

Impact of foreign exchange exposure on profitability: A study on select IT and ITeS companies in India

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Abstract

As it is known, each country is having its currency or else a group of countries is having a common currency (Ex: EURO) and these currencies itself used as a medium of exchange for any transactions happening within the specific political boundary or country. In this competitive globalized era, every company wants to enter into the international business and looking to tap the international market, in the process of doing so the volatility of foreign exchange rates have become a serious issue. Indian Information Technology (IT) sector contributes around 7.9% to India's Gross Domestic Product and Indian IT exports reached US\$ 126 billion for 2017-18. Indian IT and ITeS (Information Technology enabled Services) sector contributes approximately 55% of market share to global services sourcing business and making itself as the largest destination for IT and ITeS sourcing across the world, majority of these companies' services are mostly provided to offshore markets and payments for services rendered are received in foreign currencies. In this backdrop, it is important to know the level of foreign exchange exposure of these companies. The present study finds the impact of exchange rate fluctuations on the profitability of select IT and ITeS companies in India. The study is based on fifty-six randomly selected companies for the period of 2016-18. The foreign exchange exposure of sample companies computed using Bodnar-Marston's (2002) formula.

Keywords: foreign exchange rate, information technology (IT), information technology enabled services (ITES), foreign exchange exposure (forex exposure), Capitalisation.

Introduction

In the recent past, increased volatility of exchange rates is one of the important economic developments. Under presently followed the system of partly floating and partly fixed exchange rates, the earnings of multinational companies, individual investors and banks have been subjected to significant fluctuations due to changes in relative exchange rates. Although volatile exchange rates increase risk, a fact cannot be denied that they also create opportunities to earn profit for both firms and investors, given a better understanding of foreign exchange risk management.

Foreign exchange exposure

In general, exposure refers to projected cash flows magnitude is not assured at the moment. The magnitude depends on the variables such as Interest rates and Foreign exchange rates. Foreign exchange exposure refers to effects triggered by exchange rate fluctuations on several areas of a company's business activities. The foreign exchange exposure of multinational companies may be classified into three broad categories namely: transaction exposure, translation exposure, and economic exposure.

Transaction exposure deals with cash flows result from existing contractual obligations. It measures the impact of an exchange rate change on outstanding obligations that existed before exchange rates change but contracts were settled after the exchange rate changes. Under this kind of exposure effect

of setting outstanding obligations entered into, before a change in exchange rates but obligation will be settled after the change in exchange rates.

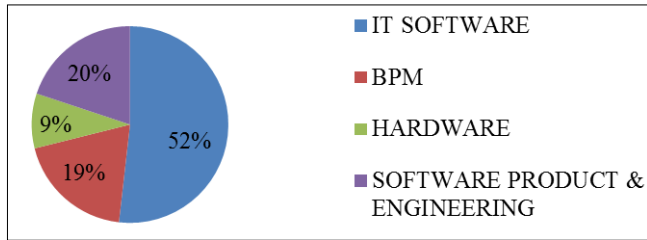
For instance, if an Indian company receivable from a company in New York worth \$100,000 due in six months, if the dollar depreciates against the Indian rupee a cash loss occurs and if the dollar appreciates against the Indian rupee a cash gain occurs. Thus, whenever a company has foreign currency denominated receivables or payables their settlements will affect the cash flow position of the company and it is subjected to transaction exposure.

Translation exposure is an accounting-based change in consolidated financial statements caused by the change in exchange rates; is also known as accounting exposure. Translation exposure is all about gains or losses caused by the translation of foreign currency assets and liabilities into the currency of the parent company for accounting purposes. There is no actual conversion of currencies as there are no cash transactions happened.

Economic exposure also is known as operating exposure which refers to the extent of the economic value of a company that can decline due to changes in exchange in rate. It shows the overall impact of exchange rate changes on the value of the firm. Economic exposure states exchange rate volatility significantly alters the cost of the company's inputs and the prices of the company's and thereby influences its competitive position.

Sector overview

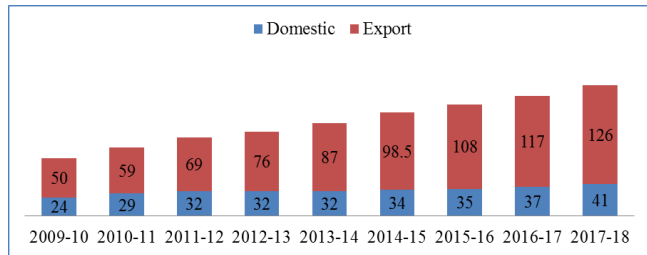
Indian IT (Information Technology) and ITeS (Information Technology enabled Services) industry have 4 major segments namely, IT Services, Business Process Management, Hardware and Software products, and engineering services.



Source: Nasscom, Make in India, IDC

Fig 1: Segments in Indian IT and ITeS Industry

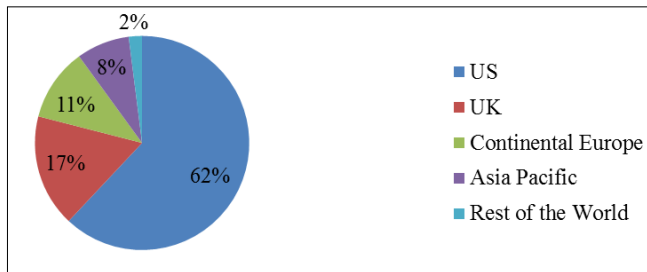
Indian IT and ITeS sector is dominated by large players. As per NASSCOM, 11 large companies are having a presence in over 60 countries with 47-50% of total export revenues. And 120 to 150 companies with 32-35% of total export revenue with nearshore and offshore presence in more than 30-35 countries. While there are 16000 to 16200 small companies with 18-20% of total export revenue. Export revenue from the industry has grown at a CAGR of 11.85% to US\$ 126 billion in 2017-18 from US\$ billion in 2009-10.



Source: Nasscom, Make in India, IDC

Fig 2: Market Size of IT industry In India (US\$ billion)

United States has been the biggest destination for Indian IT exports followed by the UK, Europe, and the Asia Pacific regions. For FY 2017-18, the US, the UK, and the EU collectively account for 90% of the total IT and ITeS exports from India.

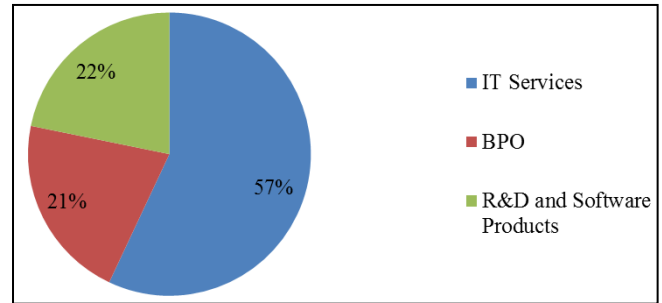


Source: Nasscom, Department of Electronics and IT Annual

Fig 3: Geographical breakup of export revenue in 2017-18

Report

India is the largest, fastest and growing destination for IT and ITeS sourcing across the world. Indian IT and ITeS sector contributes approximately 55% market share i.e., US\$ 185-190 billion to global services sourcing business in 2017-18. IT and ITeS industry revenues (excluding hardware) was estimated at around US\$ 167 billion in FY 2017-18 and grew to US\$ 181 billion in FY2018-19. The domestic revenue including the hardware of the IT industry is estimated at US\$ 44 billion and export revenue is estimated at US\$ 137 billion in FY19. The contribution of the IT sector to India's GDP stood at 7.9 percent in 2017-18. Indian IT and ITeS sector accounts for the largest share on total Indian services export (> 45%).



Source: Nasscom, Department of Electronics and IT Annual

Fig 4: Export Revenue 2017-18 Sector-wise Breakup

Report

One of the major reasons behind India's emergence as a global outsourcing hub is because of availability of skilled English speaking workforce. Employment in the IT & ITeS sector reached 3.97 million in 2017-18. India's top 10 Information technology companies added about 114,390 engineers to its workforce in 2018 against 22,156 in 2017.

As per data released by the Department for Promotion of Industry and Internal Trade (DPIIT), the computer software and hardware sector in India attracted cumulative FDI inflows worth US\$ 37.23 billion between April 2000 and March 2019 and ranks second in the inflow of FDI.

Literature Review

Ki-ho Kim and Charles T. Davidson (1996) [7] reported evidence of the aggregate profit of the US manufacturing industry was affected by fluctuations in the real exchange rate of the dollar with the help of quarterly data covering the period from 1975 to 1993. Regression of manufacturing profit on the exchange rate and other key variables showed a significant negative relationship. Importantly estimated regression coefficient indicated that a 1% change in the dollar value changed the profits in the opposite direction by 0.56% and also the unit root and cointegration tests prove the equilibrium relationship between variables in the long-run and vector autoregressive analysis has further confirmed the relationship between the variables.

Bodnar and Marston (2002) [3] developed a model of foreign exchange exposure dependent on three variables namely, the

ratio of the firm's revenues and expenses denominated in Foreign currency to total revenues and total expenses respectively and its profit rate.

Ida Aghdas Mirzaie (2003) ^[6] examined the effects of exchange rate fluctuations on real output and price level also developed a model that decomposes movements of exchange rate into anticipated and unanticipated components. And, suggested that unanticipated currency fluctuations help to determine aggregate demand through exports, imports and demand for domestic currency and supply through the cost of imported intermediate goods. It was found that unanticipated currency fluctuations appear more significant than that of anticipated fluctuations with varying effects on output growth and price inflation across developing countries.

Mihir Dash and Akshay Madhava (2009) ^[11] had found positive foreign exchange exposure for the Indian IT and ITeS companies for two years 2005-06 and 2006-07, and also identified the high level of exposure for some small-cap Indian IT companies.

Dimas Bagus Wiranata Kusuma (2010) ^[5] has attempted to show the impact of Exchange rate fluctuations on imports and export performance in OIC member countries by co-integration of imports and exports in the selected OIC member countries and also identified the significant impact of exchange rate fluctuation towards exports and imports.

Chanan Pal Chawala (2011) ^[4] explained the relationship between the values of local currencies in terms of foreign currencies and export competitiveness of countries. And, in the short run devaluation of the local currency has a positive effect on exports but also makes the imports costly and also suggested that the relationship will become more complex if there is heavy dependence of imported resources in the exported products. On the other hand, in the long run, brand and value addition will have a more profound effect on export competitiveness rather than cost-based strategies which are easier to copy by other countries.

Verena Tandrayen, Rago Obur and Nawsheer Emamdy (2011) ^[18] have investigated the impact of real effective exchange rate volatility on the Mauritian export performance from the year 1975 to 2007. The results are based on Autoregressive distributed lag (ARDL) which showed real exports are co-integrated with foreign economic activity, real effective exchange rate and the volatility of the real exchange rate. The finding of the study show exchange rate volatility has a positive and significant short-run impact on exports but in the long run, volatility has adversely affected the Mauritian exports.

Pham Thi Tuyet Trinh (2012) showed the short and long-run impact of the exchange rate on the trade balance in Vietnam. The study makes use of ADRL to explore the long-run impact to show trade balance improvement when real exchange rate depreciates. And also Error correction model (ECM) based on a long-run co-integration equation which has been used to indicate immediate deterioration of trade balance after depreciation.

As it is evident from the available literature that there will be an impact of currency fluctuations on the revenues of the companies which are involved in international business and whether fluctuation is positive or negative it will be having an impact on revenues of the companies.

In India, contribution to service sector form the Information Technology (IT) and Information Technology enabled Services (ITeS) is more than 45% (IBF Report, 2019). Hence, an attempt has been made in the present study to know the Impact of Exchange Rate Volatility on the Profitability of select IT and ITeS companies in India. For the study, companies are classified into small-cap, medium cap and large-cap based on their market capitalization.

Data and methodology

The objectives of the study are to measure the foreign exchange exposure of Indian IT & ITeS companies and to identify is there any relationship between forex exposures with the profitability of Indian IT & ITeS companies.

The sample consists of fifty-six Indian IT & ITeS companies having both onshore and offshore operations. The sample selected randomly and classified based on their market capitalization and the sample consist of 55.36% of small-cap companies, 21.43% of mid-cap companies and 23.21% of large-cap companies. The research period for the study is 2016-17 and 2017-18. The data for the study was collected from the Capitaine database and annual reports of companies.

The forex exposure of the sample companies was measured using Bodnar and Marston's (2000) ^[3] formula: $FE: h_1 + (h_1 - h_2) * (\frac{1}{r} - 1)$, where h_1 represents the ratio of forex revenue to total revenue, and h_2 represents the ratio of forex expenditure to total expenditure, and r represents the expected rate of return/cost of capital. For the study, the cost of capital was assumed to be 15% p.a.

The extreme values are $FE = \frac{1}{r}$ which arise when $h_1 = 1$ & $h_2 = 0$ (for a pure exporter) and $FE = -(\frac{1}{r} - 1)$ which arise when $h_1 = 0$ & $h_2 = 1$ (for a pure importer).

The profitability of the sample IT & ITeS companies is measured using the adjusted profit after tax margin (APATM) and the return on capital employed (ROCE).

Analysis and interpretation

The exchange rate of INR/USD for the past ten years was in extreme fluctuation, the average exchange rate for the financial year 2008-09 was INR 45.91/USD rate went up to INR 69.89/USD for the financial year 2018-19. Table 1 shows the Average Exchange rates of INR/USD from the financial year 2008-09 to 2018-19.

Table 1: Average Exchange Rates of INR/USD from 2008-09 to 2018-19

Financial Year	INR/USD	Change from previous year
2008-09	45.91	5.67
2009-10	47.42	1.51
2010-11	45.58	-1.84
2011-12	47.95	2.37
2012-13	54.45	6.5
2013-14	60.5	6.05
2014-15	61.15	0.65
2015-16	65.46	4.31
2016-17	67.09	1.63
2017-18	64.45	-2.64
2018-19	68.89	4.44

Source: Reserve Bank of India, Average for the year

The exchange rate for the financial year 2017-18 and 2018-19 were INR 64.45/USD and INR 68.89/USD respectively; there was an increase in the exchange rate by close to 7%.

The Profitability and forex exposures of the sample IT and ITeS Companies are shown in table 2. The descriptive

Statistics of the forex exposure and profitability of the sample IT and ITeS Companies are shown in table 3.

The Forex exposure of sample companies was maximum at 0.7101 and 0.7205 for 2016-17 and 2017-18 respectively, the minimum level was 0 and 0.0006 for 2016-17 and 2017-18 respectively.

Table 2: Forex Exposures and Profitability measures of sample IT and ITeS Companies

Compnay Name	Company Type	2017-18			2016-17		
		Forex Exposure	APATM (%)	ROCE (%)	Forex Exposure	APATM (%)	ROCE (%)
Informed Technologies India Ltd	Small Cap	0.2632	27.43	6.00	0.1299	-12.20	-4.39
Continental Chemicals Ltd	Small Cap	0.0623	4.92	3.47	0.0656	6.67	4.20
Genesys International Corporation Ltd	Mid Cap	0.0462	26.07	14.53	0.0827	30.06	9.36
Lee & Nee Software (Exports) Ltd	Small Cap	0.0223	5.06	0.23	0.0243	3.07	0.13
ASM Technologies Ltd	Small Cap	0.1485	4.03	10.45	0.1729	9.25	16.61
Athena Global Technologies Ltd	Small Cap	0.5297	6.72	7.02	0.2906	-32.42	0.00
Capricorn Systems Global Solutions Ltd	Small Cap	0.0683	0.56	2.71	0.0657	1.02	1.09
63 Moons Technologies Ltd	Small Cap	0.0467	10.14	5.02	0.3195	36.27	4.17
BNR Udyog Ltd	Small Cap	0.0092	4.26	2.37	0.0020	3.49	7.16
Alankit Ltd	Mid Cap	0.0650	20.44	38.23	0.1228	15.61	38.31
Adroit Infotech Ltd	Small Cap	0.0038	8.82	12.30	0.0000	32.07	7.18
B2B Software Technologies Ltd	Small Cap	0.0305	8.04	8.59	0.0379	20.45	11.83
CG-VAK Software & Exports Ltd	Small Cap	0.0792	7.78	17.75	0.0751	3.36	8.44
CES Ltd	Small Cap	0.0837	6.48	10.70	0.0912	15.69	27.94
Cybertech Systems & Software Ltd	Small Cap	0.0720	3.15	3.83	0.0539	15.75	14.47
Aurionpro Solutions Ltd	Mid Cap	0.0587	4.58	10.80	0.0667	4.63	7.45
Karvy Computershare Pvt Ltd	Small Cap	0.0175	22.05	46.20	0.0283	18.74	46.46
Capgemini Technology Services India Ltd	Small Cap	0.1022	11.11	20.39	0.1183	11.31	21.42
Cyient Ltd	Large Cap	0.2417	27.91	25.83	0.2752	18.34	15.63
Goldstone Technologies Ltd	Small Cap	0.1860	9.69	3.32	0.1381	5.53	-0.06
Ace Software Exports Ltd	Small Cap	0.0701	13.78	6.89	0.0650	12.22	7.25
KPIT Technologies Ltd	Mid Cap	0.0833	12.31	11.50	0.1069	12.80	12.72
ITC Infotech India Ltd	Small Cap	0.1988	2.76	12.34	0.1917	1.96	9.74
Larsen & Toubro Infotech Ltd	Large Cap	0.6150	16.80	43.77	0.5793	15.16	47.05
Allied Digital Services Ltd	Small Cap	0.0437	7.98	3.36	0.0522	2.25	3.96
Cybermate Infotek Ltd	Small Cap	0.0291	3.64	12.17	0.0186	4.34	13.32
Intense Technologies Ltd	Small Cap	0.1819	8.56	7.59	0.2250	6.23	6.91
Jeevan Scientific Technology Ltd	Small Cap	0.0172	1.30	5.85	0.0101	5.90	11.28
Datamatics Global Services Ltd	Mid Cap	0.1284	12.04	11.20	0.1453	11.00	8.62
FCS Software Solutions Ltd	Small Cap	0.1416	8.57	0.68	0.0551	-8.45	-0.16
Cigniti Technologies Ltd	Mid Cap	0.1027	10.42	12.57	0.1089	-1.28	0.00
Bodhtree Consulting Ltd	Small Cap	0.0282	3.87	14.90	0.0441	3.61	14.14
Hypersoft Technologies Ltd	Small Cap	0.0255	20.00	6.95	0.0419	0.52	0.38
Allsec Technologies Ltd	Mid Cap	0.0391	19.93	12.56	0.0470	17.73	12.12
Firstsource Solutions Ltd	Mid Cap	0.0874	22.28	10.34	0.0604	20.05	10.82
Cambridge Technology Enterprises Ltd	Small Cap	0.0362	5.47	14.37	0.0603	7.86	13.44
Geojit Technologies Pvt Ltd	Small Cap	0.0908	57.31	9.87	0.3215	66.59	13.67
Hinduja Global Solutions Ltd	Mid Cap	0.0251	8.51	14.34	0.0242	6.36	14.24
GSS Infotech Ltd	Small Cap	0.2582	19.69	2.10	0.1439	-54.06	0.00
eClerx Services Ltd	Mid Cap	0.3334	24.31	32.08	0.3021	28.50	38.37
Infinite Computer Solutions India Ltd	Mid Cap	0.0697	17.16	15.06	0.0773	23.95	20.18
Excel Realty N Infra Ltd	Small Cap	0.0254	13.39	2.64	0.0045	0.36	0.54
L&T Technology Services Ltd	Large Cap	0.6055	13.96	38.96	0.5873	14.43	43.93
Intellect Design Arena Ltd	Mid Cap	0.2371	3.26	4.21	0.2048	-15.31	-10.22
iEnergizer It Services Pvt Ltd	Small Cap	0.0006	9.26	33.70	0.0004	8.94	37.10
Infibeam Avenues Ltd	Large Cap	0.0263	4.40	2.49	0.5650	0.34	5.99
Dev Information Technology Ltd	Small Cap	0.0136	5.15	22.32	0.0099	5.13	27.49
Wipro Ltd	Large Cap	0.6018	17.27	20.10	0.6055	17.72	21.52
Tata Elxsi Ltd	Large Cap	0.4610	17.32	54.40	0.4355	14.13	53.67
Infosys Ltd	Large Cap	0.7205	26.08	30.21	0.7101	23.31	29.31
Tata Consultancy Services Ltd	Large Cap	0.5165	25.93	41.19	0.5190	25.52	41.71
HCL Technologies Ltd	Large Cap	0.2292	33.35	33.50	0.2373	35.58	34.31

Oracle Financial Services Software Ltd	Large Cap	0.4396	26.05	44.53	0.4382	30.13	42.99
Tech Mahindra Ltd	Large Cap	0.6901	16.90	24.27	0.6973	13.15	21.87
Mindtree Ltd	Large Cap	0.6408	11.74	27.54	0.6837	8.85	22.63
NIIT Technologies Ltd	Large Cap	0.4656	13.74	18.86	0.4563	11.35	16.15

Table 3: Descriptive Statistics of select IT and ITeS companies in India

		2017-18			2016-17			CHANGE		
		Forex Exposure	APATM	ROCE	Forex Exposure	APATM	ROCE	Forex Exposure	APATM	ROCE
Small Cap	Mean	0.0931	0.1035	0.1020	0.0922	0.0650	0.1051	0.0009	0.0386	-0.0031
	Std. Dev.	0.1093	0.1073	0.0987	0.0932	0.1973	0.1161	0.0877	0.1895	0.0551
MID Cap	Mean	0.1063	0.1511	0.1562	0.1124	0.1284	0.1350	-0.0061	0.0227	0.0212
	Std. Dev.	0.0905	0.0766	0.0964	0.0767	0.1298	0.1385	0.0270	0.0700	0.0621
Large Cap	Mean	0.4810	0.1934	0.3120	0.5223	0.1754	0.3052	-0.0412	0.0180	0.0068
	Std. Dev.	0.2053	0.0799	0.1363	0.1498	0.0930	0.1453	0.1510	0.0337	0.0397
Total	Mean	0.1860	0.1346	0.1623	0.1964	0.1042	0.1579	-0.0104	0.0304	0.0044
	Std. Dev.	0.2102	0.1013	0.1363	0.2088	0.1694	0.1504	0.0981	0.1446	0.0535
F Value		40.9740	4.2587	17.3707	80.2906	2.1932	11.431	0.8569	0.1103	0.9062
P-Value		0.0000	0.0193	0.0000	0.0000	0.1216	0.0001	0.4303	0.8958	0.4102

The small-cap companies found to have the mean Forex exposure of 0.0931 and 0.0922 for 2016-17 and 2017-18 respectively and the standard deviation 0.1093 in 2016-17 and 0.0932 in 2017-18. The mid-cap companies found to have the mean Forex exposure of 0.1063 and 0.1124 for 2016-17 and 2017-18 respectively, and the standard deviation 0.0905 in 2016-17 and 0.0767 in 2017-18, the large-cap companies found to have the mean of 0.4810 and 0.5233 for 2016-17 and 2017-18 respectively, and the standard deviation 0.2053 in 2016-17 and 0.1498 in 2017-18.

A One-way ANOVA is conducted to compare the effect of Forex Exposure on Profitability measures for sample years. Table 3 shows the results of One-way ANOVA.

An analysis of variance showed that the effect of Forex Exposure on APATM for the year 2017-18 was significant, $F(2, 53) = 4.259$, $p = 0.019$. Further, analysis of variance showed that the effect of Forex Exposure on ROCE for the year 2016-17 was significant, $F(2, 53) = 11.431$, $p = 0.000$. And, the effect of Forex Exposure on ROCE for the year 2017-18 was significant, $F(2, 53) = 17.371$, $p = 0.000$.

Table 4: Correlation of Forex Exposure and Profitability

		Apatm 2018	Roce 2018
Forex Exposure 2018	Pearson Correlation	0.288*	0.522**
	Sig. (2-tailed)	0.031	0.000
		Apatm 2017	Roce 2017
Forex Exposure 2017	Pearson Correlation	0.201	0.435**
	Sig. (2-tailed)	0.137	0.001
		Change In Apatm	Change In Roce
Change in Forex	Pearson Correlation	0.429**	0.193
	Sig. (2-tailed)	0.001	0.153
** Correlation is significant at the 0.01 level (2-tailed).			
* Correlation is significant at the 0.05 level (2-tailed).			

Correlation analysis of sample companies' Forex exposures and profitability for two years are shown in table 4. Based on the results of the study, sample companies Forex exposure was strongly related to APATM $r = 0.288$, $p < 0.05$ for 2017-

18. Whereas, Forex exposure was strongly related to ROCE $r = 0.435$, $p < 0.01$ for 2016-17 and $r = 0.522$, $p < 0.01$ for the year 2017-18. Significantly, Change in Forex exposure from 2016-17 to 2017-18 was strongly related to Change in APATM from 2016-17 to 2017-18 $r = 0.429$, $p < 0.01$. Thus, it showed that profitability was significantly correlated to Forex exposure of sample IT and ITeS companies.

A simple linear regression was calculated to predict APATM for 2017-18 based on Forex Exposure of 2017-18. A significant regression equation was found ($F(1, 54) = 4.898$, $p = 0.031$), with an R^2 of 0.083. Companies predicted APATM for 2017-18 is equal to $10.874 + 13.900$ (Forex Exposure). Companies APATM for 2017-18 increased 13.900 for the calculated level of Forex Exposure.

Further, a simple linear regression was calculated to predict ROCE for 2017-18 based on Forex Exposure of 2017-18. A significant regression equation was found ($F(1, 54) = 20.187$, $p < 0.000$), with an R^2 of 0.272. Companies predicted ROCE for 2017-18 is equal to $9.941 + 33.837$ (Forex Exposure). Companies ROCE for 2017-18 increased 33.837 for the calculated level of Forex Exposure. And, another simple linear regression calculated to predict ROCE for 2016-17 based on Forex Exposure of 2016-17. A significant regression equation was found ($F(1, 54) = 12.581$, $p < 0.001$), with an R^2 of 0.189. Companies predicted ROCE for 2016-17 is equal to $9.644 + 31.316$ (Forex Exposure). Companies ROCE for 2016-17 increased 31.316 for the level of Forex Exposure.

An important simple linear regression was calculated to predict Change of APATM from 2016-17 to 2017-18 based on Change in Forex Exposure from 2016-17 to 2017-18. A significant regression equation was found ($F(1, 54) = 12.177$, $p < 0.000$), with an R^2 of 0.184. Companies predicted Change of APATM is equal to $3.695 + 63.255$ (Change of Forex Exposure from 2016-17 to 2017-18). Companies Change of APATM from 2016-17 to 2017-18 increased 63.255 for the Change in level of Forex Exposure from 2016-17 to 2017-18.

Discussion

Based on the results of the study it is evident that there exists a significant relationship between the level of Forex exposure and profitability measures. The small-cap companies Forex

exposure is ranging between 0.0000 to 0.32151 for 2016-17 and 0.00058 to 0.52970 for 2017-18, the mid-cap companies Forex exposure ranging between 0.02415 to 0.30211 for 2016-17 and 0.02506 to 0.33344 for 2017-18 and the large-cap companies Forex exposure ranging between 0.23730 to 0.71006 for 2016-17 and 0.02628 to 0.72051 for 2017-18. Thus, large-cap companies found to have a wide range and high level of exposure; mid-cap companies have a low level of exposure whereas small-cap companies found to have a moderate level and also a wide range of Forex exposure.

The Forex Exposure of sample companies had reduced by 0.0104 from the previous year but APATM and ROCE had increased by 0.0304 and 0.0044 respectively from the previous year. The profitability measure of the companies found to have improved in 2017-18.

The correlation analysis across Change in Forex exposure to change in APATM from 2016-17 to 2017-18 found to have 0.429** which shows strong relationship even regression analysis across the sample companies showed the significant impact of Forex exposure on profitability measures.

This study was conducted for a limited research period with limited sample size and only exchange rate risk is analyzed, for better understanding of risk management in IT and ITeS companies different types of risks should be considered like interest rate risk, inflation risk etc., on these grounds there is a wide scope for detailed study in IT and ITeS sector.

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References

1. Aksoy Yunus, Riyanto Yohanes E. Exchange Rate Pass-Through in Vertically Related Markets, *Review of International Economics*. 2000; 8(2):235-251.
2. Anshu Grewal. Impact of Rupee-Dollar Fluctuations on Indian Economy: Challenges for Rbi & Indian Government, *International Journal of Computer Science and Management Studies*. 2013; 13(06):22-27.
3. Bodnar GM, Dumas B, Martson R. "Pass-through and exposure," *Journal of Finance*, 2002, 57.
4. Chanan Pal Chawla. Understanding the Impact of exchange rate fluctuation on the competitiveness of Business, *Opinion*. 2011; 1(1):16-19.
5. Dimas Bagus Wiranata Kusuma. Analysis the Impact of Exchange Rate Fluctuation toward the of Exports and Imports Performance the OIC Member Countries, *International Conference in Economic and Trade Integration Among OIC Member Countries: Opportunities and Challenges*, 2010.
6. Ida Aghdas Mirzaie, Magada Kandil. The Effects of Exchange Rate Fluctuations on Output and Prices: Evidence From Developing Countries, *Journal of Developing Areas*, 2003, 38(2).
7. Ki-ho Kim, Charles T. Davidson. Fluctuations in currency value and the aggregate profit of the U.S. Manufacturing sector, *International Journal of Business*. 1996; 1(2):45-62.
8. Krishna Murari, Rajesh Sharma. OLS modelling for Indian Rupee fluctuations against US Dollar, *Global Advanced Research Journal of Management and Business Studies*. 2013; 2(12):559-566.
9. Magada Kandil. Exchange rate fluctuations and economic activity in developing countries: Theory and Evidence, *Journal of economic development*. 2004; 29(1):85-108.
10. Mehul Raithatha. A conceptual study on the fluctuation of rupee in relation to dollar, *International Journal of Business Economics & Management Research*. 2012; 2(3):266-274.
11. Mihir Dash, Akshay Madhava. A study on The Impact of Currency Fluctuation on the Indian IT Sector, *SSRN Electronic Journal*, 2009.
12. Mushtaqur Rehman, Shafiq ur Rehman. Relationship of exchange rate with various macroeconomic variables, *International Conference on Business management*, 2011. ISBN: 978-969-9368-01-1.
13. Najia Saqib. the Effect of Exchange Rate Fluctuation on Trade Balance: Empirical Evidence from Saudi Arab Economy, *Journal of Knowledge Management, Economics and Information Technology*. 2013; 3(5):1-10.
14. Pinelopi Koujianou Goldberg, Michael M. Knetter Goods Prices and Exchange Rates: WhatHave We Learned? *Journal of Economic Literature*, American Economic Association. 1997; 35(3):1243-1272.
15. Sachin Dabhade, Hemangi Kelkar. Deep impact: how a vulnerable rupee is affecting performance of Indian Firms, *IOSR Journal of Business and management*, P-ISSN: 2319-7668, 2012, 40-49.
16. Saeid Mahdavi. The response of the US export prices to changes in the dollar's effective exchange rate: further evidence from industry level data, *Applied Economics Journal*. 2002; 34(17):2115-2125.
17. Swenson Deborah L. Overseas assembly and country sourcing choices, *Journal of International Economics*. 2005; 66(1):107-130.
18. Verena Tandrayen-Rago Obur, Nawsheer Emamdy. Does exchange rate volatility harm exports? Evidence from Mauritius. 2011; 2(3):146-155.
19. Yang Jiawen. Pricing-to-market in U.S. imports and exports: A time series and cross-session Study, *The Quarterly Review of Economics and Finance*. 1998; 38(4):843-861.