DECLARATION

I, Dr. Anindita Chakraborty, being the first author of the paper hereby declare that the paper entitled "**Foreign Exchange Rate Exposure and Stock Price: Evidence from India"** is unpublished original paper & it is not sent anywhere for publication in any journal /newspaper. This paper is prepared by me exclusively for your Journal. The secondary data collected and used absolutely for this research paper and it is not used and analyzed anywhere else. I also like to state that I had followed the guidelines for the author of this journal.

Signature

Name: Dr. Anindita Chakraborty

Designation: Asst. Professor

Official address: Faculty of Management Studies, Banaras Hindu University

Phone No: 096215-22587, 094253-40768

E-Mail Address: aninditachakraborty19@gmail.com

FOREIGN EXCHANGE RATE EXPOSURE AND STOCK PRICE: EVIDENCE FROM INDIA

Dr. Anindita Chakraborty, Asst. Professor, Faculty of Management Studies,
Banaras Hindu University, Varanasi, Ph: 096215-22587/094253-40768
E-mail id: aninditachakraborty19@gmail.com.

Abstract

This paper examines the foreign exchange exposure of a sample of Indian importing and exporting firms. Using daily data, the study construct estimates of the exchange rate sensitivity of the firms with the help of Adler & Simon model (1986) and Jorion's approach (1990). The findings of the study revealed that 15 % of sample firms had a positive and significant economic exposure for the examined period in case of NSE listed companies whereas 7% for BSE listed companies when exposure was calculated through Adler & Simon model (1986). Further the application of Jorion's approach (1990) revealed that 46 % of sample firms have a positive and significant economic exposure for the examined period in case of NSE listed companies whereas 11% for BSE listed companies where level of significance is 10%. The proportion and mean exposure coefficient were high for exporter companies compare to non-exporter.

Key words: Foreign exchange exposure, Transaction exposure, Economic exposure, Translation exposure

Introduction

Ever since the collapse of the Bretton Woods fixed-parity system in the early 1970s, the volatility of exchange rates and its associated risks have become an increasingly important constituent of multinational financial management. As the nature of business becomes international, many firms are exposed to risk of fluctuating exchange rates. Foreign exchange risk refers to the adverse effects of changes in foreign exchange rates on firm's income and equity. Changes in exchange rates may affect the settlement of contracts, cash flows and the valuation of the firms. Therefore, it becomes necessary for the managers to know the firm's foreign currency exposure and thus manage the exposure. The wide currency fluctuations

experienced during the last few decades results in the ever more keen interest in the potential exposure of multinational firms to foreign exchange rate risk, and this issue has initiate a considerable amount of research.

Numerous research papers analytically focus on the exchange rates and examined that it is a major source of uncertainty for multinational firms (Jorion, 1990) and therefore exchange rate risk is of great concern to both market participants and managers. The investors are concerned with the impact of unexpected changes in the exchange rate as it relates to portfolio values, whereas the managers are concerned with the exposure of the firm as it relates to profitability (Pantzalis et al, 2001). Exchange rate fluctuations affect operating cash flows and firm value through translation, transaction, and economic effects of exchange rate risk exposure (Choi and Prasad, 1995).

The estimation of exchange rate exposure is a relatively new area in multinational finance (Bodnar and Wong, 2000). From theoretical perspective there are three types of exposures: transaction, economic and translation exposure. Transaction exposure can be defined as the sensitivity of the realized domestic currency values of the firm's contractual cash flows denominated in foreign currencies to unexpected exchange rate changes. Economic exposure can be defined as the extent to which the values of the firm would be affected by the unanticipated changes in the exchange rate. The changes in the exchange rates can have a profound effect on the firm's competitive position in the world market and the thus on its cash flows and market value. While translation exposure refers to the potential that the firm's consolidated financial statements can be affected by changes in exchange rates. Thus, exchange rate changes have important implications for financial decision-making and for firm profitability.

This paper studies the exchange rate exposure of firms involved in international trading. Like many firms, companies involved in international trading are highly affected by exchange rate fluctuations; it affects most directly those firms which are involved in foreign currency transactions and foreign operations. Even without such activities, exchange rates also affect all industries indirectly. Adler and Dumas (1984) showed that even firms whose entire operations were domestic then also they may be affected by exchange rates, if their input

and output prices were influenced by currency movements. The purpose of this paper is to examine the size and significance of the exchange rate exposure of the Indian listed companies. To that end, the paper first estimate the exchange rate sensitivity of the equity returns of a sample of NSE and BSE listed import and export companies and then estimate the overall impact. Two models were used to estimate the foreign exchange rate sensitivity such as Adler & Simon model (1986) and Jorion's approach (1990).

Model for Economic Exposure Measurement

To measure the Indian firms' economic exposure *Adler & Simon (1986)* model was used. The paper measure economic exposure as the slope coefficient from a regression of stock returns on exchange rates.

$$R_{it} = \alpha_i + \beta_i e_t + e_{it} \quad (1)$$

α_i = constant term, R_{it} = Stock return for firm i, e_t = Percentage change in exchange rate

The coefficient β_i represents the sensitivity of a company i's stock returns to exchange rate movements. In the model exchange rate quotation is direct quotation for INR/USD.

The study further used *Jorion's approach (1990)*. Jorion (1990) introduced another macroeconomic variable i.e. market return to control for market movements.

$$R_{it} = \alpha_i + \beta_{1i} e_t + \beta_{2i} R_{mt} + e_{it} \quad (2)$$

α_i = constant term, R_{it} = Stock return for firm i, e_t = Percentage change in exchange rate,

R_{mt} = Market return

Review of Literature

The currency risk exposure was firstly documented by Lessard (1979) and the researcher examined the extent to which the nature of currency risk exposure changes as the period for which one considers the exposure is farther in the future. According to Jorion (1990) exchange-rate exposure was related to the portion of total sales made in a foreign country by US multinationals. He thus admits that exchange rate risk appears to be diversifiable. If exposure could be priced in an arbitrage pricing framework, then the firms could hedge the exposure. Bartov et al (1996) examined that the volatility of both current and future cash flows of internationally active as well as domestic firms has been rising since the collapse of fixed parity regime and results in the currency risk exposure.

Shapiro (1975) concluded that the main determinants of exchange rate risk are the proportion of foreign sales, the substitutability of production factors, and the

level of intensity of competition. Corporations with a high proportion of foreign sales, or with direct foreign investment, will experience significant exposure to exchange rate fluctuations. While Choi and Prasad (1995) depicted that the exchange risk sensitivity of firms depends on their operating profiles, financial strategies, and other firm-specific variables. It is discerning that the cash flow sensitivity of a firm to exchange rates should depend on the nature of a firm's activities, such as the extent to which it imports/exports, its involvement in foreign operations, the currency denomination of its competition, and the competitiveness of its input and output markets. Adler and Dumas (1984) showed that exposure to exchange rate risk is similar to that of market risk measured in the traditional sense. Therefore, the average exposure to exchange risk can be obtained by regressing the stock returns on the changes of exchange rates. Bodnar and Wong (2000) revealed that the theoretical examination of exposure coincides with the interest of a firm's managers in understanding how their firm's cash flows will be affected by exchange rate change in order to make value-maximizing risk management decisions.

Bodner and Gentry (1993) examined industry level exposures for three countries, Canada, Japan and USA. They revealed that some industries in all three countries had significant exposure. Several studies focused on the some companies and they demonstrated that exporter firms' stock values are more sensitive to change in foreign exchange rates (Mao and Kao, 1990; Bortov and Bodnar, 1992). Bartram and Karolyi (2006) found that the foreign exchange rate exposure of nonfinancial firms is systematically related to firm characteristics, regional factors and industry characteristics. Adjas et al (2008) looked at the relationship between stock markets and foreign exchange market, and examined whether movements in exchange rates have an effect on stock market in Ghana. They found that there was negative relationship between exchange rate volatility and stock market returns – a depreciation in the local currency leads to an increase in stock market returns in the long run. Where as in the short run it reduces stock market returns.

The studies on emerging markets include Mishra (2004), Adjas et al (2008); and Koutmos et al (1993). In the studies of Smith (1992) and Apte (2001) they have found a significant positive relationship

between stock prices and exchange rates while others, like Ajayi and Mougoue (1996), Mao and Kao (1990) have reported a significant negative relationship between the two variables. Whereas in some studies of Bartov and Bodnar (1994), Frank and Young (1972), they have reported very weak or no relationship between stock prices and exchange rates. While studies have so far documented weak relationships between exchange rates and stock returns, international evidence focusing on more open economies yield more significant currency risk exposure. Thus there is always a question of debate which needs to be answered. Therefore this study will be helpful and add new dimension to the existing theory and research.

Objectives of the Study

1. To evaluate the exchange rate sensitivity INR/USD with the help of Adler & Simon model (1986).
2. To evaluate the exchange rate sensitivity INR/USD with the help of Jorion's approach (1990).
3. To open new vistas for further research.

Research Methodology

The study was empirical in nature and the total population of the study consisted of all the listed companies of India those who are involved in international trade i.e. importing and exporting. The time frame of the study was from the year 2000-2010 and the sample size was 30 listed companies from BSE and NSE which are involved in international trade. The sampling element of the study was stock prices, exchange rate and market prices of the listed companies. Purposive sampling technique was used to complete the study and the data was collected from secondary sources through official website of NSE, BSE and yahoo finance.

Tools for Data Analysis

1. Adler & Simon model (1986)

$$R_{it} = \alpha_i + \beta_i e_t + e_{it}$$

α_i = constant term

R_{it} = Stock return for firm i.

e_t = Percentage change in exchange rate

2. Jorian's Approach (1990)

$$R_{it} = \alpha_i + \beta_{1i} e_t + \beta_{2i} R_{mt} + e_{it}$$

α_i = constant term

R_{it} = Stock return for firm i.

e_t = Percentage change in exchange rate

R_{mt} = Market return

Result and Discussion

In this study two models were applied and ordinary least square regression was used to estimate both the models. Exchange rate sensitivity of firm value was measured by using stock return, firstly, regressed real effective exchange rate on all sample value. Then sample was divided into two groups Exporter and Importer companies and exchange rate sensitivity of each group was examined.

1. **Adler and Simons Model**
   a) **Impact of Exchange Rate Sensitivity on Stock Prices of Exporter companies**

Ho (1): There was no significant impact of Exchange Rate Sensitivity on Stock Price of exporter companies.

Table 1: Index wise effect of Exchange Rate Sensitivity on Stock Price of exporter companies of NSE

S. no	Company name	R-square	F value	Significant value	Equation Stock return= alpha+ beta*forex rate	Hypothesis Rejected/ Not Rejected
1	Arvind Mills Ltd	.000	.561	.454	=.022+(-.022)*forex rate	Not Rejected
2	Ashok Leyland	.000	.617	.432	=.068+.030* forex rate	Not Rejected
3	Asian Paints	.000	.002	.546	=.070+(-.018)* forex rate	Not Rejected
4	ASIL	.006	4.209	.041	=-.127+.040* forex rate	Rejected
5	Birla Power	.005	4.733	.030	=.382+(-.010)* forex rate	Rejected
6	Cipla	.003	5.420	.020	=-.079+.001* forex rate	Rejected
7	Escorts	.000	.647	.421	=-.051+(-.033)* forex rate	Not Rejected

8	Hexaware	.000	1.052	.305	=.006+.009* forex rate	Not Rejected
9	Infosys	.000	.003	.959	=.000+(-.067)* forex rate	Not Rejected
10	Liberty Shoe	.001	1.979	.160	=-.033+.004* forex rate	Not Rejected
11	Maruti	.001	1.512	.219	=.115+.017* forex rate	Not Rejected
12	Mastek	.000	.042	.837	=.034+.022* forex rate	Not Rejected
13	Mphasis	.000	.000	.989	=-.030+.022* forex rate	Not Rejected
14	P & G Hygine	.000	.378	.539	=-.071+010* forex rate	Not Rejected
15	Patni	.000	.222	.638	=-.038+.016* forex rate	Not Rejected
16	Philips Carbon	.008	16.605	.000	=-.117+.002* forex rate	Rejected
17	Polaris	.001	1.270	.260	=-.092+(-.001)* forex rate	Not Rejected
18	TCS	.000	.136	.713	=-.093+.049* forex rate	Not Rejected
19	Tech Mahindra	.001	.745	.388	=.028+(-.036)* forex rate	Not Rejected
20	Wipro	.000	.235	.628	=.048+(-.002)* forex rate	Not Rejected

The impact of exchange rate volatility on stock price of NSE export companies was insignificant at 5% level of significance, except ASIL, Birla Power, Cipla & Polaris. The value of Beta was positive for Ashok Leyland, Asil, Cipla, Hexaware, Liberty Shoes, Maruti, Mastek, Mphasis, P&G, Patni, Philips Carbon & TCS which indicate

positive relationship between exchange rate sensitivity and stock return but in case of rest of the companys' stock prices showed negative relationship.

Table 2: Index wise effect of Exchange Rate Sensitivity on Stock Price of exporter companies of BSE

S. no.	Company name	R-square	F value	Significant value	Equation Stock Return= (alpha+ beta)*forex rate	Hypothesis Rejected/ Not Rejected
1	Aditya Ispat	.000	.027	.870	=.077+(-.004) (forex rate)	Not Rejected
2	Amit Spinning	.005	2.840	.092	=.050+(-.068) (forex rate)	Not Rejected
3	Arvind Mills	.001	1.257	.262	=.046+.025 (forex rate)	Not Rejected
4	Asian Paints	.001	1.532	.216	=.106+.027 (forex rate)	Not Rejected
5	Atlas Cycle	.001	2.402	.121	=.041+.030 (forex rate)	Not Rejected
6	Birla Power	.000	.138	.710	=-.099+.007 (forex rate)	Not Rejected
7	Cipla	.002	3.672	.056	=-.068+(-.047) (forex rate)	Not Rejected
8	Escorts	.000	.653	.419	=.065+(-.018) (forex rate)	Not Rejected
9	Hexaware	.000	.072	.788	=.118+.006 (forex rate)	Not Rejected
10	Infosys	.000	.126	.723	=-.002+(-.008) (forex rate)	Not Rejected
11	Liberty Shoe	.001	2.329	.127	=.017+(-.031) (forex rate)	Not Rejected

12	Maruti	.000	.007	.933	=.116+.002 (forex rate)	Not Rejected
13	Mastek	.000	.010	.919	=-.050+.002 (forex rate)	Not Rejected
14	Mphasis	.001	1.678	.195	=.026+(-.027) (forex rate)	Not Rejected
15	Philips Carbon	.000	.880	.348	=.108+.021 (forex rate)	Not Rejected
16	Polaris	.000	.271	.603	=-.065+(-.010) (forex rate)	Not Rejected
17	TCS	.000	.432	.511	=.085+(-.014) (forex rate)	Not Rejected
18	Tech Mahindra	.000	.475	.491	=.021+.022 (forex rate)	Not Rejected
19	Wipro	.000	.088	.767	=-.067+(-.007) (forex rate)	Not Rejected

The impact of exchange rate volatility on stock return of BSE export companies was insignificant for all the exporter companies thus there was no significant impact of exchange rate sensitivity on the stock returns at 5% level of significance. The value of beta was negative for Aditya Ispat, Amit spinning, Cipla, Escorts, Infosys, Liberty Shoes, Mphasis, Polaris, TCS & Wipro which showed negative relationship of exchange rate sensitivity and stock return but rest of the companies shows positive relationship.

b) Impact of Exchange Rate Sensitivity on Stock Prices of Importer companies

Ho (2): There was no significant impact of Exchange Rate Sensitivity on Stock Price of importer companies.

Table 3: Index wise effect of Exchange Rate Sensitivity on Stock Price of importer companies of NSE

S.	Company name	R-	F	Significa	Equation	Hypothesis

no		square	value	nt value	Stock return= alpha+ beta*forex rate	Rejected/ Not Rejected
1	Apollo Importer	.000	.067	.796	=-.036+.008* forex rate	Not Rejected
2	Ashok Leyland	.000	.099	.753	=-.022+.002* forex rate	Not Rejected
3	BHEL	.000	.033	.953	=-.128+(-.001)* forex rate	Not Rejected
4	Crompton Greaves	.000	.347	.556	=-.025+.024* forex rate	Not Rejected
5	Hindu Zinc	.000	.160	.689	=-.206+(-.009)* forex rate	Not Rejected
6	Salora	.000	.950	.330	=-.040+.034* forex rate	Not Rejected

The impact of exchange rate volatility on stock return of importer companies was insignificant at 5% level of significance. The value of beta was negative for BHEL & Hindu Zinc which indicates negative relationship of exchange rate volatility and stock return. But rest of the companies shows positive relationship with Exchange rate volatility.

Table 4: Index wise effect of Exchange Rate Sensitivity on Stock Price of importer companies of BSE

S. no	Company name	R-square	F value	Significant value	Equation Stock return= alpha+ beta*forex rate	Hypothesis Rejected/ Not Rejected
1	Apollo Tyres	.000	.339	.561	=.067+(-.020) (forex rate)	Not Rejected
2	Ashok Leyland	.000	.027	.870	=.074+.004 (forex rate)	Not Rejected

3	BEL	.001	1.127	.289	= .099+(-.023) (forexrate)	Not Rejected
4	BHEL	.000	.400	.527	=.125+(-.014) (forex rate)	Not Rejected
5	Crompton Greaves	.000	.037	.847	=.040+(-.006) (forex rate)	Not Rejected
6	Hindu Zinc	.000	.357	.550	=.207+.013 (forex rate	Not Rejected
7	Jamna Auto	.000	.264	.607	=.073+.013 (forex rate)	Not Rejected
8	Salora	.000	.468	.494	=(-.103+.014) (forex rate)	Not Rejected

The impact of exchange rate volatility on stock return of importer companies which were listed in BSE was insignificant. The stock return of Apollo Tyres, Bharat Electrics Limited, Bharat Heavy Electricals Limited and Crompton Greaves showed negative relationship with exchange rate volatility and rest of the companies' stock return shows positive relationship.

c) Foreign Exchange Exposure of Indian Companies listed in NSE.

Table 5: Foreign Exchange Exposure of Indian Companies BSE.

Sample size	**All Firms**	**Exporters**	**Importers**
	26	**20**	**6**
Significant at 5%			
Number of Firms	4	4	0
Percent of Total	15%	20%	0%
Significant at 10%			
Number of Firms	4	4	0
Percent of Total	15%	20%	0%

In Table 5, the results of the first model were summarized. Percentage of firms with significant exposure was presented in three groups as; all firms, exporters and importers. In the sample of 26 companies were included while 20 companies were exporters and 6 companies were importers. Exporter firms' exposure range from 2.18 – 19.858, mean exposure coefficient was -.206 - .359. For importer firms, exposure coefficient ranges from 9.804 – 4.719, but their mean exposure coefficient was ranges from -.206 - .128. In Table, it was indicated that 4 (15%) companies had significant exposure in case of all firms. It was seen that none importer companies had significant exposure in the sample, only 4 (20%) exporters had significant exposure in the sample. 10 companies' β coefficients were negative and 16 companies' were positive which reveals that most of the companies' stock returns appreciate with a increase in Exchange Rate .

d) Foreign Exchange Exposure of Indian Companies listed in BSE.

Table 6: Foreign Exchange Exposure of Indian Companies BSE.

Sample size	**All Firms**	**Exporters**	**Importers**
	27	**19**	**8**
Significant at 5%			
Number of Firms	0	0	0
Percent of Total	0%	0%	0%
Significant at 10%			
Number of Firms	2	2	0
Percent of Total	7%	10%	0%

In Table 6, the results of the first model were summarized. Percentage of firms with significant exposure was presented in three groups as; all firms, exporters and importers. In the sample of 27 companies were included while 19 companies were exporters and 8 companies were importers. Exporter firms' exposure range from 1.683 - 6.056, mean exposure coefficient was -.102- .116. For importer firms, exposure range from 5.535 – 1.81, mean coefficient ranges from -.103 - .126. In Table, it was indicated that none companies had significant exposure. 14 companies' β coefficients were negative and

9 companies' were positive which reveals that most of the companies' stock returns appreciate from Exchange Rate volatility.

2. Jorian's Approach

e) Impact of Exchange Rate Sensitivity on Stock Prices of Exporter companies

Ho (3): There was no significant impact of Exchange Rate Sensitivity and Market Return on Stock Price of exporter companies.

Table 7: Index wise effect of Exchange Rate Sensitivity and Market Return on Stock Price of exporter companies of NSE

S. no	Company name	Adjusted R-square	F value	Significant value	Equation Stock return = (alpha+ beta)*forex rate + beta (market return)	Hypothesis Rejected/ Not Rejected
1	Arvind Mills Ltd	-.001	.122	.885	=.038+(-.008)* forex rate+ (-.010)(market return)	Not Rejected
2	Ashok Leyland	.000	.588	.556	=(.066+.030)* forex rate+.016 (market return)	Not Rejected
3	Asian Paints	.000	.416	.660	=.055+(-.023)* forex rate+.020 (market return)	Not Rejected
4	ASIL	-.001	2.103	.123	=(-.131+.040)* forex rate+.008 (market return)	Not Rejected
5	Birla Power	-.002	2.374	.760	=.336+(-.010)* forex rate+.023 (market return)	Not Rejected
6	Cipla	.001	3.165	.042	=-.069+(-.001)* forex rate+(-.042) (market return)	Rejected
7	Escorts	.001	99.290	.000	=-.056+(-.032)* forex rate+.021 (market return)	Rejected
8	Hexaware	-.001	4.214	.015	=-.001+.007* forex rate+.011 (market return)	Rejected

9	Infosys	.005	1.520	.219	=.009+(-.068)* forex rate+(-.041) (market return)	Not Rejected
10	Liberty Shoe	.000	27.404	.000	=(-.026+.003)* forex rate+(-.032) (market return)	Rejected
11	Maruti	-.001	.821	.440	=.115+.017* forex rate+(-.001) (market return)	Not Rejected
12	Mastek	.002	5.081	.006	=.067+.020* forex rate+(-.052) (market return)	Rejected
13	Mphasis	.000	.278	.758	=(-.025+.020)* forex rate(-.009) (market return)	Not Rejected
14	P & G Hygine	.000	8.578	.000	=(-.073+.011)* forex rate+.021 (market return)	Rejected
15	Patni	.003	10.265	.000	=(-.047+.018)* forex rate+.061 (market return)	Rejected
16	Philips Carbon	-.001	12.122	.000	=(-.118+.002)* forex rate+.002 (market return)	Rejected
17	Polaris	.000	.902	.406	=(-.135+.019)* forex rate+(-.014) (market return)	Not Rejected
18	TCS	.001	16.154	.000	=(-.092+.049)* forex rate+(-.001) (market return)	Rejected
19	Tech Mahindra	.000	.802	.449	=.033+(-.036)* forex rate+(-.018) (market return)	Not Rejected
20	Wipro	.001	37.198	.000	=.031+(-.001)* forex rate+.048 (market return)	Rejected

The impact of exchange rate volatility and market return on stock price of NSE export companies was insignificant, except Cipla, Escorts, Hexaware, Liberty Shoes, Mastek, P&G, Patni, Philips carbon, TCS & Wipro. The value of Beta was negative for Arvind Mills, Asian Paints, Birla power, Cipla, Escorts, Infosys, Tech Mahindra & Wipro which indicate negative relationship of exchange rate volatility and market return with stock return but rest of the companies'

stock return shows positive relationship with Exchange rate volatility and market return.

Table 8: Index wise effect of Exchange Rate Sensitivity and Market Return on Stock Price of exporter companies of BSE

S. no	Company name	Adjusted R-square	F value	Significant value	Equation Stock return = (alpha+ beta)*forex rate + beta (market return)	Hypothesis Rejected/ Not Rejected
1	Aditya Ispat	.000	.146	.864	=.073+.012 (forex)+.000 (market return)	Not Rejected
2	Amit Spinning	.000	.699	.497	=.052+.042 (forex) +(-.021) (market return)	Not Rejected
3	Arvind Mills	.000	.699	.497	=.052+.042 (forex)+(-.021) (market return)	Not Rejected
4	Asian Paints	.000	.723	.486	=.108+.026 (forex)+-.003(market return)	Not Rejected
5	Atlas Cycle	.002	3.285	.038	=.049+.034 (forex)+.037 (market return)	Rejected
6	Birla Power	.000	.383	.682	=-.076+.005 (forex)+-.017(market return)	Not Rejected
7	Cipla	.002	2.535	.080	=(-.060)+ (.051) (forex)+(-.029) (market return)	Not Rejected
8	Escorts	.000	.606	.546	=.076+(-.024) (forex)+-.009 (market return)	Not Rejected
9	Hexaware	.001	1.873	.154	=.121+.004 (forex)+-.042(market return)	Not Rejected
10	Infosys	.000	.316	.729	=.000+(-.008) (forex)+ -.015 (market return)	Not Rejected
11	Liberty Shoe	.000	1.468	.231	=.015+(-.034) (forex)+ (.007)(market return)	Not Rejected
12	Maruti	.000	.102	.903	=.123+.003(forex)+ (-.010)	Not

					(market return)	Rejected
13	Mastek	.000	.318	.728	=-.035+.000 (forex)+(-.798))(market return)	Not Rejected
14	Mphasis	.001	1.581	.206	=.032+(-.029)(forex)+ (-.002) (market return)	Not Rejected
15	Philips Carbon	.000	.642	.526	=.128+.024(forex)+(-.008) (market return)	Not Rejected
16	Polaris	.000	1.324	.266	=-.062+(-.013)(forex)-.030)(market return)	Not Rejected
17	TCS	.000	.612	.542	=.085+(-.013)(forex)+-.019	Not Rejected
18	Tech Mahindra	-.001	.241	.786	=.021+(.-022)(forex)+-.003	Not Rejected
19	Wipro	.000	.088	.916	=-.072+(-.009)(forex)+-.071	Not Rejected

The impact of exchange rate volatility and market return on stock return of BSE export companies was insignificant except Atlas Cycle. The value of beta was negative for TCS, Tech Mahindra, Escorts, Infosys, Liberty Shoes, Mphasis, Polaris and Wipro which indicates negative relationship of Exchange rate volatility and market return with stock return but rest of the companies' stock return showed positive relationship with Exchange rate volatility and market return.

f) Impact of Exchange Rate Sensitivity on Stock Prices of Importer companies

Ho (4): There was no significant impact of Exchange Rate Sensitivity and Market Return on Stock Price of importer companies.

Table 9: Index wise effect of Exchange Rate Sensitivity and Market Return on Stock Price of importer companies of NSE

S. no	Company name	Adjusted R-	F value	Significant value	Equation Stock return = (alpha+	Hypothesis Rejected/

		square			beta)*forex rate + beta (market return)	Not Rejected
1	Apollo	.000	.034	.976	=-.061+(-.012)* forex rate+ (-.007) (market return)	Not Rejected
2	Ashok Leyland	-.001	.499	.607	=-.050+(-.009)* forex rate+ (-.009) (market return)	Not Rejected
3	BHEL	-.001	7.196	.001	=-.124+(-.001)* forex rate+ (-.010) (market return)	Rejected
4	Crompton Greaves	-.001	.	.000	=(-.040+.024)* forex rate+.017 (market return)	Rejected
5	Hindu Zinc	-.001	2.205	.111	=-.206(-.009)* forex rate+.001 (market return)	Not Rejected
6	Salora	.001	1.372	.254	=(.024+.040)* forex rate+(-.004) (market return)	Not Rejected

The impact of Exchange rate volatility and market return on stock return of importer companies which were listed in NSE was insignificant except BHEL & Crompton greaves. The value of Beta was positive for Crompton greaves and Salora which indicate positive relationship of Exchange rate volatility and market return with stock return. But rest of the companies' stock return showed negative relationship with Exchange rate volatility and market return.

Table 10: Index wise effect of Exchange Rate Sensitivity and Market Return on Stock Price of importer companies of BSE

S. no	Company name	Adjusted R-square	F value	Significant value	Equation Stock return = (alpha+ beta)*forex rate + beta	Hypothesis Rejected/ Not

					(market return)	**Rejected**
1	Apollo Tyres	.036	16.174	.000	=.053+(-.021) (forex) +.195(market return)	Rejected
2	Ashok Leyland	-.001	.062	.940	=-.072+.005 (forex)+.008 (market return)	Not Rejected
3	BEL	.000	.007	.493	=.101+(-.024) (forex)+ (-.011) (market return)	Not Rejected
4	BHEL	.000	.981	.375	=.129+(-.012) (forex)+ .028 (market return)	Not Rejected
5	Crompton Greaves	.000	.879	.415	=.044+(-.004) (forex) + (-.040) (market return)	Not Rejected
6	Hindu Zinc	.000	.298	.743	=.208+.013(forex)+ .012 (market return)	Not Rejected
7	Jamna Auto	.000	.163	.850	=.074+.012(forex)+(-.006) (market return)	Not Rejected
8	Salora	.000	.791	.454	=(.124)+.012(forex)+.028 (market return)	Not Rejected

The impact of exchange rate volatility and market return on stock return of importer companies which were listed in BSE was insignificant except Apollo Tyres. The stock return of Apollo Tyres, BEL, BHEL, Crompton Greaves shows negative relationship with exchange rate volatility and market return with stock return and rest of the companies' stock return showed positive relationship.

g) Foreign Exchange Exposure of Indian Companies listed in NSE.

Table 11: Foreign Exchange Exposure of Indian Companies listed in NSE

Sample size	**All Firms**	**Exporters**	**Importers**
	26	**20**	**6**
Significant at 5%			

Number of Firms Percent of Total	12 46%	10 50%	2 33%
Significant at 10% Number of Firms Percent of Total	12 46%	10 50%	2 33%

In Table 11, the results of the first model were summarized. Percentage of firms with significant exposure was presented in three groups as; all firms, exporters and importers. In the sample of 26 companies were included while 20 companies were exporters and 6 companies were importers. Exporter firms' exposure range from 9.804 – 1.685 mean exposure coefficient was -.206 - .358. For importer firms, exposure ranges from 9.80 - 44.72, mean exposure coefficient was -.128 - .0633. In Table, it was indicated that 12 (46%) companies had significant exposure. It was seen that more companies had significant exposure than importers in the sample, only 2 (33%) importers had significant exposure and 10 (50%) companies had significant exposure in the sample. 12 companies' β coefficients were negative and 14 companies' were positive which reveals that most of the companies' stock returns appreciate with a increase in Exchange Rate .

h) Foreign Exchange Exposure of Indian Companies listed in BSE

Table 12: Foreign Exchange Exposure of Indian Companies listed in NSE

Sample size	**All Firms**	**Exporters**	**Importers**
	27	**19**	**8**
Significant at 5% Number of Firms Percent of Total	2 7%	1 5%	1 12.5%
Significant at 10% Number of Firms Percent of Total	3 11%	2 10%	1 12.5%

In Table 12, the results of the first model were summarized. Percentage of firms with significant exposure was presented in three groups as; all firms, exporters and importers. In the sample of 27 companies were included while 19 companies were exporters and 8 companies were importers. Exporter firms' exposure range from 6.056 to 1.683, mean exposure coefficient was -.0788 to 0.122. For importer firms, exposure ranges from 5.53 to 1.81, mean exposure coefficient was ranges from -.116 to 0.206. In Table, it was indicated that 1 exporter and 1 importer had significant exposure in the sample. 12 companies' β coefficients were negative and 15 companies' were positive which reveals that most of the companies' stock returns appreciate from an increase in Exchange Rate.

Conclusion and Suggestions

Exchange rate volatility has attracted much attention in financial economics in developed and developing countries due to its implications in the financial markets, especially the stock market. Different implications were observed among exchange rate volatility and stock market returns – depreciation in the local currency leads to increases in stock market prices in the long run. Where as in the short run it reduces stock market returns. This study was undertaken to determine the effect of exchange rate exposure on stock returns of exporter and importer companies in India. The results showed that there was an inverse relationship between exchange rate exposure and stock market returns like the studies of Bartov and Bodnar (1994) and Frank and Young (1972). The study also indicated that there was the presence of foreign exchange exposure for some of the listed exporter and importer companies. Thus the study provides mixed results. This gives an indication that changes in the trade-off between risk and return is predictable thus serving as a useful guide for risk management and the investors can hedge this risk with better risk management tools. This also implies that investors may use macroeconomic variables to forecast stock market volatility.

Further this also gives an indication to the sample companies that they should also hedge their risk. The volatile nature of the foreign exchange rate market results in the increased use of forward contracts as the firms that import raw materials or market their product internationally need to make use of these instruments to hedge their payables and receipts. This will enable them

to lock in so as to go round the problem of exchange rate volatility. It is also recommended that investors could take into consideration the nature of volatility in the exchange and other macroeconomic variables in the economy to make an informed decision as to where to direct their investments. So that whenever the local currency depreciates, it is a signal that the stock market returns is likely to appreciate; especially for an import dominated economy. But this argument is based on an improvement in the international competitiveness of the local firms. Finally, it is suggested that based on this study other researchers can use data for other countries and periods of time to study further the macroeconomic determinants of stock market and foreign exchange market volatility.

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