and strength of association between fundamental variables and the KSE 100 Index,
2. Whether stock exchange performance in Pakistan is a valid leading indicator of the country's economic conditions.

Therefore, this research sets out to investigate whether stock exchange performance in Pakistan reflects the economic conditions of the country and whether fundamental variables can be used to predict stock prices. This study will be based on the efficient market hypothesis which argues that stock index tends to reflect changes in fundamental macroeconomic factors (Fama, 1970).

3. LITERATURE REVIEW

An array of studies has been carried out on stock returns and their potential predictors; notable among these are the ones that argue for the dynamic impact of macroeconomic factors on stock prices.

Yoon and Miller (2003) explored the functional relationships between earnings, cash flows and stock market returns in Korea using regression analysis on data from 1995 to 1999. The study found both cash flows and earnings to be statistically significant positive

determinants of stock prices in Korea; however, the impact of earnings was superior.

Ratanapakorn and Sharma (2007) explored the short and long-term linkage between the US stock market (S&P 500 Index) and six macroeconomic indicators, namely the long-term interest rate, the short-term interest rate, the money supply, inflation, the industrial production, and the exchange rate. Data used for this study ranges from January 1975 to April 1999. The Granger Causality test applied for this research indicated a negative relationship between long-term interest rate and stock prices, and a positive relationship between stock prices and the other five variables including the short-term interest rate.

Ali *et al.* (2010) evaluated the impact of four macroeconomic indicators on stock exchange prices in Pakistan from June 1990 to December 2008. Inflation, exchange rate, balance of trade, and index of industrial production were studied as determinants of the stock price movement in the Karachi Stock Exchange (KSE) using the unit root Augmented Dickey Fuller test, Johansen's co-integration and the Granger causality test. The research found that stock prices in Pakistan do not portray the macroeconomic health of the country and that no causal relationship exists between macroeconomic variables and stock exchange prices in Pakistan.

Kim and Yang (2011) examined the impact of portfolio investment inflows on stock market indices of South Korea, Thailand, Malaysia, Indonesia, and the Philippines by applying the panel vector autoregression model (VAR) on quarterly data from 1999 to 2006. Empirical results from the study suggested that rising inflows of portfolio investment in these selected

Asian economies have an instantaneous positive impact on stock prices. The study reinforced the importance of capital flows in determining stock market prices.

Tan (2011) studied the relationship between macroeconomic variables and stock market returns in China from 2005 to 2009 using the multiple regression analysis. Results from the study illustrated that foreign exchange reserves, the gold price, and the consumer confidence index are the three most significant positive determinants of stock returns in the Shenzhen stock exchange. Export rate, import rate, crude oil price, inflation, money supply, and industrial production index were found to be insignificant predictors.

Al-Tamimi *et al.* (2011) studied the factors affecting stock index prices in the UAE using data from 1990 to 2005. Multiple regression analysis was used to study the impact of earnings per share (EPS), the dividend per share (DPS), the oil price, the GDP, the consumer price index (CPI), the interest rate, and the M1 money supply on equity prices. Results from the study showed a significant positive impact of the EPS and a significant negative impact of the CPI on stock prices. The coefficients of money supply, the GDP, and the interest rate were statistically insignificant. Oil price and DPS were dropped from the regression model due to multicollinearity issues.

Hsing and Hseih (2012) applied the GARCH model to test the impact of macroeconomic factors on stock market prices in Poland on quarterly data from 2000 to 2010. They found that stock returns in Poland are positively affected by industrial production and foreign stock market, and negatively impacted by government borrowing, real interest rate, expected inflation rate,

government bond yield, and the nominal effective exchange rate. The money supply (M2) to the GDP ratio was revealed to have a quadratic relationship with stock returns, i.e. the relationship was positive (negative) when the ratio was less (greater) than 43.68 percent.

Basci and Karaca (2012) used vector autoregression (VAR) on monthly data from 1996 to 2011 to examine the influence of gold price, exchange rate, exports, and imports on the stock price movement in Turkey. The researchers found all four variables to be significant determinants of stock index price fluctuations.

The Literature review of the aforementioned previous studies helps form the basis for this study's conceptual framework. In order to build a relevant eclectic model, this study has adopted important fundamental determinants studied in prior researches on stock index in a diverse range of developed and developing economies. Figure 1 illustrates the conceptual framework based on the hypotheses of this study.

4. RESEARCH METHODOLOGY

This study examines the causal links among the Karachi Stock Exchange Index (KSE100), the industrial production, the money supply, the interest rate differential, the exchange rate, the balance of trade, the expected inflation, the government debt to the GDP, the inflow of portfolio investment, and the earning yield. First of all, the Augmented Dickey Fuller (ADF) test is used to check for stationarity of time series data. Secondly, a vector autoregression (VAR) model is fitted to the data to conduct tests of the Granger Causality between the KSE 100 Index and the independent variables. Finally, the multiple

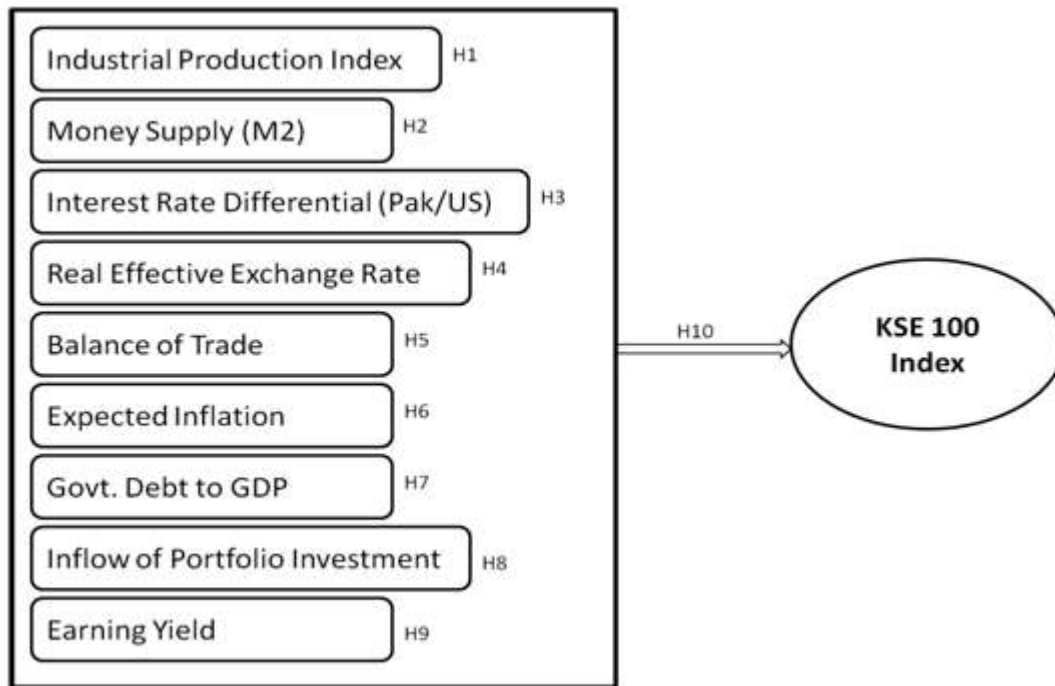


Figure 1 – Conceptual Framework

regression analysis is used to determine the relationship between fundamental variables and the KSE 100 Index.

In this study, the industrial production index has been used as a proxy for real output in Pakistan since data for GDP is not available at monthly frequency. Also, the data for the government debt to the GDP and the inflow of portfolio investment for Pakistan are only available at an annual and quarterly frequency, respectively. Therefore, they have been interpolated into monthly data using the Cubic Spline technique. Hurn and Becker (2004) stated that the Cubic Spline interpolation is a widely accepted method to estimate missing observations. According to Ajao *et al.* (2012), Cubic Spline interpolation is a robust method to convert macroeconomic data into a higher frequency while maintaining efficiency and reliability.

- Data Collection

Monthly time series data have been collected from January 2000 to April 2014 in order to explore the links between the independent variables and the KSE 100 Index. The main sources of secondary data for this study are the KSE website, the World Bank database, the International Financial Statistics (IFS), and monthly bulletins published by the State Bank of Pakistan.

- Description of Variables

This study considers nine independent variables used in fundamental analysis and evaluates their link with the dependent variable, the KSE 100 Index. The Independent variables included are industrial production index, money supply, interest rate differential, real effective exchange rate, balance of trade, expected inflation, government debt to the

GDP, inflow of portfolio investment, and earning yield where,

- IPI refers to the industrial production index,
- MS refers to the M2 money supply,
- INTD refers to the Pakistan-US interest rate differential,
- REER refers to the real effective exchange rate,
- BOT refers to the balance of trade,
- EINF refers to the expected inflation rate,
- GDEBT refers to the government debt to the GDP ratio,
- PORT refers to the net inflow of portfolio investment, and
- EY refers to the earning yield of the KSE 100 Index.

Since data for the government debt to the GDP and the inflow of portfolio investment for Pakistan are not published on a monthly basis and are only available at an annual and quarterly frequency respectively, they have been interpolated into monthly data using the Cubic Spline technique. Cubic Spline interpolation is a process which fits a series of cubic polynomials between data points in such a way as to generate a smooth continuous curve (McKinley and Levine, 1998). Hurn and Becker (2004) stated that Cubic Spline interpolation is a widely accepted method to estimate missing observations.

- Hypotheses

Based on the conceptual framework, the following hypothesis statements have been developed to examine the relationships between the independent variables and the stock market index in Pakistan.

H1_a: There is a statistically significant impact of IPI on KSE 100 Index.

H2_a: There is a statistically significant impact of MS on KSE 100 Index.

H3_a: There is a statistically significant impact of INTD on KSE 100 Index.

H4_a: There is a statistically significant impact of REER on KSE 100 Index.

H5_a: There is a statistically significant impact of BOT on KSE 100 Index.

H6_a: There is a statistically significant impact of EINF on KSE 100 Index.

H7_a: There is a statistically significant impact of GDEBT on KSE 100 Index.

H8_a: There is a statistically significant impact of PORT on KSE 100 Index.

H9_a: There is a statistically significant impact of EY on KSE 100 Index.

H10_a: There is a statistically significant impact of hypothesized factors on KSE 100 Index.

5. RESULTS AND DISCUSSION

- Descriptive Statistics

The following descriptive statistics provide the mean, standard deviation, minimum and maximum values, skewness, and kurtosis for each variable. There are 172 monthly observations (N) for each variable. In terms of skewness, values between +1 and -1 indicate that the data are symmetrical (Rafay et al., 2014); where this is not the case, the variables are log transformed. The Augmented Dickey Fuller (ADF) test is applied to check stationarity; where time series data are found to be non-stationary at level, they are transformed into stationary data via differencing.

Table 1 - Descriptive Statistics of Variables

	KSE100	IPI	MS	INTD	REER	BOT	EINF	GDEBT	PORT	EY
Mean	9156.377	88.0487	14.6312	8.998430	98.44041	-7.56E+10	72.3152	67.8079	60634930	12.0656
Median	9267.340	95.7000	15.2950	5.140000	98.32000	-6.92E+10	60.1950	63.4000	26673957	12.2800
Maximum	28912.98	133.770	20.5900	30.00000	111.2100	6.75E+09	133.800	87.9000	1.04E+09	17.0000
Minimum	1133.440	43.4500	5.57000	1.440000	89.75000	-2.19E+11	41.2500	54.7200	-2.66E+08	2.47000
Std. Dev.	6243.309	22.2063	3.66614	8.018159	4.328645	6.14E+10	29.4466	10.3091	1.82E+08	2.98668
Skewness	0.799167	-0.46565	-0.62892	0.974770	0.300020	-0.372089	0.72409	0.70029	2.962391	-0.90235
Kurtosis	3.514452	2.24756	2.71613	2.946496	2.540054	1.937219	2.07894	1.99966	13.95035	4.07354

- Augmented Dickey Fuller Test

While analyzing time series data, it is crucial to ensure that all included data are stationary; if this is not the case, the empirical results can show a significant relationship between variables where none exists in actuality. The ADF test is applied to check stationarity of data for use in Multiple Regression and Granger Causality under Vector Autoregression analyses so as to avoid spurious results. Table 2 illustrates the results of the ADF testing. Table 2 indicates that BOT and LPORT are stationary at level, KSE100, IPI, MS, INTD, REER, GDEBT, and DEY are stationary at first difference, and EINF is stationary at second difference.

- Regression Analysis

Multiple linear regression is used when we need to test the predictive power of two or more independent variables to explain changes in the dependent variable (Gujarati and Porter, 2009). Multiple regression analysis has been used in numerous previous studies to test the link between the stock market and macroeconomic variables (Chen et al., 1986; Yoon and Miller, 2003; Tan, 2011; Al-Tamimi *et al.*, 2011). Using the results from the ADF unit root testing, this study uses the following modified model for regression analysis.

$$DKSE100 = \alpha + \beta_1 DIPI + \beta_2 DMS + \beta_3 DINTD + \beta_4 DREER + \beta_5 DBOT + \beta_6 DDEINF + \beta_7 DGDEBT + \beta_8 DPORT + \beta_9 DEY + e$$

D and DD represent first and second differences respectively.

Table 2 - Investigation of Unit Root at Level, 1st difference, & 2nd difference

Variables	At Level			At First Difference			At Second Difference		
	ADF test	Critical Value	Prob.	ADF test	Critical Value	Prob.	ADF test	Critical Value	Prob.
KSE100	3.61	-1.94	0.99	-12.36	-3.44	0.00	-	-	-
IPI	2.36	-1.94	0.99	-5.12	-2.87	0.00	-	-	-
MS	-2.80	-2.88	0.06	-15.14	-1.94	0.00	-	-	-
INTD	-0.60	-1.94	0.46	-12.09	-1.94	0.00	-	-	-
REER	-3.11	-3.44	0.11	-10.05	-1.94	0.00	-	-	-
BOT	-7.99	-3.44	0.00	-	-	-	-	-	-
EINF	-2.93	-3.44	0.16	-0.02	-1.94	0.67	-6.35	-1.94	0.00
GDEBT	-1.15	-1.94	0.23	-3.46	-1.94	0.00	-	-	-
LPORT	-3.12	-2.87	0.02	-	-	-	-	-	-
EY	-2.77	-2.87	0.07	-13.87	-1.94	0.00	-	-	-

The above model is consistent with that used by Rafay *et al.* (2014), who used transformed symmetrical data for regression analysis. The Eviews output for the regression model is illustrated in Table 3.

Table 3 shows the adjusted R² to be 0.18, which indicates that the fundamental variables included in this model explain 18 percent of the variation in the KSE 100 Index. Statistical significance of the model is 0.000; this means that the regression model is significant at the 1% significance level. From the results of the

multiple regression, the derived equation can be written as:

$$\begin{aligned} DKSE100 = & -126.47DINTD + \\ & 92.02DREER - 2410000000BOT \\ & - 324.8DGDEBT - 125.29DEY \end{aligned}$$

The results imply that interest rate differential, real effective exchange rate, balance of trade, government debt to GDP, and earning yield have a significant impact on the KSE 100 Index, while industrial production, money supply, expected inflation,

Table 3 - Regression Output (OLS)

Dependent Variable: DKSE100

Method: Least Squares

Sample (adjusted): 2000M03 2014M04

Included observations: 170 after adjustments

White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	858.8567	2315.218	0.370962	0.7112
DIPI	0.629983	5.636411	0.111770	0.9111
DMS	16.31025	39.41883	0.413768	0.6796
DINTD	-126.4742	47.56302	-2.659086	0.0086
DREER	92.02224	40.83127	2.253720	0.0256
BOT	-2.41E-09	1.12E-09	-2.155676	0.0326
DDEINF	26.24024	1099.959	0.023856	0.9810
DGDEBT	-324.8002	147.1078	-2.207905	0.0287
LPORT	-107.0518	275.5223	-0.388541	0.6981
DEY	-125.2916	46.83315	-2.675275	0.0082
R-squared	0.223738	Mean dependent var	158.7199	
Adjusted R-squared	0.180074	S.D. dependent var	730.6979	
S.E. of regression	661.6454	Akaike info criterion	15.88436	
Sum squared resid	70043945	Schwarz criterion	16.06882	
Log likelihood	-1340.171	Hannan-Quinn criter.	15.95921	
F-statistic	5.124004	Durbin-Watson stat	2.057236	
Prob(F-statistic)	0.000004			

and inflow of portfolio investment are statistically insignificant determinants at the 5% significance level.

One unit increase in DINTD would cause the KSE 100 Index to decline by 126.47 points. Therefore, before making any policy changes, the State Bank of Pakistan must be mindful of the effect of the monetary policy on the stock market. Keeping a relatively low interest rate would ensure robustness in the KSE 100 Index. The results also indicate that an increase of one unit in DREER would cause an incline in the KSE 100 Index by 92.02 points. The short-run positive impact of the real effective exchange rate on the KSE 100 Index necessitates careful management of the exchange rate in Pakistan, taking into account the elasticities of imports and exports in order

to achieve stock market stability. A robust monetary policy can be used to effectively reduce fluctuations in the exchange rate. The Balance of trade is found to have a small significant negative impact on the KSE 100 Index; an increase of one unit in BOT would cause the KSE 100 Index to decline by less than one point. Therefore, Pakistan's monetary authorities need to control domestic inflation in order to stabilize the balance of trade. The Government debt to the GDP is found to have a significant negative impact on the KSE 100 Index with a coefficient of -324.8; an increase of one unit in DGDEBT would cause the KSE 100 Index to decline by 324.8 points. Based on this result, it is recommended that instead of increasing the budget deficit, the government of Pakistan could adopt privatization policies

to promote efficient and financially sound businesses. In addition, the earning yield is also found to have a significant impact on the KSE 100 Index; an increase of one unit in the earning yield would cause the KSE 100 Index to decline by 125.29 points. This result conflicts with the hypothesis of this study; this could be due to overvaluation in the stock index, i.e. the earning yields higher than the long-term interest rate; in such a situation investors expect stock prices to fall in the near future and sell their stocks to protect their gains.

- Granger Causality under VAR

Granger Causality is a test to verify whether one time series can be used to predict changes in another. Multivariate Granger Causality is usually tested by fitting a vector autoregressive model (VAR) to the time series. The VAR model was introduced by Sims (1980) to test the causality and interdependencies between key economic variables. Thornton and Batten (1984), and Liew (2004) found the Final Prediction Error (FPE) to be a superior criterion for lag

Table 4 - Results of Granger Causality Testing under VAR

Variables	Alternative Hypothesis	Prob.	Results
IPI	DIPI \rightarrow DKSE100	0.1534	Independent
	DKSE100 \rightarrow DIPI	0.7615	
MS	DMS \rightarrow DKSE100	0.1896	Unidirectional
	DKSE100 \rightarrow DMS	0.0236***	
INTD	DINTD \rightarrow DKSE100	0.1800	Independent
	DKSE100 \rightarrow DINTD	0.8142	
REER	DREER \rightarrow DKSE100	0.4569	Independent
	DKSE100 \rightarrow DREER	0.2632	
BOT	BOT \rightarrow DKSE100	0.0810**	Unidirectional
	DKSE100 \rightarrow BOT	0.7915	
EINF	DDEINF \rightarrow DKSE100	0.0590**	Unidirectional
	DKSE100 \rightarrow DDEINF	0.2168	
GDEBT	DGDEBT \rightarrow DKSE100	0.0156***	Unidirectional
	DKSE100 \rightarrow DGDEBT	0.4418	
PORT	LPORT \rightarrow DKSE100	0.1220	Independent
	DKSE100 \rightarrow LPORT	0.4928	
EY	DEY \rightarrow DKSE100	0.7386	Independent
	DKSE100 \rightarrow DEY	0.7130	

selection. Using the FPE optimal lag order of 3, the following VAR model is estimated.

$$V(t) = \sum_{T=1}^3 A_T KSE100(t-T) + \varepsilon(t)$$

Where, $\varepsilon(t)$ is a white Gaussian random vector. A time series V_i Granger causes the KSE 100 Index if one or more elements $A_T(j, i)$ for $T = 1, \dots, 3$ are significantly greater than zero in absolute terms. Results of Granger Causality show the relationship between two time series to be unidirectional, bidirectional, or independent (Gujarati and Porter, 2009). For interpretation, if the probability value is less than the significance level of 5% or 10%, we reject the null hypothesis, which means that variables have a significant causal relationship.

Results of Table 4 indicate that IPI, INTD, REER, PORT, and EY have no statistically significant causal link with the KSE 100 Index. This result is consistent with Ali *et al.* (2010), Al-Tamimi *et al.* (2011), Scott and Ovuefeyen (2013), and Lamont (1998). Unidirectional links were discovered among MS, BOT, EINF, GDEBT, and the KSE 100 Index. These findings are supported by the results of Basci and Karaca (2012), Hsing (2011), and Ardagna (2009).

The Balance of trade was found to have a negative impact on the KSE 100 Index in both the short and long runs. This means that an increase in Pakistan's balance of trade would reduce stock prices. Therefore, Pakistan's government could encourage foreign trade and increase the openness of the economy in order to increase opportunities for exporting companies. In doing so, the profitability of the exporting firms would increase, thus leading to an increase in equity prices. A high inflation

rate impedes high-cost investment and export competitiveness. Since this study found evidence to support a long-run negative causality from expected inflation to the KSE 100 Index, volatility in the KSE 100 Index can be minimized if inflation expectations are low. Consequently, appropriate measures need to be taken by Pakistan's monetary authorities to stabilize inflation. The Government debt to the GDP was found to have a negative impact on the KSE 100 Index in both the short and long runs; this implies that an incline in the government debt to the GDP ratio would cause the KSE 100 Index to decline. A privatization policy could provide the government with much needed finances to pay off internal and external debts.

6. CONCLUSION AND RECOMMENDATIONS

This study aimed to explore whether fundamental variables have causal links with the Karachi Stock Exchange index. Secondary data from January 2000 to April 2014 were used in this study at a monthly frequency for a total of 172 observations. Using Granger Causality tests under VAR, this study found that the balance of trade, the expected inflation and the government debt to the GDP have a significant impact on the KSE 100 Index. However, the impacts of industrial production index, money supply, interest rate differential, real effective exchange rate, inflow of portfolio investment, and the earning yield were found to be statistically insignificant. In addition, results from Granger Causality indicated that KSE 100 Index can be used as a leading indicator for the M2 money supply, but not for any of the other variables in the model. Using multiple regression analysis, it was affirmed that the fundamental variables included

in this study's model have a significant impact on the KSE 100 Index. Further, results from multiple regression analysis implied that the interest rate differential, the real effective exchange rate, the balance of trade, the government debt to GDP, and the earning yield impact the KSE 100 Index in the short run. Combining the results from both statistical techniques, we find that balance of trade and government debt to GDP affect stock prices in both the short and long-run while expected inflation only affects stock prices in the long run. Interest rate differential, real effective exchange rate, and earning yield affect stock prices in the short run but not in the long run. Here, the short-run conclusions are derived from the findings of multiple regression analysis, while the long-run conclusions are derived from the findings of Granger Causality under VAR. In conclusion, the results of this study imply that policy makers play a crucial role in Pakistan's stock market through manipulation of fundamental variables.

It is recommended that future researches focus on other independent variables not included in this study such as the role of mutual funds, long-term bonds, derivatives, foreign exchange reserves, dividend policy, unemployment rate, and global prices of commodities such as oil and gold. The Consumer Confidence Index (CCI) was launched in Pakistan in 2012; once adequate amounts of data are available, future studies can test the impact of fluctuations in the CCI on the KSE 100 Index. Further, plans are in motion to launch separate indices for different sectors of the Karachi Stock Exchange; it would be imperative to test the impacts of fundamental variables on individual sectors to check how the impacts differ from sector to sector. The stock market index is ever-

changing and information on index values is now available in real time; therefore, it is suggested that future studies can conduct analyses based on daily or weekly data in order to get more reliable results. Additionally, it would be interesting to test and compare the effects of fundamental variables on other developing countries in South Asia, such as India, Bangladesh, and Nepal.

REFERENCES

- Adjasi, C. K., & Biekpe, N. B. (2006). Stock market development and economic growth: the case of selected African countries. *African Development Review*, 18(1), 144-161.
- Ajao, I.O., Ibraheem, A.G., Ayoola, F.J. (2012). Cubic Spline Interpolation: A Robust Method of Disaggregating Annual Data to Quarterly Series. *Journal of Physical Sciences and Environmental Safety*, 2(1), 1-8.
- Ali, I., Rehman, K. U., Yilmaz, A. K., Khan, M. A., & Afzal, H. (2010). Causal relationship between macro-economic indicators and stock exchange prices in Pakistan. *African Journal of Business Management*, 4(3), 312-319.
- Al-Tamimi, H. A. H., Alwan, A. A., & Abdel Rahman, A. A. (2011). Factors affecting stock prices in the UAE financial markets. *Journal of Transnational Management*, 16(1), 3-19.
- Ardagna, S. (2009). Financial markets' behavior around episodes of large changes in the fiscal stance. *European Economic Review*, 53(1), 37-55.
- Basci, E. S., & Karaca, S. S. (2012). The Determinants of Stock Market Index: VAR Approach to Turkish Stock Market.

- International Journal of Economics and Financial Issues*, 3(1), 163-171.
- Bodie, Z., Kane, A., & Marcus, A. J. (2008). *Investments*. McGraw-Hill Education.
- Chakravarty, S. (2005). Stock market and macroeconomic behavior in India. *Institute of Economic Growth, Delhi*.
- Chen, N. F., Roll, R., and Ross, S. A. (1986). Economic forces and the stock market. *Journal of Business*, 383-403.
- Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, 25(2), 383-417.
- Gujarati, D. and Porter, D.C. (2009). *Basic Econometrics*. New York: McGraw-Hill Irwin.
- Hsing, Y. (2011). Macroeconomic Determinants of the Stock Market Index and Policy Implications: The Case of a Central European Country. *Eurasian Journal of Business and Economics*, 4(7), 1-11.
- Hsing, Y., & Hsieh, W. J. (2012). Impacts of macroeconomic variables on the stock market index in Poland: new evidence. *Journal of Business Economics and Management*, 13(2), 334-343.
- Hurn, S., & Becker, R. (2004). *Contemporary Issues in Economics and Econometrics: Theory and Application*. Cornwall: Edward Elgar Publishing.
- Ibrahim, M. (1999). Macroeconomic variables and stock prices in Malaysia: an empirical analysis. *Asian Economic Journal*, 13(2), 219-231.
- Kim, S., & Yang, D. Y. (2011). The impact of capital inflows on asset prices in emerging Asian economies: is too much money chasing too little good?. *Open Economies Review*, 22(2), 293-315.
- Lamont, O. (1998). Earnings and expected returns. *The Journal of Finance*, 53(5), 1563-1587.
- Liew, V. K. S. (2004). Which lag length selection criteria should we employ?. *Economics Bulletin*, 3(33), 1-9.
- McKinley, S., & Levine, M. (1998). Cubic Spline Interpolation. *College of the Redwoods*, 45, 1049-1060.
- Rafay, A., Naz, F., and Rubab, S. (2014). Causal Relationship between Macroeconomic Variables: Evidence from Developing Economy. *Journal of Contemporary Issues in Business Research*, 3(2), 88-99.
- Ratanapakorn, O., & Sharma, S. C. (2007). Dynamic analysis between the US stock returns and the macroeconomic variables. *Applied Financial Economics*, 17(5), 369-377.
- Ritchie, J. C. (1996). *Fundamental analysis: A back-to-the-basics investment guide to selecting quality stocks*. Irwin Professional Publishing.
- Scott, A. O., & Ovuefeyen, E. J. (2013). Foreign Financial Resources Inflows and Stock Market Development: Empirical Evidence from Nigeria and Ghana. *Research Journal of Finance and Accounting*, 4(9), 43-49.
- Sims, C. A. (1980). Macroeconomics and reality. *Econometrica: Journal of the Econometric Society*, 1-48.
- Sohail, N., and Hussain, Z. (2009). Long-Run and Short-Run Relationship between Macroeconomic Variables and Stock Prices in Pakistan: The Case of Lahore Stock Exchange. *Pakistan Economic and Social Review*, 183-198.

- Tan, R. (2011). Relationship between Stock Returns and Macroeconomic Variables: A study of Beverage and Food companies listed on the Shenzhen Stock Exchange, China. *AU-GSB e-Journal*, 4(2), 121-131.
- Thornton, D. L., & Batten, D. S. (1984). Lag length selection and Granger causality. *Federal Reserve Bank of St. Louis Working Paper Series*, (1984-001).
- Turner, T. (2000). *A Beginner's Guide to Day Trading Online*. Adams Media.
- Yoon, S. S., & Miller, G. (2003). The Functional Relationships among Earnings, Cash Flows and Stock Returns in Korea. *Review of Accounting and Finance*, 2(1), 40-58.
- Zafar, M. (2013). Determinants of stock market performance in Pakistan. *Journal of Contemporary Research in Business*, 4(9), 1017-1026.