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Short Run and Long Run Association of Macro-Economic Indicators with Stock Market: Evidence from Pakistan Stock Market

Abstract *Stock markets are of prime importance for the stability and boosting of an economy; its development and formation of capital. An active and stable stock market induces effective and successful organizations. The stability of stock markets is always disturbed by fluctuations in certain macroeconomic variables. This study is an endeavor to find out the effect of these variables on the Pakistan stock exchange index both on long term as well as short term bases. Statistical tests were applied on the quarterly time series data from January 2004 to December 2018. The results of the study show that there is negative association among the rate of inflation and share price while the stock prices have positive association with exchange rate and rate of interest. Findings of this study could help the investors to gain positive returns from investment in stock market.*

Key Words: Interest rate , Exchange rate, inflation, Share Prices.

Introduction

The role of stock market is vital in a nation's economy. It mainly stimulates the progress of commerce and industries in the country which are the life blood of a state's economy (Boyer & Filion, 2007). Raising funds for the business is the main job of the stock market. Its secondary function is to provide a public podium for buyers and sellers of those stocks. Shares are used as liquid assets in the stock markets (Ryan & Worthington, 2004).

Stock market provides a stage to the investors and induces effective and successful organizations. The shares of successful companies go up as against different unsuccessful companies on the stock exchange. Kabir et al (2011) signifies that in the money market, share prices and profit growth plays a vital role.

The behavior of stock market is always instable while it is necessary for the investors to understand the way the stock market behave; as the shares are directed by this unpredictable design (Saleem, Zafar & Rafique, 2013). There are certain variables which are responsible for clarifying the fluctuations in the share returns; like the financial disaster of one business sector speed up the ruin of another market severely once it is coordinated with a major business sector (Ratanapakorn & Sharma, 2007). The rise and fall of an economy can best be predicted from its macro-economic factors. It is essential for all concerned to recognize the influence of macro-economic elements because it is important element in stock exchange (Osisanwo & Atanda, 2012).

Various researchers have investigated the influence of rate of exchange on the share prices. Some of these studies found a significantly positive connection among the two variables (Solnik, 1987; Aggarwal, 1981; Smith, 1992) while the others are showing a significantly negative relationship between the two variables (Soenen & Hennigar, 1998). Some of the researchers found weak or no link amid share prices and rates of exchange. Results on the causal relationship between these two are also

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varied. Some studies evidenced that causation moves from share price to rate of exchange, whereas Some other suggest the opposite relationship (Abdalla & Murinde, 1997). Some of the studies, for example Bahmani et al. (1992), claimed that the causal association is two-way in short-term but not in long-run.

Macroeconomic elements are considered as vital factors effecting share market's performance (Momani & Alsharari, 2012). Treasury bills, rate of exchange and CPI are significant factors among macro-economic elements that shape the stock exchange performance i.e. variation in these variables changes the share prices (Zhang, 2017)

According to Zohaib et al (2012), both factors i.e. interest rate as well as exchange rates are negatively correlated to share prices. Menike (2006) and Lobo (2000) argued that interest rate can be used as a good as well as bad sign for investors.

Variation in rate of inflation has a potential influence on share prices. As inflation rate rises, share prices also start increasing which will further affect the profitability of the corporation (Cohn & lessard, 1980). The researchers further analyzed the association between stock exchange performance and country rate of inflation. They supported Fisher theory (1930) in which he claims that devaluation in currency leads to the variation in the share prices.

The relationship among the rate of exchange and inflation rate exists in a progressive way. Upsurge in the inflation rate causes upswing in the interest (Talla, 2013). Therefore a strong need was felt to scrutinize the effect of these elements on one of the emerging share markets of Asia and world, the Pakistan stock exchange. Following are the objectives

1. To check the short-term relationship among inflation, rate of exchange and interest rate with Pakistan Stock Market.
2. To analyze the long-term association among inflation, interest rate, and rate of exchange with Pakistan Stock Market.
3. To examine the causation among inflation, interest rate, and exchange rate with index of Pakistan Stock Market.

Hypothesis of the Study

1. Pakistan stock exchange has a connection with interest rate, inflation and exchange rate in the short term.
2. Pakistan stock exchange has a connection with interest rate, inflation and exchange rate in long run.
3. Rate of interest, inflation, and exchange rate have a causative relationship with Pakistan stock exchange.

Methodology

The Quarterly time series data of (CPI) are used in this study, T-bills rate having six months maturity, and exchange rate (ER) and PSE index share prices. The stock price data were collected from PSE website. The data on CPI and T-bill (six months) was obtained from the Pakistan's State Bank website and from www.Opendoor.pk website. While the data of exchange rate was obtained from International Financial Statistics, Annual Report of SBP and monthly Statistical Bulletin. The study used the secondary time serried date. The main problem with the time series data is either it is stationary or not. To check the data stationary PP-test and ADF was used. The statistical technique Granger causality was applied to check the dependent and independent factors have a casually related or not, and to study the long run and short run connection, the co-integration and regression technique is used.

Data Collection

Research data was collected to study the association among the Pakistan share market and the selected factors. Secondary data is obtained from January 2004 to December 2018 obtained from (SBP) and PSE website.

Data Analysis

Data is collected on quarterly basis in order to carry out the results, to check the hypothesis and address the question of the research. For result estimation and analysis of data, EViews-8 analysis software was used. Regression model was used in EViews for the analysis of the study. Sixty quarters covering a period of fifteen years constitute the time series for the study consisting of sixty observations.

Various research scholars have used the co-integration method to analyze pricing influence and perceive the connection among the factors of macro-economic with prices of different companies' shares. Co-integration method is developed in time series analysis. It is popular in experimental investigation in the area of finance and economics, later it was familiarized by Granger (1969) as well as in another research Engle and Granger (1987) to inspect the short run as well as long run associations between the macro-economic variables and share prices. Research studies apply co-integration method when the consequences of the co-integration test shows 0 it means no long term association exists and when finding shows 1 or 2 co-integration it indicates long term association between dependent and independent variables. Empirical framework was also developed with the co-integration procedures of (Johansen, 1991; Granger, 1969; Engle & Granger, 1987; Kazi, 2008; Johansen, 1995; Johansen, 1988; Johansen, 2000).

Findings of the study

Unit Root Test

ADF and PP tests were conducted to test independent and dependent variables stationary for unit root test. Summary of results of ADF and PP tests on level for each series is given in the below given table

Table 1. Unit Root Test

Variables	Augmented Dickey Fuller		Philips- Perron Test	
	Level	1 st Difference	Level	1 st Difference
LINF	0.1310	0.0000(*)	0.1084	0.0000(*)
LINT	0.6822	0.0000(*)	0.6557	0.0000(*)
LEXR	0.9111	0.0000(*)	0.8860	0.0000(*)
LSP	0.3492	0.0000(*)	0.3522	0.0000(*)

The result of the table shows that at level all the variables are not stationary but after taking the first difference all the variables become stationary. The ADF test and Philips Parron gives the same result at first difference.

Co-integration analysis

For the variables' selection of the suitable lag in co-integration examination was our first step. AIC was employed in the study for the selection of suitable lag length. Trace statistics as well as Maximal Eigen were used to ascertain the sum of the vectors of co-integration technique. Maximal Eigen and Trace statistic test in table below shows that 1 co-integration between inflation, share price, rate of interest and EXR, which means that all the above mentioned macroeconomic factors have long term associations with share prices. Thus alternate hypothesis was accepted whereas the null hypothesis was rejected. The co-integration analysis made it clear that the macro-economic variables had a positive significant effect on the share prices.

Ho = Pakistan stock exchange index does not associate with inflation, rate of exchange and interest rate in long run.

Regression Analysis

Ho = Pakistan stock exchange index has no association with inflation rate of exchange and country interest rate in the short term.

H1 = Pakistan stock exchange index has association with inflation, rate of foreign exchange and interest rate in the short term.

Table 4. Regression Analysis

	C	DLINF	DLINT	DLEXR
Coefficient	0.000578	-6.20e-05	0.000106	0.000150
Std Error	8.31E-08	2.15E-05	2.45E-05	2.74E-05
t-statistic	6.956274	-2.970288	4.503716	5.109978
Prob	0.0000	0.0044	0.0000	0.0000

R Square 66%

The OLS (ordinary least square) method output is presented in the table above in order to present the effect on share market price of the macro-economic factors. Both the dependent and independent variables are lag transformed; these are related to the price elasticity. It means that the percentage variation of y is due to percentage variation in X. In this research, 1% variation in inflation rate of country will cause share price decreased by 209%. Table 4.6, results denotes a strong association among share prices index and inflation (DLINF) (since the p-value 0.0000 is lower than 5%). Share prices will fall with increase in inflation as shown by negative sign of the co-efficient. The result is consistent and affirms that there is adverse and important association among country inflation rate and share prices as was previously evidenced (Lintner, 1973; Fama & Schwart, 1977). The coefficient sign is positive and there p-value (0.0000 < 0.05) shows another significant and positive relationship among rate of foreign exchange and share prices. It shows the earlier evidence is affirmed by Doong et al, (2005) that currency appreciation will cause share prices to rise. The macro-economic variable of interest is also significant, its coefficient sign shows in positive connection between share prices and rate of interest. The analysis of the study shows that the interest rate and rate of exchange had a positive significant effect on the share prices in Pakistan. But in case of inflation rate, it was proved that the inflation rate negatively affects the share prices.

Discussion

Raising capital and ensuring the most profitable and optimum use of the capital is the role of the share market. The co-integration examination of the study indicates that Trace statistics as well as Maximal Eigen values have been used to ascertain the vectors related to co-integration. The above table shows Maximal Eigen and Trace statistic test of co-integration between CPI and share price, interest rate and EXR. The test results proved the existence of significant association between share prices of registered companies of PSX and macro-economic variables.

Chughtai, Malik, and Aftab (2015) studied association between these variables and stock exchange performance. The findings of the study suggest no relationship between the variables. The result of this study is opposite to our finding while the results of Obben *et al* (2006) study similar to this study.

Co-integration method is one of the best methods used by different scholar in order to find out the connection among these two i.e. macro-economic variable and share prices. Regardless of the reality that co-integration method developed in time series analysis is yet in its experimental stages in the area of finance and economics it is popular, later it was familiarized by Engle and Granger (1987) an Granger

(1969) to inspect short and long term associations among the share prices and the macroeconomic factors. In this study the research use the co-integration method. Empirical frame works was also developed with the co-integration procedures by different scholars (Johansen, 1991; Granger, 1969; Engle & Granger, 1987; Kazi, 2008; Johansen, 1995; Johansen, 1988; Johansen, 2000).

Furthermore Granger causality test was employed to study the causality association among the macroeconomic variable and Pakistan stock exchange. ADF test was used on Granger Causality test with lag 2 as the lag selection to ascertain the difference of four factors for getting stationary variables.

The findings of the Gringer Causality Test revealed that interest rate and rate of inflation unidirectionally causes the rate of stock prices. The findings of this study are in consonance with the previous research (Chughtai, Malik, and Aftab (2015); Obben *et al*, 2006).

The regression analysis finds out a strong association among stock prices index and inflation (DLINF) (since the p-value 0.0000 is lower than 5%). Share prices will fall with increase in inflation as shown by negative sign of the co-efficient. The result is consistent and affirms the previous research i.e. there is a negative and important association among inflation and share returns (Lintner, 1973; Fama and Schwart, 1977). The positive sign of coefficient and its p-value ($0.0000 < 0.05$) shows another significant and positive relationship among share prices and rate of exchange. It shows the earlier evidence is affirmed (Doong et al., 2005) that currency appreciation will cause share prices to rise. The macro-economic variable of interest is also significant, its coefficient sign shows in positive association among stock prices and interest rate.

Conclusion

As the study was conducted to ascertain the factors affecting the share prices in share market, the findings of the study reveal that exchange rate and rate of interest positively affect the share prices; means a decrease in one will also cause decrease in the other and vice versa; because depreciation in rate of interest and exchange rate will reduce the flow of funds in the market which will result into the decreased share prices. On the other hand, the rate of inflation was found to have negative association with the share prices because increase in inflation raises funds supply in the share market; however the demand on the other hand remains the same. The stagnancy on the demand side keeps the stock prices on the downward tendency. Investors need to pay attention and follow the CPI because market condition becomes difficult due to the high inflation.

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