



**Impact of Interest Rate on Stock Price, Analysis of Stock Movement of Fauji Fertilizer and Engro Corporation Limited:
Evidence From Pakistan Stock Exchange**

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Abstract

The objective of this study is to evaluate the impact of interest rate on Pakistani stock market price. Take a teen year ending data from 2009 to 2018 of two companies which is listed in Pakistan stock market (PSX) Fauji fertilizer and Engro Corporation limited. MATLAB tool is used for analysis the secondary data of interest rate and both companies stock price. Study uses the correlation and linear regression approaches in order to evaluate the impact of interest rate on stock price of both companies, the result shows the link between interest rates and stocks is favorable. As the interest rate is increase or decrease the stock price of both companies are increase or decrease.

Keywords: Interest rate, Stock price, Pakistan Stock exchange, Fauji fertilizer and Engro Corporation

1. Introduction

Pakistan stock exchange (PSX), is the trading and investment floors which provide the opportunity to investor, buyer and seller to buy or sell the stock and shares of companies which is listed in Pakistan stock exchange. (PSX), it provides the trading floors to companies' owners where companies' owners may purchase or sell their companies' stock and shares as per their rules and regulations. (PSX) was established in 11 January 2016 by combine or merge these three stock market which is Karachi stock exchange market which made in 1947, Lahore stock exchange market which is made in 1970 and Islamabad stock exchange market which is made in 1992 these three stock market merge in 11 January 2016. Good investors always investment in an efficient market.¹ Stock is type of investment that shows ownership in company share. We purchase the company's stock we purchase the small piece of that company which is known as share. Companies are issuing their shares at that time when companies want to grow companies or issue their share for raise the funds or want to investment in their companies then issue the shares of company. When you have stock in company you are called a shareholder. Common stock and preferred stock are the two forms of stocks. Common stock is security that shows the ownership in corporation and also give the right of voting and control of electing the board of director on corporation policy. Preferred stock is security show the ownership in corporation but no right of voting (Audi et al., 2023).

In this research we focus on stock price when interest rate is decrease or increase the stock moment of the two companies which is listed in Pakistan stock exchange. Basically stock price is telling us the company's current value or its market value, stock price show that how much stock is trade and what value trader agree to buy or sell the stock of that company (Wang & Rehman, 2015). The money paid by someone and return with additional money is known as interest. When someone borrowed money on interest he paid the money which he borrowed plus additional money which is fixed at the borrowing time. For example, someone borrowed Rs. 100 for a year with interest rate 10%. This means that when he returns amount at the end of year he pays the original amount Rs. 100 and the additional amount Rs. 10 in the shape of interest. Interest rate effect on share price, bond price, return price of T-bond, zero-bond etc. and T- bills. Interest rate and bond price are inversely related. Increase of interest rate decrease the bond price. By decrease in interest rate it is found by studies, consumer and business will have increase of investment spending. "Interest rate is the income which goes to the owner of capital" by carver. When interest rates is increase, business have to pay more to borrow, other words, their cost of borrowing is increase which is reduces profitability and reduces market value of their share due to decrease in dividends. Increase in interest rate also decreases the worth of corporate bonds (Ali, 2015). Due to high interest rate the bond rate that the holder pays for its holder is not very attractive. When interest rate is decreased which are more excellent for the economic environment because customer can easily pay for the borrowed because they don't have to pay high interest rate to borrow. In order to control economic growth the interest rate is used as a device.

We take two fertilizer companies Fauji fertilizer limited company and Engro Corporation limited company which is listed in Pakistan stock exchange. The objective of study is evaluating the impact of interest rate on stock price of both companies.

Fauji Fertilizer Company limited is Pakistani largest urea manufacturing company. It established by the Fauji foundation in 1978 as a private limited company. Fauji Fertilizer Company listed in Karachi stock exchange in 1991. Based on the excellent dividends to pay its shareholders. Top 25 best companies in Pakistan, 14 year since in 1992.²

Engro Corporation limited is a very large multinational organization in Pakistan. There subsidiaries sector which involved in production of foods, fertilizers, chemicals, petroleum products, energy, rice processing and experts, digital technology, telecom infrastructure, and chemical handling and shortage. They also focus on flagship projects which are Engro foundation; I am the change, diversity and sustainability. It is also listed in Pakistan stock exchange (PSX). The Engro Corporation is trading in Pakistan stock exchange with the symbol of (ENGRO).³

1.1. Problem Statement

In the dynamic scope of financial markets, understanding the relationship between interest rates and stock prices movement, this knowledge is important for individual investor, analysts and policymakers. This study aim is to investigate the impact of interest rates fluctuation on the stock prices of two fertilizer companies in the Pakistani market, Fuji fertilizer and Engro Corporation limited

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1.2. Objectives of the study

- Determine the impact of interest rate on stock price of Fauji fertilizer.
- Determine the impact of interest rate on stock price of Engro Corporation limited.

2. Literature Review

Ali (2014), has examined the interest rate and stock market connection between. Where they have identified that negative impact between interest rate and stock market. The author of this study took ten year previous data start from January 2004 – December 2013 of interest rate and Karachi stock exchange market. The variables of research are interest rate, stock market index, and stock market data of variables is taken from International Financial Statistic (IFS), Global economy, Karachi stock exchange (KSE), State bank of Pakistan, International Monetary Fund (IMS), books, journals, articles, annual reports etc. In this research article the researcher use research tools which are descriptive statistic, regression analysis and co-relation. The stock price is a dependent variable while interest rate is an independent variable.

Khalid (2017), has examined the effect of interest rate and exchange rate on stock market capitalization and measure the performance of market with interest rate and exchange rate. Where they have identified the co-efficient of long term is that if interest rate is increase (1%) the exchange rate is decrease (0.23%) and the market capitalization is increase (3.17%). The author of this study took a sample data which Pakistan covering in 1990-2017 periods. Take three variables which is market capitalization, interest rate and exchange rate which Pakistan covering 1990-2017 period. The main purpose of this research article is analyze short run and long run aggregate market capitalization and macro-economic variables by using the econometric tool of Johnson approach which is the whole series data co-integrated and long term relationship among variable.

Hussain (2017), has examine the forecast impact between interest rate volatility on stock return volatility (PSX). Stock returns basis on KSE 100 index and interest volatility basis on monthly treasury bills. Where they have identified the short-term volatility has positive relationship with overall stock return volatility. The author of this study took a sample data start from 1994-2016 period data and use the two models auto Regressive Conditional Heteroscedasticity (ARCH) which forecast the stock price and Generalized Auto Regressive Conditional Heteroscedasticity (GARCH) which is used to estimate stock volatility.

Uddin and Alam (2010), have examine that two key factors in any nation's economic growth are the stock exchange and interest rates. They have noted a negative association between share price and interest rate. Therefore, an increase in interest rates will have a negative effect on share price growth. The study looks for evidence in favor of the Dhaka Stock Exchange (DSE) based on daily price index data from 1994 to 2005 and shows a relationship between stock index and Bangladeshi interest rates on a month basis, with data starting in May 1992 and ending in June 2004. Ordinary least- square (OLS) regression technique used. If Bangladesh Government is controlled, the interest rate which is more benefit for Dhaka stock exchange.

Salman Ahmed, Mohammad Gul, Dr. Gohar Saeed (2010), have examine the relationship between interest rate change and market capitalization. Where they have identified effective of interest rate change on stock market capitalization and find that interest rate is increase the market capitalization is also increase. The author of this study took data start from January 2004 to June 2006 on weekly basis. Single-variety regression model are used and two variable Repo (state bank of Pakistan) and KIBOR (Karachi interbank offered rate),

Shakira Mahzabeen (2016), has examine money, interest rates, and inflation's effects on the Dhaka stock exchange. Where they have identified that there is a no connection between the stock market return and money, stock market is independent and negative connection between stock market return and short term interest rate and inflation played role in stock return. Interest effect on inflation vice versa. These variables have a strong impact on capital market. Methodology of this research paper T-bill used as a short term interest rate (M2) taken to measure money supply and 91-days T-bills data is took to measure a short term interest rate analysis with monthly inflation. The author of this study took data start from January 2001 to December 2012 monthly total observation is 144. Use ordinary least-square regression and Granger Causality models.

Geetha, Mohidin, Vincent Chandran, Victoria, (2011), have explore the connection between stock and inflation. Inflation was divided into two form expected inflation and unexpected inflation. They have found that there is a long-term association between expected and unexpected inflation and stock return, but that there is a short-term relationship with variables of China but not for Malaysia. The author of this study took the secondary data which consists of monthly time series start from January 2000 to November 2009. Variables used in this research which is interest rate, inflation, exchange rate, GDP and share price. Variables of data were taken from (IFS) and (CPI). He finds Long run relationship test through cointegrating vectors and short run relationship test through vector error correction modeling.

Zohaib, Sangeen, Lala rukh, Imadullah (2012), have examine the three macro variables which effect on economy of country. Which variables are interest rate, exchange rate and inflation on stock return of (KSE) 100 index. Where they have identified there is weak relationship between independent and dependent variables. Interest rate and inflation is insignificant on stock return of (KSE) 100 index and the impact of exchange rate is significant on stock return (KSE) 100 index. The author of this study took ten-year monthly data start from 31st July 2001 to 30th June 2010 and multiple regressions are applied on data variables. Independent variables are interest rate, exchange rate and inflation. Dependent variables are stock return.

Sobia, Faisal, Zaheer, Mohsin and zia (2019), have analyze how macroeconomic factors affect the stock market. Where they have identified macroeconomic variables and their association with (PSX)-100 index and money supply is negative and exchange positive affected on stock market. The stock market is positively impacted by the rate of inflation and interest rate. The author of this study took monthly data starting 30 June 2011 to 30 June 2018 from Pakistan stock exchange. There are five variables are used which are (PSX)-100 index are dependent and these are independent money supply, inflation, interest rate and exchange rate. Used multiple regression econometric technique.

Jun hu, George J.Jiang and Guan zhong pan (2018), have review the stock market reaction to fluctuations in Chinese stock market interest rates from central bank. Where they have identified the Chinese stock market, there is an immediate positive response to interest rate increases and a negative response to interest rate reductions. Use robustness testing to demonstrate that market sentiment is strong for positive interest rate hikes and low for negative interest rate reduction. The author of this study took data of shanghai composite index (SCI) for the period of January 1996 to December 2016 has an average of 1.07% abnormal return interest increase by the central bank and -1.85% abnormal return interest rate decrease during the two- day announcement period.

Micheal, Isaac menash, Albert frimpong, ruzima, (2016), have explained that the effect of interest rate and liquidity on stock market performance in Ghana. Based on their secondary data sources these authors further add revealed interest rate effects on Ghana Stock Exchange index positive insignificant. Where they have identified the performance of the Ghana stock market is highly influenced by liquidity, exchange rate and inflation and interest rate positive effect on stock. The author of this study took secondary data of Ghana stock exchange and central bank of Ghana start from December 2010 to November 2013 use robust linear regression technique.

3. Research Methodology

A researcher uses different research method to collect the data for the objectives and questions set. Hence, the current researcher feels important to provide a brief account about research and method employed for the study.

For the purpose of research, two types of approaches are widely used. These are quantitative approaches and qualitative approaches. Quantitative approaches used to improve decision making that decision which we take right or wrong. Data collection tools of this approaches are closed-ended structure, methodical observation, interview, questionnaire, document evaluation, and official statistic. The data which quantitative approaches are produced a number and categorical. Observe analytical techniques which is counting, comparing and statistical analysis. They have produced the information which is Quantitative (amount).⁴

Qualitative approaches is used to answers of the question why and how. It basically define the quality not quantity. Qualitative data use to observe behave of people and provide information about human.⁵ Their data collection tools are open-ended/semi structure, observation, interview, questionnaire, document analysis, image analysis, and video recording. The data qualitative approaches are produced word, image, and audio. Observe analytical techniques are thematic analysis, narrative analysis, and image analysis. They have produce the information are qualitative.⁶

We used quantitative approaches in this research study because my research is based on quantity not quality. This research is analysis the impact of interest rate on stock price of two Fertilizer Company.

Studies is carried out on quantitative data which is a secondary data, which is taken from the state bank of Pakistan (SBP) and Pakistan stock exchange (PSX), we use articles review, journals and other website which is mention in reference. We used yearly data in this research study. Take a ten year interest rate data of state bank of Pakistan (SBP) which is from 2009 to 2018 and take a ten year stock price data of two companies Fauji fertilizer and Engro Corporation limited which is taking from the Pakistan stock exchange (PSX) from 2009 to 2018. Interest rate and stock price are the two variables we are considering, interest rate is an, independent variable and stock price is a dependent variable. For the research many methods and approaches are used. We used the two approaches in this research which is linear regression and correlation. Analysis the data we used the MATLAB tool.

3.1. Limitation of the study

The scope of this research study to awareness through information which we found in this research that if interest rate is increases the effect on stock price of both companies Fauji fertilizer and Engro Corporation limited.

Due to shortage of time period there is some limitation which is we not use the full time period from the beginning of the both companies we cover ten year time period from 2009 to 2018 of both companies.

4. Theoretical Framework

This study has develop the framework in which two variables have been discussed which include interest rate (independent) and other variable is stock price which is (dependent) variable. These both variables help me in this research study. As I assume that interest rate is independent variable and stock price is dependent variable.



4.1. Hypothesis

Following two hypothesis were developed for further test. I will return to this debate later in the finding parts of this research project.

Null hypothesis (H0): there is no expressive relationship between interest rate and stock price.

Hypothesis (H1): there is expressive relationship between interest rate and stock price.

5. Results & Discussions

I used the correlation approach to find out the relationship between both variables. The criteria of the relationship status mention below in the table.

Correlation < 0.02	Weak relation
Correlation ≥ 0.2 but < 0.5	Moderate relation
Correlation ≥ 0.5 up to 1	Strong relation

This table criteria set to find out the relationship between both variables, the test result show the relationship between both variables.

5.1. Fauji fertilizer

This is the correlation test result of Fauji fertilizer stock price and interest rate.

```
>> Correlation = corr2(Interestrate, Price)

Correlation =

    0.5659

>> Normality_test_Interestrate = kstest(Interestrate)

Normality_test_Interestrate =

    logical

    1

>> Normality_test_Price = kstest(Price)

Normality_test_Price =

    logical

    1
```

We find that there is strong relationship in between both variables because the result of correlation is 0.5659 and the criteria of strong relationship is ≥ 0.5 up to 1. Same as the case here as discussed with the correlation of Engro Corporation, the correlation result of Fauji fertilizer also justifying further the investors are interested to invest in the stock of this company as well for purpose of higher return.

This is the result of linear regression of Fauji fertilizer stock price.

```
>> mdl = fitlm(Price, Interestrate)

mdl =

Linear regression model:
y ~ 1 + x1

Estimated Coefficients:

```

	Estimate	SE	tStat	pValue
(Intercept)	-7.6941	5.8405	-1.3174	0.22419
x1	0.11505	0.059261	1.9414	0.08815

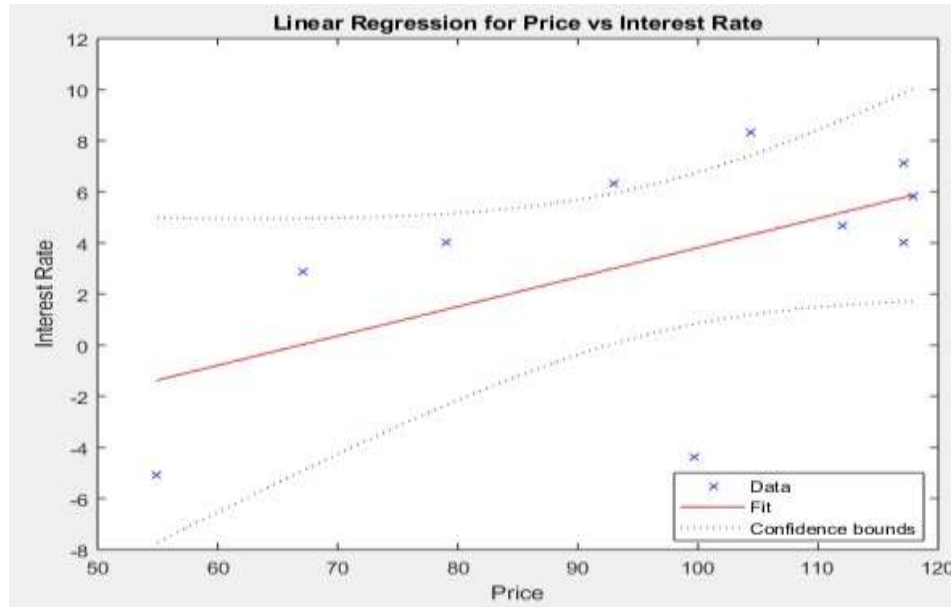
```

Number of observations: 10, Error degrees of freedom: 8
Root Mean Squared Error: 3.99
R-squared: 0.32, Adjusted R-Squared 0.235
F-statistic vs. constant model: 3.77, p-value = 0.0881
>> plot(mdl)
>> title('Linear Regression for Price vs Interest Rate');
>> ylabel('Interest Rate')
>> xlabel('Price')
```

This is the result of Fauji Fertilizer Company. The result of this model shows the 0.235 value of Adjusted R. square that explain the effect of independent variable interest rate on the dependent variable stock price is only 23.5% at the confident interval of (1-0.0881) 91.19% and remaining 76.5% is error term that explain that there might be other variables which effects the value of stock prices of this company and these result are.

Further this model shows the positive co-efficient value SE is at 0.059261 which shows the small positive relationship between both variables interest rate and stock price and these results are significant at 76.5% confident interval.

This is the graphically result of linear regression of Fauji fertilizer stock price.



Based on the analysis and findings the hypothesis (H0) is rejected. As mentioned above about (H0) hypothesis there is no expressive relationship between interest rate and stock price.

5.2. Engro Corporation Limited

This is correlation test result of Engro Corporation limited stock price and interest rate.

```
>> Correlation = corr2(Interestrates, Price)

Correlation =

    0.6512

>> Normality_test_Interestrates = kstest(Interestrates)

Normality_test_Interestrates =

    logical

    1

>> Normality_test_Price = kstest(Price)

Normality_test_Price =

    logical

    1
```

This is the result of linear regression of Engro Corporation limited stock price.

```
>> mdl = fitlm(Price,Interestrates)

mdl =

Linear regression model:
y ~ 1 + x1

Estimated Coefficients:

```

	Estimate	SE	tStat	pValue
(Intercept)	-2.8165	2.8039	-1.0045	0.34455
x1	0.033162	0.013664	2.427	0.041399

```

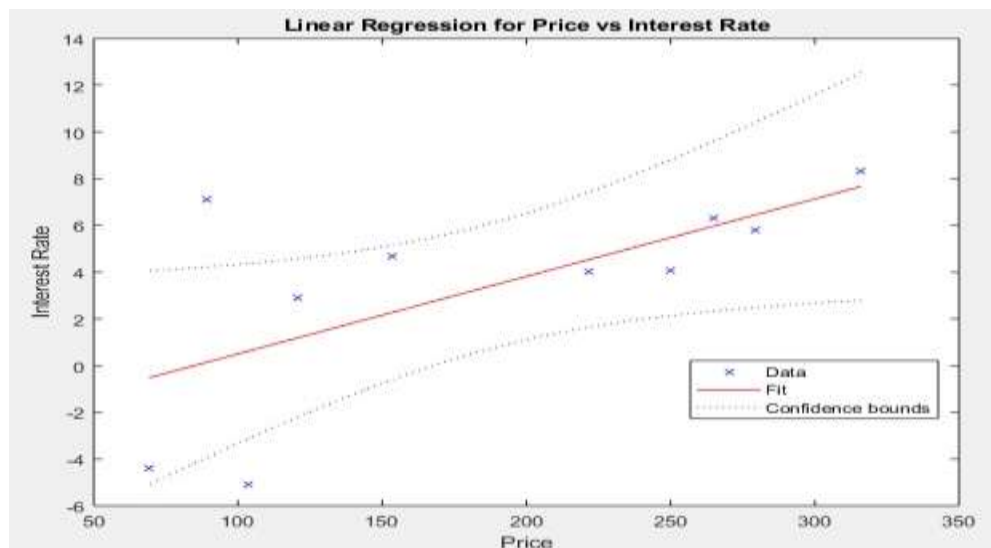
Number of observations: 10, Error degrees of freedom: 8
Root Mean Squared Error: 3.67
R-squared: 0.424, Adjusted R-Squared 0.352
F-statistic vs. constant model: 5.89, p-value = 0.0414
>> plot(mdl)
>> title('Linear Regression for Price vs Interest Rate');
>> ylabel('Interest Rate')
>> xlabel('Price')
```


We have used correlation approach to find out the strength in between both variables. I find that there is strong relationship in between both variables because the result of correlation is 0.6512 and the criteria of strong relationship is ≥ 0.5 up to 1. This suggests the many investors are interested to invest in the stock of the company in expectations of higher return besides the other marketable securities.

This is the result of Engro corporation limited company. The result of this model shows the 0.352 value of Adjusted R. square that explain the impact of a dependent variable like stock price on an independent variable like interest rate in only 35.2% at the confident interval of (1-0.0414) 95.86% and remaining 64.8% is error term that explain that there might be other variables which effects the value of stock price of this company and these result are.

Further this model shows the positive co-efficient value SE is at 0.013664 which shows the small positive relationship between both variables interest rate and stock price and these results are significant at 95.86% confident interval.

This is the graphically result of linear regression of Engro Corporation limited stock price.



Based on the analysis and findings the hypothesis (H1) is accepted. As mentioned above about (H1) hypothesis where the researcher want to measure expressive relationship between interest rate and stock price.

6. Conclusions

Based on the key findings from this study the current researcher has drawn the following conclusions.

- Objective 1: Determine the impact of interest rate on stock price of Fauji fertilizer.
- Hypothesis (H0): there is no expressive relationship between interest rate and stock price.
- Findings: the result of correlation is 0.5659 which shows there is strong relationship between interest rate and stock price.
- Conclusions: based on the analysis and findings hypothesis (H0) is rejected. The result of objective 1 is shown there is strong relationship between interest rate and stock price. If interest rate is increase the stock price is also increase, if interest rate is decrease the stock price is also decrease.
- Objective 2: Determine the impact of interest rate on stock price of Engro Corporation.
- Hypothesis (H1): there is expressive relationship between interest rate and stock price.
- Findings: the result of correlation is 0.6512 which shows there is strong relationship between interest rate and stock price.
- Conclusions: based on the analysis and findings hypothesis (H1) is accepted. Here, is also the result of objective 2 is shown there is strong relationship between interest rate and stock price. If interest rate is increase the stock price is also increase, if interest rate is decrease the stock price is also decrease.

6.1. Recommendations

- ✓ The result shows there is strong relationship between interest rate and stock price of both companies. If interest rate is increase the stock price of the both companies is also increase. So my study recommended to investor more investment on both companies stock for high return

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