



## Relationship Between Exchange Rate and Select Information Technology Stocks Listed in Bombay Stock Exchange of India

### KEYWORDS

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**ABSTRACT** *Indian Information Technology companies generate majority of their income from foreign countries. The volatility in exchange rate will have profound impact on their bottom line. This study examines the relationship between exchange rate and stock price of Infosys and Wipro. For this study monthly average close price of sample stocks and exchange rate (USD) are collected for the period 2004 – 2014. Before performing the analysis, closing prices are adjusted for stock splits, bonus and rights issues. Data analysis was performed in two levels. First, we measured the performance of the stock price movements. Second, we run the correlation and regression analysis to understand the association between stock prices and exchange rate. The results indicate that, Weaken Rupee has significant positive relationship with IT stock prices.*

### I. Introduction

An exchange rate between two currencies is the rate at which one currency is exchanged for another. It is also considered as the price of one currency in terms of another currency. In the retail currency exchange market, a different buying rate and selling rate is quoted. The buying rate is the rate at which dealers will buy foreign currency, and the selling rate is the rate at which they sell the currency. Exchange rate fluctuations have direct and indirect impact on company performance. The weaker currency of a country will increase exports and make imports more costly. On the other hand, a stronger currency will decrease exports and increase imports.

The Information Technology companies in India generate majority of their revenues from global markets. They have fixed contract terms with clients and irrespective of the exchange rate volatility their revenues in terms of foreign currency – predominantly USD, remains constant. However, any change in the domestic currency will influence their profit margins. When domestic currency i.e. Rupee weakens the IT companies will report more income for the same fixed dollar income. On the other hand, when Rupee becomes stronger, they report less income. For example, a company has fixed contract of USD 1 Million. When exchange rate is Rs. 45, the company revenues will be Rs. 45 Million. When the Rupee weakens to Rs. 50, the company will report revenue of Rs. 50 Million. Without any change in contract amount, due to change in the exchange rate (weaken Rupee) the company reports additional revenue of Rs. 5 Million. When the Rupee strengthens, the opposite will happen. Companies try to cover fluctuations in exchange rate through hedging strategies.

Investors keep an eye on exchange rates and makes investment decisions depending on exchange rate volatility. Their sentiments and assumptions are resembled in stock price movements. As weaken Rupee increases company revenues, there is a possibility that the stock price will increase. Earlier research proved that there exists relationship between exchange rate and company profitability.

### II. Significance of the Study

To the best of our knowledge there is little research on understanding the relationship between Exchange Rate and stock returns. This study aims to fill that gap by relating

exchange rate to stock returns. Furthermore, the study is more focused on company level and industry level analysis. I believe that investigating the causal relationship in multi stocks data is a promising research path.

### III. Need for the Study

There exists broad research on understanding the relationship between exchange rate and stock returns. However, the results are mixed. Few of the studies argue that exchange rate has negative impact on stock returns and on the other hand few studies report a positive association. There is a need to conduct an extensive study to understand the relation between exchange rates and stock prices. There is also need to know the intensity of these economic variables on companies and industries.

### IV. Scope of the Study

Scope of the current study is limited to Information Technology stocks listed in BSE Sensex. In all there are three stocks (Infosys, TCS, and Wipro). Due to insufficient data, we excluded TCS from the study. Monthly closing price values of these two stocks are sourced for a period of 11 years. The stocks are considered as dependent variables. On the other hand Exchange Rate is considered as Independent variable. The study tries to examine the impact of independent variable on dependent variables. It is assessed, whether the impact is akin to two stocks or is there any deviation. Understanding the repercussions of exchange rate is pivotal for investing in stocks.

### V. Objectives of the Study

Objectives of the current study are

1. To examine performance of IT stocks
2. To investigate the empirical relationship between exchange rate and stock prices
3. To test the causal relationship between exchange rates and stock prices
4. To assess the association between exchange rate and IT industry

### VI. Hypothesis

H1: Weaken Rupee will be positively related to stock prices of IT companies.

H2: Weaken Rupee is significantly positively related to IT industry.

## VII. Data

The period of this study is between 2003 – 2004 and 2013 -14. Monthly values of Exchange rate and stock prices were collected for 11 years beginning from 2004 - 05. All the data is sourced from official sources of Government of India. Information pertaining to companies was collected from company websites and their local offices located in Hyderabad. Whenever required we approached the officials of the companies for clarifications. We also sought help from technicians, stock traders and economists of clarifications and suggestions. Secondary Data is sourced from www.bseindia.com, www.inflation.eu, www.rbi.gov.in, www.sebi.gov.in,

## VIII. Conceptual and Statistical tools applied for analysis

We sourced the data of sample stocks for a period of 11 years. As the data belongs to a decade long period, there are stock splits, bonus issues, and rights issues etc. To know this information, initially we plotted the data of each company on graph using MS-Excel. All the stocks have either stock splits or bonus issues. Using appropriate methodology we adjusted the stock prices for splits and bonus shares. Data analysis is carried out on split adjusted stock prices.

First, we calculated the descriptive statistics (Average Price, Volatility, Skewness, and Kurtosis), of all the stocks, Inflation, and Exchange Rates on yearly basis and also for eleven years. Hypotheses testing are carried out using regression and ANOVA analysis. For each company first we considered exchange rates as independent variable and stock price as dependent variable. For each stock we carried out regression analysis. This analysis is carried out to measure the casual relation when the independent variable is high or low. Finally, we tested the hypothesis on industry.

## IX. Data Analysis

Table one presents the exchange rates and stock prices for 11 years. It is evident that there is a fluctuation in exchange rate and stock price. During the years of high exchange rate, the stock price is also high. Highest exchange rate and stock price is reported in the year 2014 followed by year 2013.

Table two shows the correlation analysis and results of hypothesis testing. Of the eleven years, the correlation between exchange rate and Wipro stock was negative for six years; however, the relation is not statistically significant. For five years there exists a statistically significant positive relation between exchange rate and Wipro. During these years the coefficient of determination, which explains the strength of association between independent and dependent variables is also high. This mean the weaken rupee has significantly influenced the stock price.

**Table 1: Average price and volatility of Exchange rate and Wipro**

Year	Exchange Rate (Avg)	SD	Price (Avg)	SD
2004	45.27	0.76	143.91	25.03
2005	44.05	0.81	185.36	19.48
2006	45.24	0.82	266.14	21.14
2007	41.37	1.83	262.29	23.46
2008	43.71	3.97	193.53	46.35
2009	48.64	1.53	222.19	84.85
2010	45.83	0.79	388.39	52.35
2011	47.03	2.81	406.56	45.74
2012	53.60	1.99	393.74	29.95
2013	58.49	3.96	432.61	67.29
2014	60.97	1.06	557.87	28.34

**Table 2: Correlation between Exchange Rate and Wipro Close Price for the period 2004 - 2014**

Year	R	R2	SE	F (1,10)	Constant	Beta	Sig.
2004	-0.13	0.02	26.03	0.17	335.68	-4.24	0.69
2005	0.81	0.65	12.12	18.41	-670.38	19.43	0.00
2006	-0.44	0.20	19.89	2.43	780.57	-11.37	0.15
2007	0.80	0.63	14.92	17.21	-158.67	10.18	0.00
2008	-0.90	0.81	21.48	41.24	651.12	-10.47	0.00
2009	-0.81	0.65	52.84	18.36	2386.24	-44.49	0.00
2010	0.02	0.00	54.89	0.01	319.55	1.50	0.94
2011	-0.39	0.15	44.17	1.80	705.41	-6.35	0.21
2012	-0.62	0.39	24.63	6.26	893.94	-9.33	0.03
2013	0.71	0.50	49.99	9.94	-269.85	12.01	0.01
2014	0.62	0.39	23.22	6.39	-461.43	16.72	0.03

Table three depicts the average annual price and standard deviation of Infosys stock. It is clearly observable that there is a linear growth in the price of Infosys stock. The standard deviations are also high this shows that Infosys stock had high volatility during the study period.

Table four presents the correlation and regression analysis of Infosys stock. Negative correlation was reported in six years, but for three years the negative correlation is not statistically significant (sig. >0.05). On the other hand when Rupee value weakened the results reported significant positive relation. In year 2005 correlation was 0.81, and coefficient of determination  $R^2$  is 0.65 at Sig. 0.00 level. Similarly in the year 2014  $r=0.84$ ,  $R^2 = 0.70$  with 0.00 sig. These results strongly support our hypothesis that weaken rupee is positively related to stock performance and company profitability.

**Table 3: Average close price and standard deviation of Infosys**

Year	Price (Avg)	SD
2004	888.70	93.61
2005	1184.16	144.39
2006	1729.37	300.97
2007	1931.23	162.82
2008	1533.03	239.20
2009	1870.53	472.18
2010	2823.06	264.58
2011	2821.04	247.62
2012	2511.83	209.72
2013	2912.54	385.52
2014	3644.42	472.61

**Table 4: Correlation between Exchange Rate and Infosys Close Price for the Period 2004 - 2014**

Year	R	R2	SE	F (1,10)	Constant	Beta	Sig.
2004	-0.46	0.21	87.42	2.61	3422.92	-55.98	0.14
2005	0.81	0.65	89.23	18.80	-5182.45	144.55	0.00
2006	0.13	0.02	312.82	0.18	-490.29	49.06	0.68
2007	0.85	0.72	91.04	25.19	-1177.01	75.14	0.00
2008	-0.65	0.42	191.47	7.17	3234.01	-38.92	0.02
2009	-0.81	0.65	291.62	18.84	13967.00	-248.69	0.00
2010	-0.23	0.06	269.77	0.58	6427.67	-78.66	0.46
2011	-0.25	0.06	251.70	0.65	3841.82	-21.70	0.44
2012	-0.81	0.65	130.11	18.58	7063.55	-84.92	0.00
2013	0.70	0.49	289.88	9.46	-1061.55	67.94	0.01
2014	0.84	0.70	270.05	23.69	-19187.09	374.50	0.00

**X. Conclusion**

This study examined the casual relationship between exchange rate and stock price performance of Information Technology stocks listed in BSE Sensex. It is hypothesized that weaken domestic currency (Rupee) will have significant positive relationship with stock prices and stronger Rupee will have negative relationship. Monthly closing prices for the period of 11 years were collected for Wipro and Infosys stocks. The results of the study reveal that weaken rupee increases the price of stocks. But, when the Rupee is stronger we didn't find any significant negative impact. This may be because of hedging strategies adapted by IT companies. As stronger will Rupee impact the bottom line of the companies, finance managers are entering into hedging contract, to cover themselves from unexpected increase in the value of domestic currency.

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