

Interest Rates and Stock Prices: Evidence from Pakistan Stock Exchange

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Abstract: This research investigates the fundamental association among rates of interest and stock prices by utilizing the data taken on a monthly basis. The (KSE)-100 index in PSX (Pakistan Stock Exchange) has been used for extracting stock prices and three-month Karachi interbank offer rate (KIBOR) is utilized as a proportion of interest rate available at State Bank of Pakistan. Time duration to collect data is starting from July, 2009 and ending at June 2019. Month end prices of stocks listed at Pakistan Stock Exchange and interest rate for the period mentioned above were taken. Statistical techniques like descriptive analysis, correlation and simple regression analysis were applied to evaluate the interest rate's effect on share prices of the entities registered at Pakistan Stock Exchange. The outcome of data analysis indicates that interest rate is negatively but significantly associated with stock prices.

Keywords: Annual Percentage Rate, Stock Prices, PSX (Pakistan Stock Exchange), Karachi Stock Exchange - 100 index

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I. Introduction

A market which deals with trading (buying/selling) of existing securities among investors is called stock exchange. Stock exchange represents a place where traders interact with each other to trade securities. Only listed securities are traded on exchanges. Generally, stock market derives an economy. The economic theory proposes that the potential performance of a corporation is reflected by stock prices. Therefore, a country's macroeconomic policies should take into consideration the macroeconomic factors including interest rates that require a considerable effect on stock prices. As proposed by author (Ologunde, Elumilade, & Asaolu, 2006) long term investments in real capital is made possible through strong share markets. The author (Mankiw, 1999) mentioned that economic recession is driven by significant fall in the stock market.

Previously, Pakistan stock exchange was comprises of Karachi, Islamabad and Lahore Stock-Exchanges which are abbreviated as KSE, ISE and LSE respectively. Later on, KSE, ISE and LSE were demutualized in line with Stock Exchange Act 2012 which was commenced from May 7, 2012. From this standpoint, stock exchanges in Pakistan were demutualized and transformed into public limited company. Consequently, these stock exchanges were renamed as KSE Limited, ISE Limited and LSE Limited after removing the work "guarantee" from their names.

It was September 18th, 1974, when Karachi Stock Exchange, an oldest exchange, was founded in Pakistan. It has shown a good growth in the past but now a days it is subject to turmoil owing to instability in political situations, threats of security, economic instability, rising inflation and various macro-economic concerns. Karachi stock exchange consists of two types of indexes; (KSE)-30 and (KSE) -100.

Introduced in the month of November (1991), KSE-100 index has 1,000 points based standard value. 100 entities of the index are registered in Pakistan Stock Exchange and represents 80 percent of the whole trade capitalizations share of registered entities. The selection of these companies is based upon sector. At least 1 entity from each sector is chosen that excludes Open-Ended Mutual Fund Sector. 100 index of KSE is made up of registered entities of highest market capitalization; therefore, this study incorporates its index value in order to measure the stock prices.

In several cases, stock prices in global markets are fluctuating. There are various factors affecting the prices of stock in the market. One of those factors is interest rate. This study makes an attempt to establish the cause and effect relation between rates of interest on prices of stocks listed at Pakistan Stock Exchange (PSX). In order to develop the association among interest rate and prices of stock, quantitative research method has been applied on the data extracted from secondary source for the period starting from July, 2009 and ending at June, 2019.

Annual percentage rate is termed as vital large -scale variable, having significant impact on economy linked with growth of an economy. Borrowing value, which represents share's price, is the extra money paid for consumption of wealth over some stipulated time frame. Considering the point of view of the person asking for money, the proportion of interest paid on the use of money is termed as borrowing rate and from lender's standpoint, this rate of interest is known as lending rate. Interest rate spread is computed by subtracting lending rate from borrowing rate.

This study will add to existing literature by studying the interest rate's influence on stock prices, in order to strengthen the current knowledge for decision making purpose. The results of this research are confined and applicable to PSX and it is also limited to the 10 years' time period. The outcome of this study will also provide guidance to fresh researchers looking to explore more into this topic and financial managers who have to undertake complex decisions in financial management.

II. Literature Review

In finance, the concept of time value of money is well-explained by taking interest rate as its basic measure. Therefore, it plays a key role in calculating the cost of money. It is considered as a crucial factor to determine the prices of stock. The stock price changes are well defined by variations in interest rate. Various research papers conducted investigations for the purpose of developing the empirical interest rate's association with stock prices.

As described by author (Fama, 1981), the anticipated rate of inflation has a negative correlation with expected real activity, but possesses positive correlation with the returns of stock market. Mandated by short-term rate of interest, the returns of stock market is negatively correlated with anticipate rate of inflation.

The studies (Schwert, 1989) and (Hamilton & Lin, 1996) identified direct relationship among volatility of stock market and recession and (Glosten, Jagannathan, & Runkle, 1993) discovered that the interest rates predicted about the instability in shares' market.

Moreover, in a study conducted by (Davidson, 1996) the association among interest rate and stock prices is proposed. He applied regression analysis to develop their linkage. Final outcome of the research delineated that a remarkable influence of interest rate on the return worth of stocks trade is observed. The interest rates that were long time based, determined the stock price fluctuations.

Further, (Kunt & Maksimovic, 1996) explored the interest rate's influence on in various countries. The conclusions drawn from this research revealed that market of stocks is stronger in those countries where interest rates were lower than those countries where interest rates were higher. They also found out the performance of stock market is determined through the prevalence of low interest rates.

In a study carried out by (Zhou, 1996) to comprehend the association among annual percentage rate and costs of share through applying regression method, long term interest rates were found to be the determining factor to explain the fluctuations in price-dividend ratios.

Similarly, (Bashir & Hassan, 1997) inspected interest rate's effect sensitivity on returns of stock of banks operated commercially in UAE. The research results revealed that interest rate sensitivity is significantly linked with market of stock returns.

Another study by (Arango, Gonzalez, & Posada, 2002) discovered the link among rate of interest and prices of shares listed on stock market of Bogota. The interbank rate was utilized as a portion of rate of interest. He found significant non-linear and inverse relationship among two variables but his finding failed to provide support to the efficiency of central stock market in Colombia.

Likewise, Structural VAR Model was applied by (Hsing, 2004) so as to observe the influence of rate of exchange, rate of interest and output on index of market of stock. He found inverse relationship among interest rate and stock market index.

Equally explained by (Bernanke & Kuttner, 2005), there occurs a negatively correlated effect among rate of interest and stock prices. The author has considered three cases: firstly, increased rate of interest can elevate interest expense of a firm which in return decreases the cash available to pay for potential dividends. Secondly, interest rates fluctuations may thrust a rise in the expected real interest rate causing decrease in nominal cash flows available to shareholders. Thirdly, anticipated equity premium may be increase by a tight monetary policy because of the fact that investors step aside from share investments.

The link among interest-rate and stock-prices was studied by (Das, 2005) by taking date for each month from the time frame commencing from 1985 to 2003 from three Asian countries: Bangladesh, India and Pakistan. Share's trading index was utilized to measure stock prices whereas treasury bills having three months of maturity was used as a measure of borrowing rate. Results of the comprehensive research revealed significant association among annual percentage rate and shares' cost for India, but this relationship is insignificant for Pakistan and Bangladesh.

(Mahmudul & Gazi, 2009) identified there was no direct association between annual percentage rate and cost of shares at Chile, Canada, Australia, Bangladesh, Colombia, Italy, Germany, Japan, Mexico, Malaysia,

Jamaica, Venezuela, Spain and South Africa. They further contended that indirect significant link among rate of interest changes and share price changes.

Similarly, (Hasan & Samarakoon, 2009) explored that rate of interest is prompted by stock prices. The rate of interest were restrained by taking Treasury-bill of various maturities such as three months, six months and twelve months whereas compounded returns on the All-Share-Price-Index (ASPI) was taken to examine the stock prices. The data tracks the anticipated returns on once-a-month, four times a year and yearly basis in the stock market in Sri-Lanka for the period between 1990 and 1997. An OLS method was applied as a statistical tool to measure the relationship. A positive but significant relationship was found among miniscule annual percentage ratio and expected shares dividend.

Theoretically, stock prices response negatively to interest rate (Hamrita & Trifi, 2011). This stem from the fact that that the present-value (PV) of future dividends are decreased by applying greater interest-rate, which thus diminishes decreases the stock price and vice versa. High rate of interest also hinders economic activities, causing the stock prices to fall.

III. Material And Methods

This study makes an attempt to observe the causal link among interest rate and stock prices in Pakistan. The database sample was extracted per month basis for the period starting from July 2009-June 2019. Hence, the sample size is 120 months. The share prices were measured by taking month end values of KSE-100 index obtained online from Pakistan Stock Exchange (PSX) website. 3-months Karachi interbank offer rate, also known as KIBOR, depicts short term interest rates.

Basically, KIBOR represents average of short-term interest rates set on daily basis by the State Bank of Pakistan (SBP). SBP obtains average of these interest rates from the prominent commercial banks and this is due to the fact that KIBOR is an average interest rate at which one bank lends money to another. KIBOR is adjusted for the factors such as rate of inflation and default risk. Hence, it is also used as a base rate for monetary policy makers (Toor & Ali, 2013). Few percentages are added on and above KIBOR by banks operated commercially to derive the interest rate to be indicted to the consumers. Therefore, KIBOR represents the benchmark at which short term interest rates are settled.

Quantitative data analysis has been used in this research. This research uses descriptive analysis in addition to correlation and regression analysis which is applied to develop the association among dependent and independent variables. The inferences have been drawn on the basis of regression analysis and the decision on hypothesis was determined through ANOVA. The following regression equation has been used:

$$Y = a + bX + e$$

Wherever,

Y= dependent-variable

X = independent-variable

a = Y-intercept

b = beta / slope of the line

e = error

Following equation will determine the effect of short-term rate of interest on stock prices:

$$\text{Stock Prices} = a + b (\text{Interest Rate}) + e$$

Table 1: Variables Abbreviations

Sr. No.	Variables	Abbreviation
1.	Stock Prices	SP
2.	Interest Rates	IR

Hypothesis

Null Hypothesis

H₀: Stock prices have no significant causality relationship with interest rates

Alternate Hypothesis

H₁: Stock prices have significant causality relationship with interest rates

Theoretical Framework

Theoretical framework serves as the parameter to direct the process of research. It depicts the relationship among independent and dependent variables in order to study their effects and draw conclusion based on some empirical evidences. After investigating the theoretical-framework of many researchers, the current research is based upon the following conceptual framework:



IV. Result

At first, the outcomes of descriptive analysis are explained in the following table 2.

Table 2 Descriptive Summary Statistics

		IR	SP
N	Valid	120	120
	Missing	0	0
Mean		9.2913	26909.8148
Median		9.3650	29689.4600
Mode		5.89	7720.93 ^a
Std. Deviation		2.60680	13112.90085
Minimum		5.73	7720.93
Maximum		13.47	50591.57
Sum		1114.96	3229177.77

a. Different types can be seen. The tiniest figure is evident

Findings of the aforementioned table show a total of 120 values of each variable have been entered. The mean of interest rate over the period of ten years is 9.29 percent, ranging from its minimum value of 5.73 percent to maximum 13.47 percent. The standard deviation for interest rate is 2.61 percent approximately which tells the average of the square of the deviation of each value from mean. The sample size of stock prices is 120 and having no missing values.

The mean of stock prices is 26909.82 approximately having standard deviation of 13112.90. The value of SP ranges from the minimum of 7720.93 to the maximum 50591.57.

The table 3 reveals the value of correlation co-efficient between IR and SP. The outcomes direct that IR is substantially negatively correlated with SP.

Table 3: Correlation Matrix

		IR	SP
IR	Pearson Correlation	1	-.839**
	Sig. (2-tailed)		.000
	N	120	120
SP	Pearson Correlation	-.839**	1
	Sig. (2-tailed)	.000	
	N	120	120

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4: Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.839 ^a	.703	.701	7172.19966	.703	279.777	1	118	.000

a. Predictors: (Remain Fixed), IR

b. Dependent Variable: SP

Table 5: ANOVA^a

Model		Addition of Squares	Df	Mean Square	F	Sig.
1	Regression	14391859219.036	1	14391859219.036	279.777	.000 ^b
	Residual	6069972860.032	118	51440447.966		
	Total	20461832079.068	119			

a. Dependent Variable: SP

b. Predictors: (Constant), IR

Table 6: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error				Lower Bound	Upper Bound
		Beta						
1	(Constant)	66107.080	2433.162		27.169	.000	61288.757	70925.403
	IR	-4218.691	252.215	-.839	-16.727	.000	-4718.146	-3719.236

a. Dependent Variable: SP

In the tables shown above, the regression analysis is utilized for the primary objective of demonstrating individual impact of interest rate on the prices of shares.

Table 4 show findings of regression analysis. R square of research model is 0.703, which demonstrates 70.3% of the variations in stock prices are explained by interest rates. According to table 5, the F-statistic value is 279.777 significant at the p-value 0.000. As the p-value is not exactly the estimation of alpha 0.05, it indicates the significance of model.

Table 6 shows the standardized beta co-efficient of -0.839 with significant level of 0.000 which implies that one unit change in IR caused negative 0.839 units change in SP.

The result specifies that 70.3% of the variance (R-square) in stock prices has been explained significantly by interest rate. Therefore, alternate hypothesis is sustained i.e. there occurs a significant causal association among interest-rate and stock-prices.

V. Conclusion

This study has looked into cause and effect association among bank rate and cost of shares. Annual percentage rate offered by bank was considered independent variable. On the other hand, cost of shares was given status of dependent variable. Change in the value of borrowing, banking rate was studied as it impacted the cost of shares in market. Sample size was equal to 120 for both variables which include month end values from the period starting from July 2009 to June 2019. Descriptive statistics such as mean, standard deviations and frequency was implied to describe the characteristics of variables. Correlation analysis and regression analysis have been used as statistical tool to clarify the causal connection between factors. The finding of the study revealed significant indirect strong association among interest-rate and stock-prices, which is analyzed by correlation co-efficient. The outcomes also showed the validity of alternate hypothesis by employing regression analysis. The model of regression analysis sustained alternate hypothesis at 0.000 level of significance. The model also revealed that a unit variation in annual percentage ratio caused (0.83 unit) variation in cost of shares.

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