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Interest Rate and Stock Prices – Evidence from India

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Abstract
This paper analyses the relationship between interest rates and stock prices in the context of India. The objectives of the paper are to investigate the impact of interest rates on stock prices and build a model for forecasting stock prices based on interest rates. Karl Pearson's coefficient of correlation and linear regression model have been applied on the time series data of eleven sectoral indices published by National Stock Exchange and Bank rates published by Reserve Bank of India for a 10 year period from 2005 and 2014. Karl Pearson's coefficient of correlation is tested for significance and coefficient of determination is also computed to assess the extent of fit of the regression model in forecasting the stock prices. The results show that six sectors (auto, bank, FMCG, financial services, IT and Pharma) out of eleven sectors were significantly impacted by the interest rate. The overall market represented by the market index (Nifty Fifty) was also impacted by the interest rate.
Keywords: Interest rate, Stock prices, Karl Pearson's coefficient of correlation, Linear Regression Model

I. INTRODUCTION

Stock markets plays an important role in the financial sector development of any economy, especially in developing economies. An efficient capital market can promote economic growth by providing long term investment opportunities that will attract both domestic and foreign capital. Interest-rate is a vital tool of monetary policy and is taken into account when dealing with macro-economic variables like investment, inflation, and unemployment. This paper aims to investigate the relationship between interest rates and stock prices from the perspective of India. Theoretically one may hypothesise that macro-economic variables impact stock prices. In isolation interest may impact the stock prices. So the present study is aimed to evaluate and analyze the impact of Interest rate on Stock prices in India.

II. REVIEW OF LITERATURE

The relationship between stock market and various economic factors such as interest rate, inflation rate etc. have been examined by researchers as they play an important role in influencing a country's economic development. Interest rates are determined by monetary policy of a country according to its economic situation. High interest rates will prevent capital outflows, hinder economic growth and consequently hurt the economy as interest rate is one of the most important factors affecting directly the growth of an economy. In the light of external factors gaining importance, some studies have been conducted to understand the relationship and quantify the impact. Some significant studies have been reviewed here.

Uddin and Alam (2009) in their study 'Relationship between interest rate and stock price: Evidence from developed and developing countries' seek evidence supporting the existence of share market efficiency based on the monthly data from January 1988 to March 2003. In their study they show empirical relationship between stock index and interest rate for fifteen developed and developing countries using time series and panel regression. They also show that for all of the countries interest rate has significant negative relationship with share price and for six countries changes of interest rate has significant negative relationship with changes of share price.

Senthil Kumar (2013) in his study 'Effect of interest rate changes on stock returns of select Indian commercial banks' investigates the long term effects of repo rate changes on seven public sector banks and six private sector banks using regression technique. He found that any increase in the interest rate adversely affects the bank stock returns.

Faff, Hodgson and Kremmer (2005) analyse the dual impact of changes in the interest rate and interest rate volatility on the distribution of Australian financial sector stock returns. In addition, a multivariate GARCH-M model is used to analyze the impact of deregulation on the financial institutions sector. It was found that there is a consistent inter temporal tradeoff between risk and return over the different regulatory periods. Moreover, finance corporations were found be highly sensitive to new shocks across the financial sector and deregulation increased the risk faced by finance corporations and small banks – effectively increasing the required rate of

return and explaining the continued rationalization of these sectors.

Muthukumaran and Somasundaram (2014) in their study 'An analytical study of interest rate and stock returns in India' estimate causality relationship between interest rate and stock returns. Using the Granger Causality test they found that there exists short term relationship among the interest rate and stock returns. Their study implies that the interest rate neither affects stock returns nor stock returns affect the interest rate.

Uddin and Alam (2010) in their study 'The impact of interest rate on stock market: Empirical evidence from Dhaka stock exchange' show empirical relationship between stock index and interest rate in Bangladesh based on monthly data from 1992 to June 2004. They tested the stationary of market return and found that DSE index does not follow random walk model, which indicated that DSE is not efficient in weak form. They determine the linear relationship between share price and interest rate, share price and growth of interest rate, growth of share price and interest rate, and growth of share price and growth of interest rate through ordinary least-square (OLS) regression. They found that interest rate has significant negative relationship with growth of share price.

III. OBJECTIVES OF THE STUDY

1. To investigate the impact of interest rate on stock prices
2. To develop a model for forecasting stock prices based on interest rate

IV. HYPOTHESIS

H0: Interest rate has no impact on stock prices
H1: Interest rate has an impact on stock prices

V. DATA AND METHODOLOGY

This study focuses on the impact of the interest rate on stock prices. The period under investigation is 10 years i.e., from January 2005 to December 2014. Hence the bank rates and closing prices of the sectoral indices from 2005-14 are considered for the research.

Eleven sectors (auto, bank, energy, FMCG, financial services, IT, media, metal, pharma, PSU bank, realty) and one market index (nifty fifty) are selected and sectoral indices are collected for those respective sectors. The closing prices of these sectoral indices were considered and then correlated with interest rates to find out the correlation between the two variables i.e., interest rates and closing prices. These sectoral indices were collected from the data base of National Stock Exchange. Bank rates were collected from the data base of RBI.

The statistical tool used for testing of the hypothesis is Karl Pearson's coefficient of Correlation. Linear Regression has been used to develop a model for forecasting stock prices based on interest rate.

VI. ANALYSIS, DISCUSSION AND RESULTS

The null and alternate hypothesis are formed in respect of each of the sector indices included in the sample. Correlation coefficient is found between the such indices over the sampling period and the interest rate. The hypothesis is either accepted or rejected based on the results of the significance test. The results of this data analysis are shown in Table 1.

Table 1

	Index	Hypothesis	r	Significance At .05 level (2 tailed)	Hypothesis accepted or rejected
1.	Nifty Auto	H0: Interest rate has no impact on Nifty Auto H1: Interest rate has an impact on Nifty Auto	.817	Significant	Rejected
2	Nifty Bank	H0: Interest rate has no impact on Nifty Bank H1: Interest rate has an impact on Nifty Bank	.746	Significant	Rejected
3	Nifty Energy	H0: Interest rate has no impact on Nifty Energy H1: Interest rate has an impact on Nifty Energy	.114	Insignificant	Accepted
4	Nifty FMCG	H0: Interest rate has no impact on Nifty FMCG H1: Interest rate has an impact on Nifty FMCG	.921	Significant	Rejected
5	Nifty Financial Services	H0: Interest rate has no impact on Nifty Financial services H1: Interest rate has an impact on Nifty Financial services	.740	Significant	Rejected
6	Nifty IT	H0: Interest rate has no impact on Nifty IT H1: Interest rate has an impact on Nifty IT	.696	Significant	Rejected
7	Nifty Media	H0: Interest rate has no impact on Nifty Media H1: Interest rate has an impact on Nifty Media	.359	Insignificant	Accepted
8	Nifty Metal	H0: Interest rate has no impact on Nifty Metal H1: Interest rate has an impact on Nifty Metal	-0.158	Insignificant	Accepted
9	Nifty Pharma	H0: Interest rate has no impact on Nifty Pharma H1: Interest rate has an impact on Nifty Pharma	0.845	Significant	Rejected
10	Nifty PSU Bank	H0: Interest rate has no impact on Nifty PSU Bank H1: Interest rate has an impact on Nifty PSU Bank	0.386	Insignificant	Accepted
11	Nifty Realty	H0: Interest rate has no impact on Nifty Realty H1: Interest rate has an impact on Nifty Realty	-0.443	Insignificant	Accepted

Regression equation is constructed for forecasting each of the indices. Further R^2 is also computed for estimating the utility of the forecast model. The results of this data analysis are shown in Table 2.

Table 2

	Index	Regression equation	R^2	Whether Forecasting model is useful ? Yes/No
1.	Nifty Auto	Y=1224.342 X - 4766.42	0.668006	No
2	Nifty Bank	Y= 2247.687 X - 5773.48	0.556951	No
3	Nifty Energy	Y= 164.2938 X + 6716.916	0.012918	No
4	Nifty FMCG	Y= 3633.655 X - 14963.6	0.84796	Yes
5	Nifty Financial Services	Y = 911.765 X - 2330.44	0.546868	No
6	Nifty IT	Y = 1293.949 X - 2641.27	0.48461	No
7	Nifty Media	Y = 152.3193 X + 629.7028	0.128945	No
8	Nifty Metal	Y = -163.531 X + 4147.165	0.025034	No
9	Nifty Pharma	Y = 1645.212 X - 6454.73	0.713233	No
10	Nifty PSU Bank	Y = 272.3806 X + 1096.297	0.148777	No
11	Nifty Realty	Y = -157.143 X + 1626.036	0.195949	No

VII. CONCLUSION

The analysis of data and discussions show that there is an impact of interest rate on stock prices. From the data analysis it is found that six sectors- auto, bank, FMCG, financial services, IT, pharma- out of eleven sectors and one market index (Nifty Fifty) were significantly impacted by the interest rate. Five sectors which did not show significant correlation with interest rate were energy, media, metal, PSU bank and realty.

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