

Does Firms Have Impact of Currency Appreciation and Currency Volatility on Market Shares?—Study of Selected Financial and Non-Financial Firms of India

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How to cite this paper: Soni, R. (2018) Does Firms Have Impact of Currency Appreciation and Currency Volatility on Market Shares?—Study of Selected Financial and Non-Financial Firms of India. *Theoretical Economics Letters*, 8, 1004-1017. <https://doi.org/10.4236/tel.2018.85069>

Received: February 14, 2018

Accepted: April 10, 2018

Published: April 13, 2018

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Abstract

This study concentrates on the new emerging challenges, opportunities and issues in the field of Exchange Rate Risk. It highlights the strong and significant negative impact from currency appreciation and currency volatility on market shares of India's Exporting Financial and Non-Financial IT firms. Quantitative data analysis of companies has been done and evaluating the Sales/Revenue growth performance of Indian firms on various measures/factors like operating profit, gross profit, net profit etc. Further, we identify the dependent and independent variables and predict the factors that highly influence the fluctuations in Exchange rate. Finally, we suggest a model at the end and offer Suggestions and Recommendations to mitigate this risk arising due to currency fluctuations and increase the investor's awareness about financial derivatives leading to important policy implications so as to make forex gains on account of hedging using forward contract rather than just aiming to square off its position.

Keywords

Exchange Rate, Export, Performance, Risk, Currency

1. Introduction

Foreign exchange risk also known as FX risk, exchange rate risk or currency risk, is a financial risk that exists when a financial transaction is denominated in a currency other than that of the base currency of the company. Foreign exchange risk also exists when the foreign subsidiary of a firm maintains financial statements in a currency other than the reporting currency of the consolidated entity.

The risk is that there may be an adverse movement in the exchange rate of the denomination currency in relation to the base currency before the date when the transaction is completed. Investors and businesses exporting or importing goods and services or making foreign investments have an exchange rate risk which can have severe financial consequences; but steps can be taken to manage (*i.e.*, reduce) the risk.

2. Exchange Rate and Firm-Level Exports

The overall trade activity of a country is a sum of the decisions of individual firms. Hence, understanding the effects of exchange-rate changes on trade balance calls for an analysis of how exchange-rate fluctuations affect the decisions of individual firms. Such analysis provides insights into the varied responses across firms to exchange-rate movements and related policy implications of central bank's efforts to manage and stabilize foreign-exchange fluctuations.

Compared with other firms, exporting firms are usually associated with higher levels of productivity and profitability. Moreover, a strong export sector might generate positive effects for other sectors that promote overall economic growth. India has witnessed strong economic performance coupled with a strong export sector in the past decade. Thus, it is quite conceivable that export-promoting policies are conducive to economic growth. Against this background, we explore how fluctuations in the exchange rate affects decisions of Indian exporting firms, and whether the data suggests a weakening of the link between REER and exports.

Using a rich firm-level dataset, I will examine the varied responses of firms to exchange-rate fluctuations in a large developing economy. Some of the questions that will be dealt with will include:

- What is the impact of exchange-rate depreciation (appreciation) on exports of Indian manufacturing firms?
- Does the textbook prediction that exchange-rate depreciation (appreciation) boosts (deters) exports hold for Indian firms or is there no significant association?
- What are the firm-specific features that influence their export responses to exchange-rate changes?
- What are the macro features of the economy as a whole that impact firm-level export responses to exchange-rate movements?

3. Review of Literature

Charlie, Adith & Singh, S Ronendra 2013 [1], this study examines the forex gains or losses on the profit and loss side are a function of multiple things—what is the exchange rate at the end (of the quarter), how the contracts are hedged, what particular derivative instruments are used and at what price. Any forex losses that may have will be on account of forward contracts maturing during the quarter, although that should get offset by translation gains, which is reported as

part of other income. Indian IT firms refrain from focusing on making that extra buck through currency movements Yin-Wong Cheung and Rajeswari Sengupta 2013, [2] the study studies the objective and comes up with the end result that strong and significant negative impact from currency appreciation and currency volatility on market shares of India's exporting firms. Indian firms with smaller export shares tend to respond more strongly to both REER change and volatility than those with larger export shares. Services exporters are impacted more strongly by exchange rate fluctuations than firms exporting goods. Raghavendra, R H; Velmurugan, P S 2014, [3] the study in the light of globalization and internationalization of world markets, foreign exchange risk cannot be avoided but needs to be managed by hedging instruments. The need and approach for managing it depends on the size of exposure and fluctuations in exchange rate. Indian IT sector is known for development of software and it mainly depends on exports. They are required to measure and manage exchange rate risk. The study is an attempt to document the currency hedging practice by IT firms of India. Pasmantier, Anita B 1993, [4] the study studies the objective and comes up with the end result that corporate treasury managers face the dilemma every day of what to do with their firms' foreign exchange exposure. Once a decision to hedge has been made, the question then arises of which hedging tool to use. Among the available choices are: forward contracts, futures contracts, money market hedges, and option contracts. Because of the simplicity of entering into a forward contract, it is the hedging tool used most commonly by corporate foreign exchange managers. A currency option provides the right but not the obligation to carry through with the stipulated option contract. Kanas, Angelos 1996, [5] this study examines a model of exchange rate economic exposure faced by an exporting firm which participates in a competitive globalized export market is developed. This firm is assumed to have a market share expansion objective and publish a dual-currency price list. The issue of hedging is also discussed on the basis of currency derivative instruments. It is shown that the risk profile of economic exposure is asymmetric depending whether the domestic currency depreciates or appreciates. A. Kanagaraj1 and Ekta Sikarwar 2011, [6] the study examines the level of foreign exchange exposure and its determinants for a sample of Indian firms. For this purpose, the relationship between exchange rate changes and stock returns for a sample of 361 Indian non-financial firms is determined over April 2006-March 2011. The study finds that only 16 percent of the firms are exposed to exchange rate exposure at 10 percent level of significance. Furthermore, out of the firms having significant exposure, 86 percent firms are negatively affected by an appreciation of the rupee which confirms that Indian firms are net exporters. Miriti, M. 2004, [7] this study explores the proposition for informal or quasi-formal institutions to deliver forms of insurance to the poor. Innovation of risk management instruments is motivated as an anti-poverty policy. Particular attention is on exposures from mass covariant events, e.g. weather or other natural disasters. The study does not however investigate the

survivability of the microfinance institution. It is limited to the investigation of household-risk implications, of local aggregation of covariant risk upon an index-insured pool in which the household is a member. Lingxiu Donga, Panos Kouvelisa, Ping Sub 2014, [8] the paper investigates the impact of operational flexibility on firms' economic exposure to currency fluctuations in the presence of global competition. Comparing the effects of two operational strategies of the global firm, namely, matching currency footprints ("natural hedge") and the capacity pooling strategy with allocation flexibility. For a two-stage stochastic model, they derive the optimal capacity and selling decisions for the global firm, and from the comparative statics analysis of the model they infer useful managerial insights. Akshatha B. G. 2013, [9] the study studies the objective and comes up with the end result that the reason that financial derivatives exist is due to risk. Investors use financial derivatives to reduce risk when they make a trade. Derivatives are excellent tool for risk management through hedging. Hedge is a way of protecting limiting or controlling something. Hedging in relation to the activity of investing devotes protection against risk arising out of unanticipated change in future price of instruments. The paper concentrates on the new emerging challenges, opportunities and issues in the field of financial derivatives. Dhargalkar, Amol 2015, [10] the study studies the objective and comes up with the end result that the common challenges involved in hedging foreign exchange risk as in early 2015 ushered in currency volatility and dollar strength unseen in decades. Rozsa Attila 2014, [11] the study studies the objective and comes up with various methods for decreasing exchange risks of foreign currency transactions. In international trade due to the growth of the number of currency loans the significance of managing financial risks coming from the changes in exchange rates has increased. One of its tools is the currency-based booking, which may make the effect of the change more predictable.

Existing literature has large number of study on derivative, exchange rate risk of it firms and some of the study for Non-IT firms as well. Research has found a gap in literature that there is no any specific study on currency appreciation and currency volatility on market share for Indian firms. This study will see the effect of currency appreciation and currency volatility on market share of financial and non-financial firms in India for the period of ten years.

4. Research Methodology

4.1. Data Description & Time Zone of the Data

The sample of firms for the study has been primarily sourced from S & P CNX 500 index which covers broad range of firms disaggregated into various industries. The S & P CNX 500 is India's first broad-based stock market index of the Indian stock market. The S & P CNX 500 represents about 96% of total market capitalization and about 93% of the total turnover on the National Stock Exchange of India (NSE). It represents the top 500 companies based on full market capitalisation from the eligible universe.

Since the primary focus of the study was on both financial as well as non-financial firms, 3 firms each were initially identified from proweess database under these categories. Omission of some firms because of the non-availability of valuation data during the period of study *i.e.* from March 2006 to March 2015 reduced the final sample size to 6. The decision to examine the financial and non-financial firms was based on the attempt to reduce the complexity of foreign exchange rate exposure and understand the risk management techniques used by these firms.

The USD-INR currency rates have been obtained from the internet and financial data from the ACE ANALYSER database, Company annual reports and various sites like Moneycontrol.com, Yahoofinance.com etc.

The data used includes past 10 years monthly USD-INR currency rates and year on year quantitative factors are studied for the period from 1st March 2006 to 1th March 2015.

Time zone used is Indian Standard Time and the Quantitative factors are of Indian IT companies and Indian Banks.

4.2. Sampling Technique

The sample period of research used for analysis was considered from March 2006 to March 2015 because: -

RBI has changed the base year of its exchange rate indices from 1993-94 to 2004-05 in November 2005. So, choosing this period would eliminate the differences of the changes that RBI made to its prior 36 countries and 5 countries nominal exchange rate index.

The following financial (banks) and non-financial companies (IT companies) are chosen as the sample for the research: -

Indian Financial Firms (Banks)

- State Bank of India (SBI).
- ICICI Bank.
- Axis Bank.

Indian Non-Financial Firms (IT companies)

- Tata Consultancy Services (TCS).
- Wipro.
- Infosys.

The above mentioned companies are chosen as the sample for the research because: -

- These are companies which are rated excellent in all their respective domains.
- Volumes are high and foreign exchange trades are carried on a large scale.
- These are best fit for a novice person to understand the impact of exchange rate risk on Indian firms considering that information about them is extensively available.

Sample of previous 10-year annual quantitative factors of a company has been used and further correlation and regression techniques have been used to find

the impact of exchange rate risk on these factors. The process has been used for all of the 6 companies taken as sample.

Independent variables *i.e.* 10 years monthly USD-INR currency rates data has been obtained by ACE ANALYSER Database and all the data is then tabulated to find out the correlation.

4.3. Research Design

Hypothesis: The following Quantitative factors are best indicators for predicting the impact of foreign exchange rate risk on Non-financial Indian firms (IT companies):

- Net Sales.
- Operating Profit.
- Tax Obligations.
- Equity Dividend.
- Earnings per share.

The following Quantitative factors are best indicators for predicting the impact of foreign exchange rate risk on Financial Indian firms (Banks):

- Interest Spread.
- Non-Performing Assets (NPA's).
- Net Profit.
- Earnings per share.

The objective is mainly to help a person to understand the impact of fluctuation of foreign exchange USD-INR rate on various parameters. Hence the hypothesis has been chosen accordingly.

4.4. Data Sources for Each Variable

USD-INR exchange rate—Obtained from Reuters website.

Various quantitative factors of the companies for the last 10 years, obtained from Ace Analyzer Database, Company annual reports and various sites like Moneycontrol.com, Yahoofinance.com etc.

4.5. Testing and Data Analysis Techniques

For the sake of consistency, we obtained all companies quantitative factors at the fiscal year-end, which is March for our sample of firms.

We do not have any explanatory variable based on reported earnings per share.

- We began by segregating the Indian firms into financial firms (Banks) and Non-financial firms (IT companies).
- For each of the above categories, 3 companies each are chosen and the annual profit and loss statement is obtained over a period of 1st March'06 to 1th March'15.
- Similarly, a dataset of past 10 years monthly USD-INR currency rates is obtained over a period of 1st Jan'06 to 31st Dec'15.
- The data of average USD-INR currency rates is then collated with the quan-

titative data collected for all the firms corresponding to their names.

- Correlation Technique is then applied to find the relation between the fluctuations of the USD-INR currency rates and each of the quantitative factors of every firm.
- The idea behind correlation technique is to understand the similarity between different quantitative factors and USD-INR currency fluctuations.
- We then move forward and perform the regression process to find a dependency of different quantitative factors on the USD-INR currency fluctuations

4.6. Data Analysis

The sample of average USD-INR currency rates collated against the 5 selected quantitative factors is analyzed and data regression is carried out using the Inferential Statistics. Inferential Statistics is useful here because we want to determine the correlation and regression between various quantitative factors namely Net Sales, Operating Profit, Tax Obligations, Equity Dividend, Earnings per share for Non-financial Indian firms (IT companies) and Interest Spread, Non-Performing Assets (NPA's), Net Profit, Earnings per share for Financial Indian firms (Banks) against Average weekly market Returns.

Two types of correlation: Pearson and Spearman have been used to find the relation between variables. Each category shows different results in terms of Correlations and Regression which is shown in below tables. **Table 1** shows the year on year average USD-INR exchange rate growth. **Table 2** shows the year on year change in USD-INR exchange rate and quantitative factors of TCS.

Considering the data from **Table 2** and applying the regression, ANOVA and correlation with the help of SPSS software we find that the least R Square value is approx. 62% for Operating Profit while the maximum is approx. 85% with Earnings per share (**Table 3**). Hence, there is only 62% dependence of Operating Profit of TCS on fluctuating currency rate. Similarly, there is 85% dependence of earnings per share of TCS on fluctuating currency rate.

Table 1. The year on year Average USD-INR exchange rate and Exchange Rate Growth.

Year	Average USD/INR	Exchange Rate Growth
2015	64.15348	3.13
2014	61.02838	2.43
2013	58.59618	5.17
2012	53.42478	6.75
2011	46.67194	0.95
2010	45.71846	-2.65
2009	48.37193	4.90
2008	43.46851	2.25
2007	41.21569	-4.04
2006	45.25533	

Table 2. The year on year change in USD-INR exchange rate and quantitative factors of TCS.

Years	Exchange rate Growth	Net Sales	Operating Profit	Tax Obligation	Equity Dividend	Earnings Per Share (Rs)
2015-2014	3.13	8905.13	-505.52	223.46	9206.54	4.14
2014-2013	2.43	16246.79	7227.45	2152.71	1961.45	28.94
2013-2012	5.17	9567.60	2920.55	526.49	-587.16	9.26
2012-2011	6.75	9583.13	2622.19	1259.91	2152.94	17.35
2011-2010	0.95	6230.96	2096.36	392.55	-1174.33	10
2010-2009	-2.65	642.53	646.34	397.52	2544.38	-19.3
2009-2008	4.90	3868.20	995.22	-117.21	0.00	1.85
2008-2007	2.25	3593.75	724.13	46.78	244.66	7.68
2007-2006	-4.04	3709.47	964.07	91.35	464.83	-17.14

Table 3. Regression and Correlation analysis between Exchange rate risk and quantitative factors of TCS.

Factors	R Square	ANOVA P value	Correlation
Exchange rate risk and Net Sales	0.750794354	0.029684017	0.797324278
Exchange rate risk and Operating Profit	0.620031655	0.055657368	0.627216121
Exchange rate risk and Tax obligations	0.656590006	0.0505716743	0.724012303
Exchange rate risk and Equity Dividend	0.756879096	0.0536588976	0.784933886
Exchange rate risk and Earnings per share	0.852217448	0.027861796	0.822616411

The P value which is an indicator of the effectiveness of the regression shows that Operating profit is least affected with the change in exchange rate with around 5.5% P value and earnings per share being the most effected with 2% P value.

The correlation is found to be least with Operating Profit with just 63% value, and maximum with earnings per share with 82% value, which shows that the 2 variables are highly correlated to each other (**Table 3**).

Considering the data from **Table 4** and applying the regression, ANOVA and correlation with the help of SPSS software we find that the least R Square value is only 67% for operating profit while the maximum is approx. 91% with Net Sales (**Table 5**). Hence, there is only 67% dependence of operating profit of Wipro on fluctuating currency rate. Similarly, there is only 91% dependence of net sales of Wipro on fluctuating currency rate.

The P value which is an indicator of the effectiveness of the regression shows that Operating profit is least effected with the change in exchange rate with around 8% P value and net sales being the most effected with 3% P value.

The correlation for almost all the factors except for Operating profit shows a correlation more than 70%, with net sales being the highest with approx. 86% which means that one variable increases with an increase in the other (**Table 5**).

Table 4. The year on year change in USD-INR exchange rate and Quantitative factors of Wipro.

Years	Exchange rate Growth	Net Sales	Operating Profit	Tax Obligations	Equity Dividend	Earnings Per Share (Rs)
2015-2014	3.13	2452.60	90.90	143.10	990.00	3.23
2014-2013	2.43	5530.70	2174.90	665.90	248.90	7.01
2013-2012	5.17	1543.60	890.50	321.40	249.50	3.89
2012-2011	6.75	5382.40	282.10	371.70	2.60	-0.68
2011-2010	0.95	3378.50	259.40	71.00	591.70	-13.63
2010-2009	-2.65	1414.70	742.80	216.70	294.90	13.06
2009-2008	4.90	4014.70	1043.10	167.70	-290.50	-0.66
2008-2007	2.25	3808.70	461.10	72.30	2.80	1.48
2007-2006	-4.04	3456.78	770.61	48.00	160.82	5.31

Table 5. Regression and Correlation analysis between Exchange rate risk and quantitative factors of Wipro.

Factors	R Square	ANOVA P value	Correlation
Exchange rate risk and Net Sales	0.913972065	0.037426796	0.86429749
Exchange rate risk and Operating Profit	0.67189743	0.081996579	0.613739103
Exchange rate risk and Tax obligations	0.710961796	0.03841308	0.731086026
Exchange rate risk and Equity Dividend	0.733790861	0.0418727517	0.683519246
Exchange rate risk and Earnings per share	0.810219742	0.040169082	0.783196833

Considering the data from **Table 6** and applying the regression, ANOVA and correlation with the help of SPSS software we find that the least R Square value is approx. 63% for Operating Profit while the maximum is approx. 82% with Earnings per share (**Table 7**). Hence, there is only 63% dependence of Operating Profit of Infosys on fluctuating currency rate. Similarly, there is 82% dependence of earnings per share of Infosys on fluctuating currency rate.

The P value which is an indicator of the effectiveness of the regression shows that Operating profit is least affected with the change in exchange rate with around 6.5% P value and earnings per share being the most effected with 2% P value.

The correlation is found to be least with Operating Profit with just 62% value, and maximum with earnings per share with 82% value, which shows that the 2 variables are highly correlated to each other (**Table 7**).

Considering the data from **Table 8** and applying the regression, ANOVA and correlation with the help of SPSS software we find that the least R Square value is only 42% for earnings per share while the maximum is approx. 98% with Interest spread (**Table 9**). Hence, there is only 42% dependence of earnings per share of SBI on fluctuating currency rate. While, there is high dependence of Interest spread of SBI on fluctuating currency rate.

Table 6. The year on year change in USD-INR exchange rate and Quantitative factors of Infosys.

Years	Exchange rate Growth	Net Sales	Operating Profit	Tax Obligations	Equity Dividend	Earning Per Share (Rs)
2015-2014	3.13	8905.13	-505.52	826.00	1493.00	4.14
2014-2013	2.43	16246.79	7227.45	567.00	1206.00	28.94
2013-2012	5.17	9567.60	2920.55	131.00	-287.00	9.26
2012-2011	6.75	9583.13	2622.19	732.00	-746.00	17.35
2011-2010	0.95	6,230.96	2096.36	661.00	2011.00	10
2010-2009	-2.65	642.53	646.34	822.00	89.00	-19.3
2009-2008	4.90	3868.20	995.22	265.00	-557.00	1.85
2008-2007	2.25	3593.75	724.13	278.00	1253.00	7.68
2007-2006	-4.04	3709.47	964.07	49.00	-589.00	-17.14

Table 7. Regression and Correlation analysis between Exchange rate risk and quantitative factors of Infosys.

Factors	R Square	ANOVA P value	Correlation
Exchange rate risk and Net Sales	0.750794354	0.036968402	0.766937243
Exchange rate risk and Operating Profit	0.630073585	0.065657368	0.627216121
Exchange rate risk and Tax obligations	0.656590006	0.050571674	0.684012303
Exchange rate risk and Equity Dividend	0.687909639	0.053658898	0.738493389
Exchange rate risk and Earnings per share	0.822174478	0.027861796	0.822616411

Table 8. The year on year change in USD-INR exchange rate and Quantitative of SBI.

Years	Exchange rate Growth	Interest Spread	Gross NPA	Net Profit for the Year	Earning Per Share (Rs)
2015-2014	3.13	5733.08	-4880.01	2210.40	-128.33
2014-2013	2.43	4950.87	10415.96	-3213.81	-60.32
2013-2012	5.17	1040.22	11512.93	2397.69	31.74
2012-2011	6.75	10,764.68	14350.17	4336.94	58.39
2011-2010	0.95	8854.96	5791.40	-1795.70	-28.30
2010-2009	-2.65	2798.30	3946.29	44.82	0.70
2009-2008	4.90	3851.91	2751.26	2392.11	37.11
2008-2007	2.25	967.02	12837.34	2187.81	20.27
2007-2006	-4.04	418.57	0.00	134.64	2.56

The P value which is an indicator of the effectiveness of the regression shows that Earnings per share is least effected with the change in exchange rate with around 5.9% P value and Interest spread being the most effected with almost 1% P value.

The correlation is found to be least with earnings per share with just 57%

Table 9. Regression and Correlation analysis between Exchange rate risk and quantitative factors of SBI.

Factors	R Square	ANOVA P value	Correlation
Exchange rate risk and Interest Spread	0.972667793	0.0131044	0.944414725
Exchange rate risk and Gross NPA	0.811549372	0.02128709	0.859944966
Exchange rate risk and Net profit	0.695044251	0.06306981	0.643179759
Exchange rate risk and Earnings per share	0.421893188	0.05959952	0.570540039

value, and maximum with Interest spread with 95% value, which shows that the 2 variables are highly correlated to each other (**Table 9**).

Considering the data from **Table 10** and applying the regression, ANOVA and correlation with the help of SPSS software we find that the least R Square value is almost 54% for earnings per share while the maximum is approx. 80% with Interest spread (**Table 11**). Hence, there is no dependence of earnings per share of Axis bank on fluctuating currency rate. While, there is very high dependence of Interest spread of Axis bank on fluctuating currency rate.

The P value which is an indicator of the effectiveness of the regression shows that Earnings per share is least effected with the change in exchange rate with very high P value and Interest spread being the most effected with almost 0% P value.

The correlation is found to be 56% with earnings per share, and maximum with Interest spread with approx. 90% value, which shows that the 2 variables are highly correlated to each other (**Table 11**).

Considering the data from **Table 12** and applying the regression, ANOVA and correlation with the help of SPSS software we find that the least R Square value is only 62% for earnings per share while the maximum is approx. 82% with Interest spread (**Table 13**). Hence, there is only 62% dependence of earnings per share of SBI on fluctuating currency rate. While, there is high dependence of Interest spread of SBI on fluctuating currency rate.

The P value which is an indicator of the effectiveness of the regression shows that Earnings per share is least effected with the change in exchange rate with around 8.9% P value and Interest spread being the most effected with almost 3% P value.

The correlation is found to be least with earnings per share with just 52% value, and maximum with Interest spread with 87% value, which shows that the 2 variables are highly correlated to each other (**Table 13**).

5. Conclusions

For the Non-Financial Indian Firms IT Companies, it is observed that the Correlation is found to be maximum with Earnings per share and net sales, in the case of Wipro, while almost all firms show the least correlation with Operating profit. This stands in accordance with the research done previously. The least R

Table 10. The year on year change in USD-INR exchange rate and Quantitative factors of Axis Bank.

Years	Exchange rate Growth	Interest Spread	Gross NPA	Net Profit for the Year	Earning Per Share (Rs)
2015-2014	3.13	2272.50	963.78	1140.15	-101.29
2014-2013	2.43	2285.38	752.99	1038.24	21.65
2013-2012	5.17	1648.51	587.12	937.22	8.01
2012-2011	6.75	1454.76	210.36	853.72	20.13
2011-2010	0.95	1558.50	-58.36	873.96	20.48
2010-2009	-2.65	1318.27	97.90	699.17	11.49
2009-2008	4.90	1100.86	102.90	744.33	20.63
2008-2007	2.25	1018.28	21.20	412.00	6.54
2007-2006	-4.04	488.85	64.43	173.95	5.99

Table 11. Regression and Correlation analysis between Exchange rate risk and quantitative factors of Axis Bank.

Factors	R Square	ANOVA P value	Correlation
Exchange rate risk and Interest Spread	0.785282749	0.001463772	0.886161808
Exchange rate risk and Gross NPA	0.792049813	0.015418367	0.831895314
Exchange rate risk and Net profit	0.646858024	0.075193445	0.628894654
Exchange rate risk and Earnings per share	0.540951716	0.083720293	0.560849896

Table 12. The year on year change in USD-INR exchange rate and Quantitative factors of ICICI.

Years	Exchange rate Growth	Interest Spread	Gross NPA	Net Profit for the Year	Earning Per Share (Rs)
2015-2014	3.13	4912.99	4588.85	1364.87	-65.67
2014-2013	2.43	4102.55	898.09	1485.01	12.78
2013-2012	5.17	6532.95	132.42	1860.21	16.08
2012-2011	6.75	7568.60	-558.93	1313.88	11.36
2011-2010	0.95	267.12	158.26	1126.40	8.63
2010-2009	-2.65	-5385.62	-445.50	266.85	2.34
2009-2008	4.90	304.21	328.30	-399.60	-3.61
2008-2007	2.25	7794.05	0.90	1047.51	2.78
2007-2006	-4.04	9209.79	9.85	570.15	6.04

square value is of operating profit while the maximum value is that with Earnings per share and Net sales (In case of Wipro). Hence, there is least dependence of operating profit of these firms on fluctuating currency rate. Similarly, there is high dependence of Earnings per share of these firms on fluctuating currency rate.

Table 13. Regression and Correlation analysis between Exchange rate risk and quantitative factors of ICICI Bank.

Factors	R Square	ANOVA P value	Correlation
Exchange rate risk and Interest Spread	0.815853605	0.033053317	0.864194225
Exchange rate risk and Gross NPA	0.840288042	0.060457949	0.790071881
Exchange rate risk and Net profit	0.63340447	0.047553605	0.58367558
Exchange rate risk and Earnings per share	0.621139793	0.081826746	0.520174361

The P value which is an indicator of the effectiveness of the regression shows that operating profit is least affected with the change in exchange rate and earnings per share and net sales (for Wipro) being the most affected.

For the Financial Indian Firm *i.e.* Banks, it can be said that the correlation is found to be maximum with interest spread, while almost all firms show the least correlation with earnings per share. The least R square value is of earnings per share while the maximum value is that with interest spread. Hence, there is least dependence of earnings per share of these firms on fluctuating currency rate. The P value which is an indicator of the effectiveness of the regression shows that earnings per share are least affected with the change in exchange rate and interest spread being the most affected.

In studying the financial and non-financial firm's quantitative factors that have explanatory effect of year on year change in USD-INR exchange rate, one should consider all the variables that have been found to be significant by researcher. Although there is no consensus on which single factor best explains effect of year on year change in USD-INR exchange rate. Several studies find that earnings per share of each of these firms comes out to be a major factor while differentiating the effect of USD-INR currency rate on IT and Non-IT firms. It has been found that earnings per share show maximum correlation with exchange rate risk for non-financial firms and minimum correlation for financial firms. Moreover, the R square value of earnings per share is maximum for IT firms and least for banks. This further proves, there is least dependence of earnings per share of non-IT firms means banks on fluctuating currency rate. While there is high dependence of earnings per share of IT firms on fluctuating currency rate. Also, the P value which is an indicator of the effectiveness of the regression shows that the earnings per share is the most affected for IT firms while least affected for banks.

For IT firms, fluctuating exchange rate risk shows least correlation with operating profit while for bank, fluctuating exchange rate risk shows maximum correlation with interest spread. These characteristics could be considered to understand the effect of year on year change in USD-INR exchange rate on Indian firms. However, there is no guarantee that a quantitative factor that has been proven significant for specific firms and during specific time periods could be an efficient indicator in different firms or time period.

6. Limitations & Future Research Scope

This research has some limitations like researcher has studied only three major firms each from financial as well as non-financial firms. This study is based on the last ten years fluctuations in the USD-INR rate. Thus, one should not expect these research result to work perfectly in the real world; rather they should use these findings as guide for their own hedging strategies. For future research, researcher can take some other factor to study the impact other than EPS and net profit like ROA and advances in case of other firms. This kind of study could be done in other industry which are involved in export in not only Indian perspective but global as well.

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