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AN ANALYSIS OF STRATEGIC USES OF FOREIGN EXCHANGE DERIVATIVES IN MANAGING FOREIGN EXCHANGE EXPOSURES BY INDIAN FIRMS

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ABSTRACT

In India, exchange rates were deregulated in 1993 and were allowed to be determined by the market forces. The economic liberalisation of the early nineties facilitated the introduction of interest rate and foreign exchange derivatives. Foreign exchange derivatives are used by firms to mitigate foreign exchange exposures. Uncertainty about exchange rates causes foreign exchange exposures having significant effects on the earnings of the firms. The use of derivatives is still a highly regulated due to partial convertibility of rupee. Currently, futures, forwards, swaps and options are available in India.

This paper attempts to evaluate the various alternatives available to Indian corporates for hedging foreign exchange risks. The paper aims to study the strategic uses of foreign exchange derivatives by Reliance Industries Limited and Tata Consultancy Services Limited to manage foreign exchange exposures.

There are evidences showing the reduction of foreign exchange exposure with the use of tools for managing the exposures. The Paper concludes that since, in addition to proper mix of foreign exchange derivative instruments in foreign exchange risk management strategy, the precise prediction of foreign exchange rate plays a very significant role in successfully managing the foreign exchange exposure of a firm, more emphasis should be given on the accurate prediction of exchange rate.

KEYWORDS:

Foreign exchange exposure; derivatives; forwards; futures; options; Swaps

JEL Classification:

F 30, F 31, G15

1. INTRODUCTION

Firms dealing in multiple currencies face foreign exchange exposures on account of unexpected/ unanticipated changes in exchange rates. A foreign exchange exposure is defined as a contracted, projected or contingent cash flow whose magnitude is not certain at the moment and depends on the value of the foreign exchange rates in future. Hedging is a technique used by firms to protect themselves from the exposures. Foreign exchange derivatives are used by firms to hedge the foreign currency exposures. The scope of this paper is limited to the analysis of management of the foreign exchange exposures faced by the Reliance Industries Limited and Tata Consultancy Services Limited.

This paper attempts to study the various alternatives available to Indian corporates for hedging financial risks. This paper aims to provide a perspective on managing the risk that firms face due to fluctuating exchange rates. It investigates the prudence in using the tools to mitigate the foreign exchange exposures by RIL and TCS.

In October 2001, RBI in a circular had said that banks must scrutinise and review unhedged forex exposures of clients that have large exposures. In February 2012, a similar circular with tougher wording was issued in which RBI said that banks should "rigorously evaluate" the risk emerging out of the unhedged forex exposure and price that risk in while extending credit facilities to these companies.[1] In January 2014, RBI put rules in place asking banks to make provision against unhedged forex exposures of their clients.

The study has been divided into six parts. The first part introduces the theme of the project. Part two provides review of literature on use of foreign exchange derivatives by corporates. Third section outlines the research methodology adopted to accomplish the objective of the study. Section four discusses the use of forex derivatives by Reliance Industries Limited and the company's policy to mitigate foreign exchange risks. The use of forex derivatives by Tata Consultancy Services Limited has been deliberated in section five. It also deals with the forex risk management policy of the company. The main findings of the study are summarised in section six.

2. REVIEW OF LITERATURE

2.1 Exchange Rate Exposures

All firms dealing in foreign currencies face a risk of unanticipated gains or losses due to unexpected changes in

exchange rates. There are different sources/ types of exchange rate exposure. The main types of exchange rate exposure are explained below:

i. *Transaction Exposure*
ii. *Economic Exposure*
iii. *Translation exposure*

2.2 *Foreign Exchange Exposure Hedging Techniques*

A firm can use various alternative ways to hedge its foreign exchange exposures. We can put the ways in two different categories as mentioned below:

A. Financial contracts: Derivative techniques
(i) Forward market hedge
(ii) Futures
(iii) Option market hedge
(iv) Swap market hedge
(v) Money market hedge

B.Operational techniques
(i) Choice of the invoice currency
(ii) Lead/lag method
(iii) Matching
(iv) Exposure netting

OTC instruments in currency forward, option and swaps are the most popular. Importers, exporters and banks use the rupee forward market to hedge their foreign currency exposure. The typical forward contracts are for one month, three months, or six months, with three months being the most common. Options are preferably used in case exchange is quite volatile. Swaps are used to mitigate foreign exchange risk relating to long term foreign liabilities i.e. debt.

2.3 Studies on Foreign Exchange Exposure Management

The studies related to foreign exchange exposure of firms can be put into three categories- first, the studies based on the efficacy of foreign exchange derivatives in managing foreign exchange risk of firms; second, the studies related to the practices of firms in managing foreign exchange exposures, and third, the studies related to on the choice of hedging instruments in managing foreign exchange risk. Selected studies on management of foreign exchange exposure are shown below in Table 1.

Table 1 Selected Studies on Management of Foreign Exchange Exposure

S. No.	Study	S. No.	Study
1	Marshall (2000)	15	Wong (2000)
2	Sivakumar and Sarkar (2008)	16	Pichler and Loderer (2000)
3	Madhu Vij (2008)	17	Oosterhof (2001)
4	Collier and Davis (1985)	18	Allayanis and Ofek (2001)
5	Batten, Metlor and Wan (1993)	19	Bengt Pramborg (2003)
6	Jesswein et al. (1995)	20	Bodnar et al. (2003)
7	Howton and Perfect (1998)	21	Abor (2005)
8	Hentschel and Kothari (2001)	22	Yazid and Muda (2006)
9	Chowdhry and Howe (1999)	23	Sathya Swaroop Debasish (2008)
10	Copeland and Joshi (1996)	24	Dash et al. (2008)
11	Fok et al. (1997)	25	Anupam Mitra (2013)
12	He and Ng (1998)	26	Sahu (2017)
13	Bodnar and Gebhardt (1998)	27	Mihir Dash (2009)
14	Nydahl (1999)	28	Geczy et al. (1997)

On the basis of review of studies carried out on management of forex exposures as discussed above, three important conclusions can be drawn. First, majority of studies indicates that use of foreign exchange derivatives is helpful in mitigating forex risk to varying degree of effectiveness. Second, the practices of using foreign exchange derivatives by corporates in managing foreign exchange exposures are increasing day by day. Third, the composition of foreign exchange derivatives in the hedging strategy of corporates is changing over the time, but at slower paceThe findings show that the use of third generation derivatives (Range, Compound options, Synthetic products) was generally less than that of the second generation derivatives (Futures, Options, Swaps and Warranties), which was, in turn, less than the use of the first generation derivatives (Forwards).

Forwards, futures and options are preferred in managing short term foreign exchange exposures. Options gives opportunity to tap unlimited profit caused by upward movement in price of currency, while the same time avowing the forex risk at minimal cost. Options are preferred when currency exchange rates are quite volatile. Swaps are generally used hedging long term exposure. Pricing method is generally preferred by corporates in managing short term foreign exchange exposures.

3. DATA AND RESEARCH METHODOLOGY

First of all, we should know the type and quantum of exposure. Then, we have to find which hedging techniques are being used by the firms. In last, are these techniques/ strategies appropriate to the given exposure and circumstances?

3.1 Data sources

The study is based on annual reports, data collected from the treasuries, interaction with the Treasures of RIL and TCS Limited and other relevant study material related to the companies. The study evaluates the foreign exchange exposures of the companies and assess the appropriateness of the hedging strategies employed by the companies.

3.2 Measure of Foreign Exchange Exposure

The foreign exchange exposure of a firm can be measured the responsiveness of return on its stocks to change in foreign exchange rate. A standard two factor model has been employed to estimate the exchange rate sensitivity coefficient of individual firms. This model can be described as given below:

$$R_{it} = a + \beta_1 e_{it} + \beta_2 R_{mt} + u_{it}$$

Where, R_{it} is the return on company i's stock at time t, e_{it} is the change in foreign exchange rate, and R_{mt} is the stock market return. Coefficients β_1 and β_2 provide the measure of exchange rate exposure and systematic risk of company i and u_{it} is the error term.

The return of company i for period t has been computed as given below:

$$R_{it} = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Where, P_t is price of stock of company i in period t and P_{t-1} is previous period price the stock. Similarly, return on NIFTY 500 and exchange rate (U.S. $ per Rupee) have been calculated.

A positive β_1 indicates exposure to appreciation of foreign currency (U.S. Dollar). Foreign exchange exposure has been assessed for 2012-2017, taking end of the month figures into consideration.

3.3 Sensitivity Analysis

In addition to the above assessment, a sensitivity analysis of company's profits/revenues to changes in foreign exchange rate has also been carried out. The sensitivity analysis shows the effect of 1% or 10% depreciation/appreciation in the value of foreign currency on the profit of the company. The results of sensitivity analysis can be used to verify the nature of forex exposure as measured by above two factor model.

3.4 Foreign Exchange Derivative Instruments

Then, the strategic uses of foreign exchange derivatives by the companies to manage foreign exchange exposures have been studied. The different derivative strategies- a combination of like - forwards, swaps, options, futures, invoice pricing, matching etc. used by the companies to meet these foreign exchange exposures have been analysed.

3.5 Appropriateness of Foreign Exchange Derivative Instruments

The appropriateness of instruments has been judged by comparing the instrument used by the company with the instrument that should have been used in these circumstances according to theory and the practices adopted by firms.

3.6 Foreign Exchange Exposure Management Policy

The policies adopted to manage the foreign exchange exposures by the companies have been analysed. It also includes internal control mechanism used by the companies. Which accounting standards are used by the companies?

3.7 Comparative Analysis

The comparison of instruments used by the companies with instruments used by global firms as provided by review of literature has been carried out.

4. RELIANCE INDUSTRIES LIMITED

RIL operations span from the exploration and production of oil and gas to the manufacture of petroleum products, polyester products, polyester intermediaries, plastics, polymer intermediaries, chemical, synthetic textiles, fabrics, retail and telecommunications. The company exports petroleum to the West Asia, the U.S., South East Asia and Australia. RIL exports Gasoil to Europe, Africa and South East Asia. The company also placed premium petroleum grades (Alkylate, PBOB) in Latin America and the American market.

Reliance Industries limited imports crude oil and condensate from Latin America, Middle East, Africa, Russia, Kazakhstan and the U.S. RIL has become the biggest importer of Ethane from U.S.A. in 2017.[2]

RIL has more than 146 subsidiary firms and 10 associate companies. The company has earnings approximately 55% in foreign exchange. Earnings in all businesses are linked to USD. The key input, crude oil, is purchased in USD. RIL has three joint ventures in the USA. Reliance has about 10% share in India' total exports.

4.1Foreign Exchange Exposure of the Company

Measure of foreign exchange exposure of stocks of Reliance Industries Limited using two factor model is given below in Table 2. The positive coefficient of exchange rate shows that the company is exposed to appreciation of the U.S. Dollar (depreciation of the rupee), due to its imports of feedstock purchased in USD.

Table 2 RIL: Foreign Exchange Exposure

	Constant	Exchange rate	Nifty	R^2	F- Statistics
Coefficient	0.0035	0.2741	0.6836	0.30	12.06
p-value	0.647	0.227	0.001		0.000

The sensitivity analysis shows that 1% depreciation of Rupee (or appreciation USD) would have resulted in loss of Rupees 329 crores in 2017. Thus. It is beneficial to RIL if Indian Rupee appreciates against the foreign currencies. It seems that in net exposure the company has to make strategy to hedge the appreciation of foreign currency i.e. USD. This

supports the results given by the two factor model above in Table 2.

Table 3 RIL: Sensitivity Analysis: Impact on Profit or Loss (in Rs crores)

Particulars	As on March 31, 2016			As on March 31, 2017		
	USD	EUR	JPY	USD	EUR	JPY
1% depreciation in INR	(302)	(26)	(4)	(309)	(14)	(6)
1% appreciation in INR	302	26	4	309	14	6

Source: Annual Report, various issues.

4.2 Foreign Exchange Risk Management Techniques

The table 4 depicts foreign currency exposures in USD, EUR and JPY on financial instruments at the end of the reporting period. The exposure to foreign currency for all other currencies are not material.

Table 4 RIL: Foreign Currency Exposures (In Rs. crore)

Particulars	As at March 31, 2015			As at March 31, 2016			As at March 31, 2017		
	USD	EUR	JPY	USD	EUR	JPY	USD	EUR	JPY
Loans	88521	3900	2411	92,914	6873	2110	92,922	8,498	1,673
Trade & other payables	37375	2093	513	44908	5389	674	59,017	1545	70
Trade & other receivables	(5596)	(2823)	(166)	(2321)	(2230)	(196)	(6281)	(55)	565
Derivatives									
Forwards & futures	30455	(3352)	(2370)	(23684)	(10140)	(2591)	(47854)	(9136)	(1702)
Currency swaps	1356			1438			1015		
Options	1950			2366			1076		
Net exposure	154061	(192)	388	115421	(108)	(3)	99,895	852	606

Source: Annual Report, various issues.

The table 4 indicates that the exposures are predominantly related to loans, trade and other payables. The exposures of the company are mainly in the U.S. Dollar. The major part of exposure is covered by the forwards contracts followed by options and swaps. The pricing of invoice, not mentioned the table, is used to mitigate the exposure on exports of the company.

The exposure of company derivatives to interest rate change at the end of the reporting period are given in Table 5. Since the company is prolific borrower to make investment and fulfil its other financing need, it has exposures to interest rates. Major portion of interest rate exposure was accounted by foreign currency interest rate swaps. Next in the lead has been Rupee interest rate swaps. This shows that the company also used money market hedge to manage in exposures.

Table 5 RIL: Interest Rate Exposure (Rs crore)

Derivatives	As at 31st March 2015	As at 31st March 2016	As at 31st March 2017
Foreign currency interest rate swaps	45532	39968	25987
Rupees interest rate swaps	23640	16835	9995
Currency swaps	1356	1438	1015
Total	70528	58241	36997

Source: Annual Report, various issues.

Table 6 shows foreign currency exposures that are not hedged by derivative instruments as on March 31. The unhedged exposures are naturally hedged by future foreign currency earnings and earnings linked to foreign currency as claimed by the company. The unhedged exposures are increasing as the imports of feedstock and foreign debt are increasing over the years and its natural hedge, the foreign currency earnings have also been increasing as well.

Table 6 RIL: Unhedged Foreign Currency Exposures (in Rs crores)

Year	2010	2011	2012	2013	2014	2015	2016	2017
Amount	50442	65893	82198	71627	64918	82812	91255	99895

Source: Annual Report, various issues.

Table 7 portrays maturity profile of derivative financial liabilities relating to forwards, options and swaps used by Reliance Industries Limited to manage its exposures during 2016-17. It can be seen that forwards and options are usually used for short term i.e. less than one year. On the contrary, swaps, which are used to meet the exposure on liability, predominantly have the maturity between one and five years i.e. longer than that of forwards and options. None of the derivatives instruments used by the company in the managing exposures has a maturity exceeding five years.

Table 7 RIL: Maturity Profile of Derivative Financial Liabilities as on March 31 (in Rs. crores)

Year	Below 3 months	3 - 6 months	6 - 12 months	1-3 years	3-5 years	Above 5 years	Total
Forwards							
2016	40	3	370	141	-	-	554
2017	1115	380	372	-	-	-	1867
Options							
2016	-	-	-	-	-	-	-
2017	33	64	62	-	-	-	159
Currency swaps							
2016	-	-	102	90	224	-	416
2017	-	-	42	42	200	-	284
Interest rate swaps							
2016	5	13	32	419	285	-	754
2017	-	1	175	51	49	-	276

Source: Annual Report, various issues.

4.3 Risk Management Policy

Currency fluctuations impact the profit of the company as it buys the crude and sells oil in U.S. dollars. A change in rates of interest also affects company's profit as one-fourth of its consolidated borrowings are pegged to floating rates. The company had consolidated borrowings nearly Rupee two lacs crores in 2016-17. At Rupee 99,895 crores, nearly half of the group's debt was denominated in U.S. dollar at the end of March 2017. RIL has a natural hedge against the exposure as future earnings are linked to U.S. dollars. The company has a very little exposure to the Euro and the Japanese Yen.

The company risk management framework is designed to be a simple, consistent and clear. It consists well defined structure for managing and reporting risks from the operations to the Board. The framework and related processes seek to avoid incidents and maximise business outcomes.

The company has adopted a three lines of defence model to enable continuous and real time assurance on key risk exposures and the ongoing effectiveness of controls.

First Line of Defence: In the first line of defence, business and functional leaders continuously prove for themselves that risk management activities they have in place are effective. In aggregation with the risk management activities themselves, this monitoring activity provides the first line of defence in the management of risk.

Second Line of Defence: This line of defence includes the experts in areas. This network of functional experts provide functional assurance to the businesses by:

i. Providing a view, independent of the line, of risks within their area of functional expertise.
ii. Setting standards for the management of risks and deliver guidance on mitigations to relevant Businesses in their area of expertise.
iii. Observing or verifying the efficiency of controls and other risk management activities completed by the business.

Third Line of Defence: Group Audit is the third line of defence. The company has established an independent Group Audit function, reporting to the Chairman of the Board and the Audit Committee.

Table 8 reveals information relating to the companies' policy to manage the forex exposure and other relevant parameters. The RIL uses centralised approach and treasury is assigned the task of forex exposure management. The company covers the transaction, operating and translation exposures. The company uses OTC and Exchange traded forex derivatives in addition to operational techniques of matching, pricing of invoice and inter-company netting.

Table 8 Foreign Exchange Risk Management

Particular	RIL	TCS
1. Foreign exchange risk management	Centralised	Centralised
2. Responsible department	Treasury	Treasury
3. Exposures covered	Transaction Economic Translation	Transaction Translation
4. Accounting standard	INDAS	IFRS
5. Derivatives markets	OTC Exchange traded	OTC Exchange traded
6. Currencies hedged	USD, EUR, JPY	USD, GBP, EUR, JPY, AUD and others
7. Forecasting of relevant currencies	Yes	Yes
8. Hedging techniques used	1. Matching 2. Forwards 3. Swaps 4. Options 5. Futures 6. Intercompany matching 7. Choice of invoicing currency	1. Matching 2. Forward 3. Options 4. Futures
9. Time horizon for hedging	Less than 5 years	Less than 1 year
10. Review of hedging policy	Continuous	Quarterly
11. Internal control mechanism	1. Regular management report on positions 2. Limits & guidelines framed by top management 3. Internal audit & control 4. Different levels of authorisation	1. Regular management report on positions 2. Limits & guidelines framed by top management 3. Internal audit & control 4. Different levels of authorisation
12. Risk evaluation techniques	1. Value at risk 2. Stress or scenario test 3. Price value of a basis point	1. Value at risk 2. Price value of a basis point
13. Use of third generation derivatives	No	No
14. Note of policies of competitors	No	No
15. Change in hedging strategy in response to exchange rate fluctuations	Yes	Yes
16. Help of external sources/experts	Yes	Yes
17. Different strategies to manage forex risks arising out from cash inflows and outflows	Yes	Yes
18. Company's exposure to	Appreciation of foreign currency	Depreciation of foreign currency

Source: Based on information provided by the respective companies.

The RIL continuously reviews its hedging policy. Internal control policy includes regular management report on positions, limits & guidelines framed by top management and internal audit & control, and different levels of authorisation.

The company evaluates the risk associated with foreign exchange fluctuations. Simple foreign exchange derivatives are used by the company in managing foreign exchange risks. The third generation derivatives are not used by the company.

The company does forecast the exchange rate of relevant currencies. It also takes consultancy services of external experts. The company makes changes in its hedging strategy in response to exchange rate fluctuations. The company uses different strategies to manage forex risks arising out of cash inflows and outflows. The foreign exchange market is well regulated and Reliance ensures compliance with all the regulations.[3]

5. TATA CONSULTANCY SERVICES LIMITED

TCS is an information technology services, consulting and business solutions company. It is servicing large global corporations across a range of industry verticals including banking, ûnancial services & insurance, telecom, retail & consumer packaged goods, media & entertainment, manufacturing, hi-tech, life sciences & healthcare, energy, resources & utilities, travel, transportation & hospitality and government sectors.

TCS has a global delivery footprint that covers over 145 solution centres. The company has 58 subsidiaries as on

March 31, 2017. It has no associate companies or joint venture companies. The functional currency of the company and its Indian subsidiaries is Indian rupee, whereas the functional currency of foreign subsidiaries is the currency of their countries of domicile.

The company earns more than 90% in foreign exchange. Revenues are largely denominated foreign currency, predominantly USD, EUR, GBP, AUS, CAD, SAR and SWF. More than the half of earnings are from North American area. About one-fourth of its earnings are from Europe. Any depreciation of foreign currency (USD and other relevant currencies) would lead decline in revenues when measured in the domestic currency (Rupee). Thus, for such a company having predominantly foreign currency earnings, the management of foreign exchange exposures becomes significant.

5.1Foreign Exchange Exposure of the Company

Foreign exchange exposure of stocks of Tata Consultancy Limited using two factor models is given below in Table 9. The company seems exposed to the depreciation of foreign currency (the U.S. Dollar). The results shows that the returns of the company are exposed to depreciation of foreign currency (USD).

Table 9 TCS: Foreign Exchange Exposure

	Constant	Exchange rate	Nifty	R^2	F- Statistics
Coefficient	0.0119	-0.3478	0.1686	0.03	0.94
p-value	0.172	0.177	0.437		0.000

The exchange rate sensitivity is calculated by aggregating the net foreign exchange rate exposure and a simultaneous parallel foreign exchange rates shift of all the currencies by 10% against the respective functional currencies of TCS and its subsidiaries. The depreciation of foreign currencies have impact on the net profit of the company. The sensitivity results supports the company's exposure to depreciation of foreign currency as shown by two factor model in Table 9.

Table 10 TCS: Expected increase (decrease) in Group's profit before tax due to 10% appreciation (depreciation) of respective foreign currency (Rs crores)

Particulars	As on March 31		
	2015	2016	2017
Expected decrease/increase	82	73	288

Source: Annual Report, various issues.

Table 11 shows the revenue growth analysis of the company. The analysis shows that exchange rate affects the revenues significantly. In 2010, the revenues of the company grew by 8% and out of this 2% was due to exchange rate impact, while in 2017 the exchange rate contributed 0.3% of revenue growth.

Table 11 TCS: Analysis of Revenue Growth (%)

Growth attributed to	Fiscal years							
	2010	2011	2012	2013	2014	2015	2016	2017
Business growth	6.0	28.5	23.0	16.1	17.3	17.0	11.9	8.3
Impact of exchange rate	2.0	(4.2)	8.0	12.7	12.6	(1.3)	2.9	0.3
Total growth	8.0	24.3	31.0	28.8	29.9	15.7	14.8	8.6

Source: Annual Report, various issues.

5.2 Foreign Exchange Risk Management Techniques

The table 12 depicts number of contracts, notional amount and fair value of outstanding currency options at the end of the reporting period. The company uses option contracts in large amount as compared to forward contracts. This strategy has been observed among many information technology firms recently in India.[4] It shows that the company intends to retain the benefit of favourable movements in prices of underlying currency, while at the same time avoiding risk.

Table 12 TCS: Outstanding currency option contracts which have been designated as cash flow hedges

Foreign currency	As on March 31, 2015			As on March 31, 2016			As on March 31, 2017		
	No of contracts	Notional amount of contracts (million)	Fair value (Rs crores)	No of contracts	Notional amount of contracts (million)	Fair value (Rs crores)	No of contracts	Notional amount of contracts (million)	Fair value (Rs crores)
USD	-	-	-	9	225	41.4	6	150	9.0
GBP	18	297	67.1	8	160	51.9	45	318	60.0
EUR	2	171	87.8	24	285	19.5	27	198	40.0
AUD	6	97	31.2	21	228	(12.5)	6	60	11.0

Source: Annual Report, various issues.

The table 13 depicts number of contracts, notional amount and fair value of outstanding currency forwards at the end of the reporting period. The company uses less forward contracts to manage foreign currency exposures in agreement with the deliberate strategy.

Table 13 TCS: Outstanding currency forwards contracts which have been designated as cash flow hedges

Foreign currency	As on March 31, 2015			As on March 31, 2016			As on March 31, 2017		
	No of contracts	Notional amount of contracts (million)	Fair value (Rs crores)	No of contracts	Notional amount of contracts (million)	Fair value (Rs crores)	No of contracts	Notional amount of contracts (million)	Fair value (Rs crores)
USD	-	-	-	-	-	-	-	-	-
GBP	-	-	-	-	-	-	5	125	5.0
EUR	-	-	-	-	-	-	3	91	15.0

Source: Annual Report, various issues.

Table 14 portrays notional amount of foreign exchange forward, option and future contracts outstanding. It clearly portrays that the TCS Limited does not use swaps at all. The obvious reason is that it has no liability in foreign currency.

TCS suffered a loss Rs. 277 crores in the first six months of 2009 on forex derivatives trading (on options). The CFO said that it was unthinkable to expect the rupee to depreciate as the foreign money was flowing into Indian market in 2008. In July 2009, TCS decided to halve the tenure of its hedging contracts in future due to the continuing unpredictability inthe rupee market. Earlier the company had a policy of hedging its dollar exposure for a period of two years or more.[5]

The company also suffered loss on derivative instruments in 2013. TCS used 'range forward options' to hedge its risk on foreign revenues which predominantly in USD. A range forward option contract provides protection against adverse exchange rate movements, while retaining some potential upside in case the currency appreciates. Losses can multiply in case the rupee moves out of the range. This had happed in the second quarter of 2013. More than fifty percent of TCS hedges were in the form of range forward options. The rupee depreciated against USD to a good extent.

Table 14 TCS: Outstanding foreign exchange forward, option and futures contracts, notional amount as on March 31 (Rs. crores)

Year	2010	20111	2012	2013	2014	2015	2016	2017
Amount	3316	4433	8223	10428	15775	19949	22144	19159

Source: Annual Report, various issues.

Table 15 shows net gain (loss) on derivative instruments transferred to profit and loss account. It transferred loss on forex derivative instruments in 2011, 2012 and 2014. While, the company transferred profit on derivative instruments to profit and loss account in 2010, 2013, 2015,2016 and 2017. In 2017, the company transferred a profit of Rupee 1522 crores on derivative instrument to profit and loss account.

Table 15 TCS: Net gain on derivative instruments (foreign exchange forward, options and future contracts) transferred to statement of profit and loss (Rs. crores)

Year	2010	2011	2012	2013	2014	2015	2016	2017
Gain/loss	91.5	(8.9)	(192.8)	272.0	(66.6)	1363.9	180.6	1522.0

Source: Annual Report, various issues.

5.3 Risk Management Policy

The company has adopted a well-defined policy for management of foreign exchange exposures. The risk management policy of TCS has been summarised below:

- Risk management policy is approved by Board of Directors which states risks, means to mitigate these risks; defining authorities, responsibilities and controls and stating broad parameters within which treasury has to function. Policy is reviewed by Board periodically.
- Risk management board is responsible for policy implementation, strategy formulation and periodic review of decisions.
- TCS Treasury is a not a profit centre but a facilitator with an objective of protecting accounting/ budgeted rates and thereby reducing unpredictability and volatility.
- The company follows globally used FAS 133 accounting standard.
- The policy allows use of only simple accounting compliant structures. It necessitates that each hedge has to be mapped with a specific set of underlying. No exotics are allowed.
- Hedging policy is to hedge the 'net' exposure.

The following basic instruments are used by TCS Limited to manage forex exposure:

Instrument	*Advantage*	*Disadvantage*
Forward contracts	Full downside protection, No cost	No participation in case of upside
Vanilla options	Full upside and downside protection	Initial cost
Range forward options	Complete down side protection Generally no upfront cost	Upside participation up to a level

TCS selects the structure of derivatives on the basis of market conditions and the expectation at the time. Table 8 reveals information relating to the company's policy to manage the forex exposure and other relevant parameters. The company uses centralised approach and the treasury is assigned the task of forex exposure management. The company manages the transaction and translation exposures. The company uses both OTC and Exchange traded forex derivatives to manage its foreign exchange exposures.

TCS quarterly reviews its hedging policy. Internal control policy includes regular management report on positions, limits & guidelines framed by top management and internal audit & control.

TCS evaluates the risk associated with foreign exchange fluctuations. Simple foreign exchange derivatives are used by the company in managing foreign exchange risks. The time horizon of the forex derivatives in use is less than one year. The third generation derivatives are not used by the company.

The company does forecast the exchange rate of relevant currencies. It also takes consultancy services from external experts. The company uses to make changes in its hedging strategy in response to exchange rate fluctuations.

The company uses various derivatives financial instruments governed by policies approved by board of directors, such as foreign exchange forward, option and future contracts to manage and mitigate its foreign exchange exposures. The company can enter into contracts for a period between one day and eight years.

TCS follows a currency hedging policy that is aligned with market best practices, to limit the impact of exchange volatility on earnings and collections. Hedging strategy is monitored by the Risk Management Committee on a regular basis.

The company and its subsidiaries report quarterly to its management committee, an independent body that monitors foreign exchange risks and policies implemented to manage its foreign exchange exposures. Company maintains hedging account. Foreign currency denominated assets and liabilities are translated at the exchange rate prevailing on the balance sheet date and exchange gains and losses arising on the settlement and restatement are recognised in the statement of profit and loss.

6. CONCLUSIONS

The main findings of the study, grouped on the basis of parameters set in the objectives of the study, have been discussed below:

(i)Effectiveness of forex derivatives in managing foreign exchange exposure

There is enormous research on the effectiveness of foreign exchange derivatives in managing foreign exchange risks. There are evidences in literature showing the reduction of foreign exchange exposures of firms with the use of tools for managing the exposures.

(ii)Understanding and Approach

Forex exposures are managed by the treasury departments in Reliance Industries Limited and Tata Consultancy Services Limited. Both companies use centralised approach to manage the foreign exchange exposures. Both companies have clear understanding of their foreign exchange exposures i.e. translation, transaction and economic exposures. The companies change their strategies in response to the fluctuations in exchange rates. However, both companies i.e. Reliance Industries Limited and Tata Consultancy Services Limited have different hedging requirements to manage their foreign exchange exposures. Hence, both the companies uses different mix of foreign exchange derivatives in their strategies to manage their foreign exchange exposures. The management of forex exposure of RIL appears more complex than that of TCS's.

(iii)Evaluation and Forecasting

RIL evaluates the foreign exchange exposures. It uses the Value at risk, Stress or scenario test and Price value of a basis point methods to evaluate the foreign exchange risks. Reliance Industries Limited does forecast the exchange rate of relevant currency; the U.S. dollar, for exposure management purpose. It also takes consultancy services of external experts. The company uses different strategies to manage forex risks arising out of cash inflows and outflows. RIL has exposure to appreciation of USD.

Tata Consultancy Services Limited evaluates the risk associated with foreign exchange fluctuations. It uses the Value at risk and Price value of a basis point methods to evaluate the foreign exchange risks. The company does forecast the exchange rates of relevant currencies. It also takes consultancy services from external experts. The sensitivity analysis shows the revenues of TCS are affected by the depreciation of concerned foreign currencies.

(iv) Derivative Techniques Used

Reliance Industries Limited has about 50 percent earnings from foreign sources in U.S. dollars. The company uses foreign currency loans to fund its investments to a good extent. Between 2012 and 2015, RIL raised US$ 11.5 billion (in foreign currency bonds) making RIL one of the most prolific borrowers in Asia.[6] It also has good amount of payables in foreign currencies. The earnings in all businesses are linked to USD. The key input, crude oil is purchased in USD. All export revenues are in foreign currency and local prices are based on import parity prices as well. Thus, any appreciation of rupee against foreign currencies appears to help the company in increasing the income. The company uses foreign exchange forwards and futures to a large extent to hedge its currency exposure, followed by use of options. The company uses swaps to mitigate the long term foreign exchange exposure. Reliance Industries Limited uses derivatives having tenure up to five years to manage its foreign exchange exposure.

The TCS has more than 90 percent of its revenue in foreign currencies. The depreciation of rupee against foreign currencies

appears to increase the revenue of the company in its functional currency i.e., rupee. Since TCS has no foreign exchange liability, it does not use swaps at all to manage exposures. It uses foreign exchange options on a large scale. Since it has revenues in foreign currencies, option contracts are best bet to gain maximum benefit (potential benefit) and mitigating forex risks at the minimum cost when exchange rates are volatile. In addition, the company also uses, on a small scale, foreign exchange forwards and futures to mitigate foreign exchange exposure. Tata Consultancy Services Limited uses short term forex derivatives (up to one year) to manage forex exposure.

Both companies carry out transactions in both markets i.e. OTC and Exchange traded derivatives markets to hedge their foreign exchange exposures.

(v)Suitability of Techniques

The strategies of both companies appear appropriate in the given situations- nature, type and duration of foreign currency revenues and expenses- to manage forex exposures.

Reliance Industries Limited used futures, forwards, options and swaps to manage its foreign exchange exposures. Since the company has foreign currency liabilities, use of swaps is appropriate in such cases. However, it uses forwards and futures on a larger scale to mitigate foreign exchange risk on the net foreign currency payables relating to import of crude oil feedstock and foreign debt. Company also uses options on a small scale to hedge foreign currency risk. The company has consistently earned profit on foreign exchange derivative instruments in the last few years.

TCS Limited suffered considerable losses on foreign exchange derivatives instruments in 2009 and again in 2013. While mix of derivative instruments in its risk management strategy was appropriate, why company suffered losses?

The TCS Limited has learnt two relevant lessons in the past. In 2009, its forecasting of exchange rate went wrong resulting a loss of crores of Rupees to the company. Consequently, it shortened the maximum maturity profile of forex derivatives from two years to one year. The shorter duration suits more to nature of foreign revenue of the company.

In 2013, TCS Limited again suffered huge loss on foreign exchange derivatives. Company also uses range forward options to manage its exposure. If exchange rate crosses a range, the resulting loss is multiplied in range forward options. Company's prediction of exchange rate went wrong and exchange rate crossed the range prescribed in contracts.

Thus, in addition to proper mix of foreign exchange derivative instruments in foreign exchange risk management strategy, the precise prediction of foreign exchange rate plays a very significant role in successfully managing the foreign exchange exposure of a firm.

(vi) Internal Control and Policy To Manage Exposures

Reliance Industries Limited continuously reviews its hedging policy. Internal control policy includes regular management report on positions, limits & guidelines framed by top management and internal audit & control, and different levels of authorisation.

Tata Consultancy Services Limited quarterly reviews its hedging policy. Hedging strategy is monitored by the Risk Management Committee on a regular basis. The company and its subsidiaries report quarterly to its management committee, an independent body that monitors foreign exchange risks and policies implemented to manage its foreign exchange exposures.

(vii)Global Comparison

The Reliance Industries Limited and Tata Consultancy Services Limited do not use third generation foreign exchange derivatives in managing forex exposures. This indicates that Indian forex derivatives market is still evolving and is not as developed as forex derivatives market in developed countries.

(viii)Suggestions

The companies maintains complete secrecy about their specific foreign exchange derivatives transactions. Divulge of more information by companies can made it possible to conduct more in-depth research of the effectiveness and working of foreign exchange derivatives instruments. This may help financial managers of multinational firms to a good extent.

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