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Stock Prices and Inflation: A Case Study of Pakistan

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Abstract

This manuscript inspects connection among inflation and stock prices in Pakistan. The observation period ranges from January, 2005 to December, 2010 have been taken from economic survey of Pakistan. The VAR is employed to locate and breakdown the friendship between dependent and independent variables. The judgment reveals that inflation is influenced negatively by pressure of stock prices. The tight monetary policy can keep the inflation at low level. Consequently investors would be certain about their returns from securities and stock prices will not be adversely affected.

1. INTRODUCTION

The formal stock exchange market came into this world in 1602. The buyers and sellers sale out and purchase shares and securities in the stock market. So in this connection, market operations are improved in such a way investors reduce transaction fee, reduce interest payments and create good mechanism in administration. It executes several tasks to encourage the economic growth, to create prosperity, to provide good atmosphere and to improve economy of Pakistan.

This study finds the relationship between stock prices and inflation. However there are number of factors which affect stock prices and inflation. Hence, findings and results of this study will help the banking sector, government of Pakistan and other policy makers to improve or revise their strategies human beings.

This study focuses on stock prices and inflation in Pakistan. Relatively, there is little published research on stock prices and their outcomes. As well as, only few studies have addressed the banking industry. On the other hand, the impact of stock prices on organizational performance has emerged as the dominant research issue in the stock exchange market. What are the outcomes of stock prices and inflation? 2. How does inflation impact on stock prices? Therefore, to achieve research objectives, based on the facts mentioned above, in this study attempts to find solution for.

1. To investigate significant and nature of the affiliation among stock prices and inflation
2. To find the tendency of inflation and stock prices in Pakistan.

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1.1 Nomenclature of the SWOT

Section 2 presents the overview of the literature. This episode uncovers the affiliation among stock prices and inflation. The trends of stock prices and inflation in Pakistan are presented in section 3. The theoretical outline of the research is presented in episode in section 4. Section 5 explains the concept of research of method and offers the pragmatic consequences of inflation on stock prices in Pakistan.

2. LITERATURE REVIEW

In the monetary segment of every market of economy, stock exchange markets assume some exceptions regarding purchase and sales of shares. An efficient capital market is used stabilize the financial sector to boost up investment opportunities and improve the economic growth of the nation. Afzal and Hossain (2011) examined stable affiliation among "M1" and "M2", inflation and exchange rate for the economy of Bangladesh. Tangjitprom (2012) study shows that there was positive association unemployment rate, premium rate, inflation and exchange rate of Thailand and over and done his study with the following remarks that stock market improve better performance for macroeconomics. Ali (2011) concluded that there was unidirectional causality between dependent and independent variables in Bangladesh. Eita (2012) explored the association among securities exchange profits and the rate of inflation in the economy of South Africa. His study supported Fisher hypothesis. The effect of balance of trade, demand deposit, exchange rate and wholesale index of prices put positive impact on stock prices in India, while crude oil prices and gold prices were negatively related to stock prices Ray (2012).

Kaul (1987) Hussain *et al.* (2012), Omotor (2009) and Rapach (2002), and Geetha *et al.* (2011) concluded that there was the harmful association stock prices and inflation.

Ibrahim and Agbaje (2013), Grossi and Tamborini (2011) and Arshad *et al.* (2012) broke down the association between stock profits and inflation in the economy. So it was concluded that inflation was a vital macroeconomic variable that influenced the return stocks. Shahzadi and Chohan (2012) stated the prices of gold effect stock of exchange rate of Pakistan negatively. Farka (2010) founded that monetary policy affect the negative relationship of inflation and stock prices for G-7 countries. Alagidede and Panagiotidis (2010) and Hsing (2011) stated that investments in securities protect the economy from rising of inflation rate in the long run. Husain and Mahmood (2001) analyzed the money market rate and long term interest rate and concluded that the first sub period supported the emerging capital market. Kimani *et al.* (2013) analyzed the stock market performance was effected by inflation, central depository system and deposit rate, gross domestic product, terms of trade and the net effective exchange rate in Nairobi.

2.1 Model specification and description of variables

In this study stock price is measured by KSE -100 indexes and is taken as a dependent variable and inflation is measured by CPI and is taken as an independent variable.

The function of both variables can be explained as under:

$$SP = f(CPI) \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

In the equation (1) SP is treated as dependent variable and inflation is the independent variable.

The econometric model in logarithmic form can be stated as:

$$Log(SP) = \alpha + \beta\, Log(CPI) + \mu t \ldots\ldots \quad (2)$$

The Log of the model shows smoothness of independent variable (CPI) and the dependent variable stock prices. The sign of the independent variable is expected to be negative. CPI is inflation which has an advantage to use in the study because it prevents autocorrelation problems in the model.

This nomenclature of this study is based on monthly time series data from January 2005 to December 2010. The data of stock prices is collected from the web site of Karachi Stock Exchange (KSE) and the data about

consumer price index is collected from several issues of Economic Surveys of Pakistan.

3. DESCRIPTIVE ANALYSIS OF DATA

The information regarding data variation, mean, median and skewness is given here:

Table 1: Descriptive statistics of the data

	Log (SP)	Log (CPI)
Mean	9.184	2.411
Median	9.199	2.317
Maximum	9.629	3.230
Minimum	8.581	1.824
Standard deviation	0.245	0.394
Skewness	-0.301	0.597
Kurtosis	2.648	2.286
Jarque Bera	1.464	5.813
Probability	0.480	0.054
Sample	72	72

Source: Authors' own estimation

In this study there are 72 observations for both stock prices and inflation. Stock prices ranges from 8.5818 points to 9.6296 points. This range reflects on standard deviation, 0.2455, which is low. Normally standard deviation shows the variation of individual variable from its mean value. Average index value from January 2005 to December 2010 is 9.1845 points. The value of Skewness shows that its shape is symmetric. Kurtosis is 2.6488 which imply that stock prices are relatively longed tailed or higher peaked. The volatility is comparatively low because standard deviation is 0.394. The skeweness is 0.597 which implies that a nearly symmetric normality shape. The Kurtosis is 2.286; this implies that cpi has high peakedness.

For stationarity, a time series should have a constant mean or variance. Thus to avoid the problem of spurious regression results time series data should be stationary. From the method of cointegrationl techniques, one of the most common trchnique is vector autoregressive (VAR) technique (Sims, 1990).

3.1 Unit root test

The Augmented Dickey Fuller test is used to check the stationarity of data. Due to variation in data collection process time series data become non stationary (Hamilton, 1994).

$$Y_t = \alpha_t Y_{t-1} + \ldots\ldots\ldots + u_t \quad \ldots\ldots\ldots\ldots\ldots (3)$$

In this equation "t" shows time period. Nevertheless "u_t" has zero mean and constant variance. If "α" is less than 1, then we will say that series is stationary and if "α" is equal to 1 then we will say that series is non stationary. It can be stated as:

$$Yt = \alpha + at + \gamma\alpha - 1 + \gamma i\alpha\text{-}1 + ut \ldots\ldots. (5)$$

$$Yt = Yt - \alpha - 1$$

Where Yt: is dependent variable, A: is constant term and t: trend variable
And ut: is stochastic term
H0: $\gamma = 0$ mean Yt is non stationary
H1: $\gamma \neq 0$ mean Yt is stationary

By comparing the t-statistics value with each critical value we can determine the level of significance. For example if the t-statistics value is greater than critical value at 10% level. This implies that t value is significant at 10% level.

To obtain the association ship between inflation and stock prices the following hypothesis are constructed:

H0: Inflation negatively influences stock prices in Pakistan.

H1: Inflation positively influences stock prices in Pakistan.

In order to test the above hypothesis we use vector autoregressive (VAR) technique. Usually OLS technique is used to investigate the relationship but OLS estimates were insignificant due to spurious regression. So we uses VAR model.

3.2 Unit root test results

Table 2 shows the results of ADF test

Table 2: Unit root test results

Variable	Statement	Level	1st difference	Conclusion
SP	Intercept	-2.893	-4.393	I(0)
	Trend and intercept	-2.940	-4.367	
CPI	Intercept	-2.694	-2.726	I(0)
	Trend and intercept	-3.392	-6.519	

Source: authors estimation form E-views

Table 2 shows the results of ADF test. Null hypothesis is rejected which implies that both stock prices and inflation are stationary at level. The value of stock prices at level with intercept is -2.893 and with trend and intercept is -2.940. The calculated value of stock prices with intercept is greater than critical value at 10%. Values of CPI at level with intercept and trend and intercept are respectively -2.694 and -3.392. The calculated value of CPI is greater than critical values at 10%. So both variables are stationary and the VAR model can be applied.

The Vector autoregression technique is usually used to check the linear interdependencies among different time series. To test the VAR model there should be dependent and independent variables. These variables will be hypothesized to affect each other as in this study we will hypothesize the effect of cpi on stock prices in Pakistan. The VAR model is useful to describe the dynamic behaviour of various time series in economics as well as in financial sector.

Basically VAR model is developed from autoregression and can be stated as:

$$B_t = \alpha_{1+} \delta_1 t + \Phi_{11} B_{t-1} +, \ldots\ldots\ldots\ldots + \Phi_{1p} B_{t-p} + \beta_{11} A_{t-1} + \ldots\ldots + \beta_{1q} A_{t-q} + \varepsilon_{1t} \quad \ldots (6)$$

And

$$At = \alpha 2 + \delta 2t + \Phi 21Bt\text{-}1 +, \ldots\ldots\ldots + \Phi 2pBt\text{-}p + \beta 21At\text{-}1 + \ldots\ldots + \beta 2qAt\text{-}q + \varepsilon 2t \quad \ldots. (7)$$

Equation 6 shows that A granger causes B and equation 7 shows that B granger causes A.

The VAR model is used for stationary variables. If the variables are not stationary then differences will be taken to make them stationary. This research observed the affiliation among inflation and stock prices.

The lag length used in VAR is 1 because the longest lag length is unity. VAR (1) is chosen because it has the lowest values of Bayesian Information Criteria (BIC), Hannan-Quinn Information Criteria (HCQ) and Akaik's Information Criteria (AIC). If the values of BIC, HCQ and AIC are smaller it means the model is fit for analysis. The estimation from VAR model is as follows:

$$\Delta log\ SP_t = 1.340 + 0.878\ (\Delta log\ SP_{t-1}) + 0.086\ (\Delta log\ CPI_{t-1}) + \varepsilon t \quad \ldots\ldots\ldots\ldots (8)$$

(3.271) (20.562) (3.241)

$$\Delta log\ CPI_t = 1.388 + 0.158\ (\Delta log\ SP_{t-1}) + 0.979\ (\Delta log\ CPI_{t-1}) + \varepsilon t \ldots\ldots\ldots\ldots\ldots (9)$$

(2.682) (2.923) (29.89)

From the equation (8) and (9) it is clear that all coefficients are significant. It implies that stock prices in Pakistan moves dependently as the inflation rate increases or decreases. From this analysis we can say that affiliation exist among inflation and stock prices in Pakistan.

3.3 Vector autoregressive (VAR) model results

After checking stationarity of the time series data, we use VAR model. The conclusion of estimated model is given in table 3:

Table 3: Vector autoregressive model results **Equation 1: SP_Diff**

	Co-efficient	Std. error	T-ratio
Constant	1.340	0.409	3.271
Log (SP)_diff_1	0.877	0.042	20.562
Log (CPI)_diff_1	-0.086	0.026	-3.241

Means dependent variables: 9.191 S.D Dependent variable: 0.241
Sum squared resid: 0.506 S.E of Regression: 0.086
R square: 0.875 Adjusted R Square: 0.872
Source: Authors estimation using E-views

Table 4: Vector autoregressive model results **Equation 2: CPI_Diff**

	Co-efficient	Std. error	T-ratio
Constant	-1.388	0.517	-2.682
Log (SP)_diff_1	0.157	0.053	2.923
Log (CPI)_diff_1	0.979	0.336	29.089

Means dependent variables: 2.415 S.D Dependent variable: 0.395
Sum squared resid: 0.808 S.E of Regression: 0.109
R square: 0.926 Adjusted R Square: 0.924
Source: Authors estimation using e-view

Table 6.2 shows the results of VAR estimation. When we develop the equation for stock prices the coefficient of constant is 1.340 and the coefficient of stock prices is o.877 and the coefficient of cpi is – 0.086 where negative sign shows the negative effect of CPI on stock prices. T- Statistics of constant is 3.271 and t-statistics of stock prices is 20.562 and the t-statistics of CPI is -3.2414. All the values of t-statistics are significant and CPI t-statistics shows that inflation affects stock prices negatively. R square is 0.926 which distributions of variables. These results imply that in the case of Pakistan inflation affects stock prices negatively.

On the other side when we develop the equation for CPI, the coefficient of constant is -1.388 and coefficient of stock prices is 0.157 and the coefficient of CPI is 0.979. T-statistics value of constant is -2.683 and t-statistics of stock prices is 2.923 and the t-statistics of CPI is 29.089. All the values of t-ststistics are significant which imply that there exist significant relationship between stock prices and inflation in the case of Pakistan.

Our findings are supported by Kimani (2013). Stock prices are negatively affected by inflation because when inflation rate increases value of money decreases as explained by Fisher. Theory of money shows that money supply raises inflation rate and decrease the value of money.

This argument is also supported by Apergis and Eleftheriou (2002). The analysis shows that impact of inflation on stock prices in Pakistan during January 2005 to December 2010. This analysis shows that inflation affects stock prices negatively in case of Pakistan.

4 CONCLUSION AND POLICY IMPLICATIONS

The association among stock prices and inflation is inspected by many economists because stock market is very important feature of the economy. When the demand for stocks increases prices of stocks also increases and vice versa. According to Efficient Market Hypothesis stock markets fully reflect all available information. So we can say that stock prices are affected by changes in inflation. We reviewed the findings of many economists. Some studies found encouraging affiliation among inflation and stock prices and other studies establish discouraging affiliation among stock prices and inflation. A number of other studies establish no noteworthy affiliation among inflation and stock prices. Alagidede and Panagiotidis (2010) established that there present long run affiliation among stock prices and consumer prices of inflation.

In this research VAR model is used to locate affiliation among stock prices and inflation from January 2005 to December 2010. We developed the equation for stock prices the coefficient of constant was 1.340 and the coefficient of stock prices was o.877 and the coefficient of cpi was – 0.086 where negative sign showed the negative effect of CPI on stock prices. T- Statistics of constant was 3.271 and t-statistics of stock prices was 20.562 and the t-statistics of CPI was -3.2414. All the values of t-statistics were significant and minus sign with CPI t-statistics showed that inflation affects stock prices negatively. R square was 0.926 which was significant. These results imply that in the case of Pakistan inflation affects stock prices negatively.

The tight monetary policy can keep the inflation at low level. Consequently investors would be certain about their returns from securities and stock prices will not be adversely affected.

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