

A Study on Management of Currency Exposure - Evidence from Disclosures of Indian Companies

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Preface

Research Center for Management Studies (RCMS) at SDMIMD has endeavoured to promote research in the field of management education in the Institute, in various ways. The Research Centre has encouraged faculty and students to actively take part in research activities jointly, collate and disseminate findings of the research activities through various types of projects to contribute to the body of knowledge to the academic fraternity in general, and management education in particular.

In this direction, keeping in line with the philosophy of promoting active research in the field of management to capture live situations and issues, the Research Center has taken a unique initiative to sponsor and encourage faculty members to carry out Applied Research Projects in various areas of management.

The duration of these projects is typically between four to twelve months. After completion of each project, after peer review, a publication is taken out, by the institute. The projects help the faculty members, and the students, who work under the supervision of the faculty members for these projects, to identify issues of current importance in the field of management in various sectors. Data is collected mostly through primary research, through interviews and field study.

The institute takes into account the time and resources required by a faculty member to carry out such projects, and, fully sponsors them to cover the various costs of the project work (for data collection, travel, etc), thereby providing a unique opportunity to the two most important institutional stakeholders (faculty and students) to enrich their knowledge by extending their academic activities, outside the classroom learning situation, in the real world.

From the academic viewpoint, these projects provide a unique opportunity to the faculty and the engaging students to get a first-hand experience in knowing problems of targeted organizations or sectors on a face to face basis, thereby, helping in knowledge creation and its transfer, adding to the overall process of learning in a practical manner, with application of knowledge, as the focus of learning pedagogy, which is vital in management education.

Dr. Mousumi Sengupta
Chairperson, SDM RCMS

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Executive Summary

This study on management of currency exposure was carried out for a sample of 349 companies listed in Indian bourses for the year ending 31st March 2018. The study found that 74% of the companies use derivatives to hedge currency risk. Forward contract is the major instrument used by companies in their hedging activities. The other instruments used for hedging activities include a combination of futures, options and swaps. Around 55% of the sample companies had borrowings in the form of foreign currency loans. The study identified economies of scale, extent of international operations, hedging substitutes and size as variables impacting the likelihood of companies using derivatives to manage exposures. Economies of scale and extent of international operations had positive impact on the likelihood of companies employing derivatives. Similarly, financial distress, economies of scale and extent of internationalization were the variables positively impacting the likelihood of companies raising foreign currency loans. The study also culminates with directions for future research.

Keywords: currency exposure, derivatives, financial distress, economies of scale, foreign currency loans

JEL Classification: F23, F30 and F31

I. Introduction and Research Issues

The exchange rate policies of a country is a major macroeconomic factor determining the competitiveness of companies as the movement in exchange rates affect the cash flows and subsequently the value of companies. The Countries following floating exchange rate regime are supposed to face more volatility in exchange rates. The sensitivity of a company's cash flows to the fluctuation in exchange rate is known as foreign exchange exposure. The exposure is broadly classified into three categories as mentioned by Eun and Resnick (1998). The first exposure is transaction exposure defined as the sensitivity of realised domestic currency values of a company's contractual cash flows denominated in foreign currencies to unexpected exchange rate changes. The second is translation exposure, which refers to the potential effect a company's consolidated financial statements can have due to changes in the exchange rates. Economic exposure is defined as the extent to which the value of a company would be affected by unanticipated changes in the exchange rates. These three types of exchange rate exposure affect the company's potential as well as current cash flows. It is thus logical to discuss on the relationship between the exchange rate changes and value of a company. This is because, the value of a company is the present value of its future cash flow streams and the exchange rate variability will affect the value of the company ultimately.

The management of exposures has attracted a lot of attention in recent years while identifying value added activities in the use of derivatives. The hedging of exchange rate risk and other risks may add value to companies because of the presence of market imperfections in the capital markets. Examples of imperfections include financial distress, underinvestment problem, hedging substitutes, agency conflicts etc. Many studies on the determinants of hedging are based on comparisons between companies using derivatives and those which do not. A few studies have also identified the derivative instruments which are widely used by companies (Tony

Muff et al.,2008). A mere study of the financial hedging instruments alone may not reflect the hedging strategies of companies. But, identifying the factors which motivate companies to hedge will add value to the literature and aid to future research.

The studies of Joseph (2000), Keloharju et al, (2001) have shown that companies having a significant proportion of turnover in the form of exports are most likely to raise foreign currency debt. This also shows that foreign currency borrowing is used by companies to hedge risks. Therefore, studies which ignore the potential to deploy foreign currency loans may not be documenting important instruments of hedging activities. Results have also shown that foreign currency borrowings are a way to manage exchange rate risk/exposure (Bradley et al .,2002).

This study is motivated by the aforesaid issues and contributes to the literature in the following ways- First, the study has taken the benefit of the change in the reporting requirements of derivatives use by companies in India (IAS21). This standard requires all companies to provide information on the use of derivatives and the management of exchange rate exposure. Secondly, the study considers a broad set of factors that explain the motivation for companies to hedge using derivatives/foreign currency borrowings.

The paper is organized as follows- Section II presents the theoretical framework on corporate hedging and the associated variables used for the study. Section III is on review of literature. Section IV is on data and methodology used for the current research, section V is on analysis and interpretation, section VI and VII are on findings and directions for future research.

II. Theoretical Framework

The theoretical framework underpinning forex hedging practices in corporates are summarised as follows-

Financial Distress

Smith et al., (1985) opined that highly geared firms

which have cash-flow problems or are otherwise near to possible bankruptcy will have an incentive to reduce risk in order to reduce the costs of this financial distress and hence increase shareholder value. Risk management can reduce the probability of firm's financial distress cost by reducing cash flow volatility. The benefit one can get by reducing this cost from risk management depends on two factors: the likelihood of encountering distress (if firm does not hedge), and financial distress cost (if it occurs). The greater the possibility of distress the greater the benefits from risk management. Subsequent researchers have used a slew of measures to proxy for financial distress, primarily based on the borrowing capacity of the firm or leverage. The empirical evidences by Froot et al. (1993) and Smith et al., (1985) provide support to theoretical arguments that high a probability of financial distress increase the likelihood of financial derivative use.

Underinvestment

The underinvestment problem arises when a firm is not able to make capital investments due to high cost of external financing and lack of internally generated funds. Firms reduce their capex by roughly \$0.35 for each dollar reduction in cash flows (Lewent et al., 1990). A firm which is highly geared may be forced to take up sub-optimal investment strategies and forego profitable investment opportunities- the so-called underinvestment problem (Mayers et al., 1987). Froot et al. (1993), Smith et al (1985), Mayers et al (1987), Bessembinder (1991) argue that through effective risk management, the potential problem of underinvestment is reduced. This happens when management want to maximize its wealth at the cost of bondholders and refuses to invest in low-risk projects. The conflict between equity and bond holders arises due to cash flow variation and high cost of external financing which can be resolved by hedging (Mello et al., 1995).

Hedging Substitutes

Nance et al. (1993), Froot et al. (1993) argue that firms

can mitigate the expected cost of financial distress and agency cost by maintaining a larger short-term liquidity position or with steps to reduce drains on cash flow by having a lower dividend pay-out. As a general strategy, holding liquid assets will reduce financial distress. On the whole, holding liquidity can be seen as a substitute for hedging activity in so far as the cost of holding liquid assets is lower than the cost of entering into financial hedging contracts.

Size and International Operations

Nance et al. (1993), Smith et al., (1985), Geczy et al. (1997), Allayannis et al., (2001) and Dunne et al. (2004), report that currency risk management activity is positively related to the size of the firm and the extent of international operations. Big size firms are not only able to benefit from economies of scale in the use of derivatives, but also take advantage of cheaper borrowing costs on international financial markets. Larger firms are therefore able to lower the cost of operations through economies of scale in hedging and borrowing and to position themselves strategically to take maximum advantage of risk diversification. The evidence is still not conclusive and ambiguous because Warner (1977), Dolde (1993) found smaller firms were most likely to report relatively larger derivatives activities than larger firms. According to them, smaller firms are more likely to experience default, may be due to undiversified nature of business and restricted access to external sources of capital. Alternatively, economies of scale also reflect an effective hedging program of a firm. Berkman et al.,(1996), Goldberg et al., (1998), Singh et al., (2008) have concluded that a positive relationship exists between scale of economies and magnitude of hedging.

Managerial Risk Aversion

Tufano (1996), Schrand et al., (1998) find evidence that hedging increases with managerial shareholding and decreases with managerial option ownership. Graham and Rogers (2000) and Dunne et al. (2004) report evidence that hedging increases with managerial

shareholdings only. These conclusions suggest that compensation programmes are important determinants of hedging. Smith et al., (1985) argued that managers with more wealth invested in a firm will have greater incentives to hedge the firm's risk and that the compensation to managers can influence

their hedging choices. Haushalter (2000), Jalilvand (1999) find no evidence that managerial risk aversion or shareholding affect corporate hedging. The relationship between managerial holdings and motivation to hedge remains ambiguous empirically.

Description of Variables

| Variable | Symbol | Proxy For |
|-------------------------------------------|--------|--------------------------|
| Debt to total assets | DTA | Financial Distress |
| Debt to net worth | DNW | Financial Distress |
| Interest Coverage Ratio | ICR | Financial Distress |
| Quick Ratio | QR | Hedging Substitutes |
| Log of Revenue | lnR | Economies of Scale |
| Promoters holding as a % of total holding | PH | Managerial Risk Aversion |
| Price to Earnings Ratio | PER | Underinvestment |
| R&D expenses to sales | R&D/S | Underinvestment |
| Log of Enterprise Value | lnEV | Size |
| Export/Total sales | EXS | International Operations |

III. Synoptic View of Review of Literature

| Authors/Year | Title | Methodology/Tool | Key Findings |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ahmed El Mastry Omneya Abdel Salam Amr Alatraby (2007) | The exchange rate exposure of U.K non-financial companies | Analysis done at the firm level. Regressing exchange rate exposure on variables such as size, foreign activity and financial hedging proxies | Firms foreign operations and hedging variables affect their sensitivity to exchange rate exposure |
| Halil Kiyamaz(2003) | Estimation of foreign exchange exposure- an emerging market application | Time series regression | Turkish firms are highly exposed to foreign exchange risks and the degree of exposure is more pronounced in textiles, chemicals and machinery. Turkish firms pay more attention to foreign exposure in the post crisis period than pre crisis period. |
| Abdullah Bin Omar Kamarun Nisham Taufil Mohammad (2017) | Exposure of Foreign Exchange Risk- A Review of Empirical Evidences | Review of earlier studies on management of foreign exchange risk | Most of the developed and developing economies are exposed to higher level of foreign currency exposure. This is due to high level of openness and imports and exports |
| Anupam Mitra (2013) | Comparative Analysis of Foreign Exchange Risk Management Practices among Non-Banking Companies in India | Survey of practicing managers of Indian Non-Banking Companies | Most of the corporate use forward contracts to hedge risk. Very few companies use a mix of futures, options and swaps |

| Authors/Year | Title | Methodology/Tool | Key Findings |
|---------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Charumathi B Hima Bindu Kota (2012) | On the Determinants of Derivative Usage by Large Indian Non Financial Firms | A multiple regression model where in the variables were financial distress cost, underinvestment, firm size, agency variable et al | Size was the major determinant of the derivative usage by large Indian non-financial companies |
| Manoj Anand K P Koushik (2008) | Currency Derivatives- A Survey of Indian Firms | Survey of practising managers in India | It identifies significant differences in the motivations of firms who either use foreign currency derivatives or have a documented foreign exchange risk management policy vis-d-vis firms that do not.. |
| Tony Muff Stephen Diacon MargarateWoods (2008) | The Management of Currency Risk- Evidence from U K Company Disclosures | A probit regression model, where in the dependent variable was binary and independent variables were financial distress cost, tax structure, hedging substitutes | Firms with low profitability, high growth opportunities and higher tax liabilities are more likely to use currency derivatives. |
| Cigdem Vural Yavas (2016) | Determinants of Corporate hedging- Evidence from Emerging Markets | A panel data logistic regression model | Firm size, foreign sales, profitability, dividend yield are the predictors which increases the likelihood of hedging. Leverage, interest coverage, growth opportunities have negative impact on the likelihood of hedging. |
| Raghavendra R H Velmurugan PS (2014) | The Determinants of Currency Hedging in Indian IT Firms | Multiple regression model- Variables such as financial distress cost, underinvestment cost, multinationality, firm size is regressed against the notional amount of currency derivatives | Firms size, underinvestment are the major determinants of currency derivative usage |
| Lee Lee Chong Xiao Jun Chang Siow Hooi Tan (2014) | Determinants of corporate foreign exchange risk hedging | Survey of practising managers in Malaysia | The insights of this survey would assist and prepare firms to hedge their exchange rate risk by employing financial derivatives. Knowing the influences of firms' adoption of currency derivatives would allow policy makers to formulate their policies in boosting the liquidity of Malaysian derivative market. |

| Authors/Year | Title | Methodology/Tool | Key Findings |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ephraim Clarke Amrit Judge (2008) | The Determinants of Foreign Currency Hedging- Does Foreign Currency Debt induce a bias | Regression and multi discriminant analysis | The researchers partition the sample into foreign currency hedgers who use foreign currency debt and those who do not use foreign currency debt. Financial distress and leverage are the significant variables which influence foreign currency hedging firms to avail foreign currency debt. |
| Talat Afza Atia Alam (2011) | Determinants of corporate hedging policies: A Case of Foreign exchange and interest rate derivative usage | Logit regression | Financial distress, taxes, underinvestment and managerial risk aversion had negative effect on firms hedging policies. |
| Rashid Ameer (2010) | Determinants of Corporate Hedging practices in Malaysia | Multiple regression model. Dependent variable- total amount of derivatives contract booked. Independent variables- Long term debt to total assets, quick ratio, market value of firm, taxes, managerial ownership, size, foreign sales | Findings suggest that there is a significant relationship between the use of derivatives and foreign sales, liquidity, firm growth, managerial ownership and size. Further, a few listed Malaysian firms have appropriate understanding of the derivatives instruments to mitigate risks in international business environment. |
| Joost M.E Pennings (2002) | Pulling the trigger or not: Factors affecting behaviour of initiating a position in derivatives market | Using questionnaire- interview conducted for 450 managers in U. S | The manager's risk attitude, the ratio of the futures price level to the manager's psychological reference price and the interaction between them, appear to explain the manager's behavior in initiating a futures position. |
| Lawrence G Velasco (2014) | Factors Influencing derivatives usage of Companies in Philippines | Panel Data Logistics regression | Results of fixed effects panel data logistic regression indicate firm size and employee stock options as significant factors influencing hedging. Liquidity and existence of growth opportunities were negatively influencing derivative usage. |

| Authors/Year | Title | Methodology/Tool | Key Findings |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Numan Khan Khurshid Ali Alina Kiran Zeeshan Khan (2017) Nasir Ali | Factors that effect the financial derivative usage of non-financial firms in Pakistan | Multiple regression model | Companies with high financial distress cost, high export sales, lower managerial holding and low interest coverage ratio were using derivatives to manage currency risk. |
| Mortaza Naghai Mohd. Nagahisarchoghaei Nadia Soleimani Raed M.Jaradat (2018) | Hedging Strategies of Corporate Houses | Multiple regression model | The paper compared the hedge strategies through derivatives of select U.S and Indian Companies. The analysis found no significant relationship between explanatory variables and hedging. The findings do not support any theory behind hedging by companies. |

Research Gap

There have been several studies of managing currency risk in global as well as the Indian context. Several studies in the global context have analysed the determinants of hedging policies and identified variables which significantly influence hedging decisions. In the Indian context too, Charumathi et al (2012), Raghavendra et al., (2014) used multiple regression approaches to determine what factors (independent variables) on the dependent variable, the dependent variable being the total value of derivative contracts used by the companies under study. However, the studies have not focussed on the ratio between the probability of companies hedging to not hedging and the present study is in that direction. Developing a logit model will be imperative to identifying companies which are likely to hedge when compared to those that do not.

IV. Data and Methodology

The data for the present study is from secondary sources. Major sources for the secondary data include annual reports of the companies and Capital Line data base. Companies selected for the study belong to S&P

CNX 500, which is India's first broad based index. S&P CNX 500 represents 96% of the total market capitalization in India. A sample of 349 companies was finally considered for the analysis. The sample was arrived at after excluding banking companies and those companies for which the complete data was not available. The study was conducted for the year ending 31st March,2018(FY 2017-18). The number of year(s) for the present study is in the similar lines of Linsley et al., (2006), Nguyen et al., (2003) and Tony Muff et al., (2008). It is to be mentioned that the number of samples considered for the present study is much higher than the samples of previous studies.

The study employs logistic estimation method to model the probability of hedging decisions against non-hedging decisions (Pennings,2002, Whidbee,1999). The dependent variable takes binary form, where in '1' is assigned to companies which use derivatives, '0' for companies who do not use derivatives (Model 1). Similarly, '1' is assigned to companies which have raised foreign currency loans and '0' for otherwise (Model 2). The independent variables are Debt/Total assets, Debt/Networth, Promoters holding as a% of total holdings, PE ratio,

interest coverage ratio, quick ratio, R&D expenses to sales, \ln (Enterprise Value), \ln (revenue), exports to sales. The following is the logit model used for the study

= Log odds of companies using derivatives against not using derivatives

..... X_k are the independent variables used for the study. The probability of a company using derivatives/raising funds through foreign currency loans is modelled as follows-

The logistic regression estimates the parameters β_1 , β_2 , and β_3 in the model, such that the likelihood of the choice data given the model is maximized. The parameters can be interpreted as the change in the log odds associated with one-unit change of the independent parameter. In our case, the odds are defined as the ratio between the probability that a company may use derivatives/foreign currency loans and the probability that a company does not use derivatives/ not raise funds through foreign currency loans. The model exhibits the likelihood ratio statistics and Wald statistics (the square of the parameter

estimate divided by the standard error). For the optimal model, two tests for goodness of fit statistics namely Nagelkerke's R^2 , which is similar to the R^2 in linear regression (Hair et al,1995) and Hosmer and Lemeshow test have been employed. The tests examine the substantive significance of the variables in the model.

$\beta > 1$ (Chance of a company using derivatives/foreign currency loans higher to not using derivatives/foreign currency loans. In other words, positive impact on the likelihood of hedging/raising foreign currency loans.)

$\beta < 1$ (Chance of a company using derivatives/foreign currency loans decreases by $1-\beta$ times to not using derivatives/foreign currency loans)

Tools for Analysis

The data collected has been analysed using R 3.6.1 and the appropriate packages are used. For instance, the package "caret" was used for the logistic regression analysis and classification. SPSS 23 was also simultaneously run for the analysis.

V. Analysis and Interpretation

Table I Descriptive Statistics

| | D/TA | D/NW | ICR | QR | $\ln R$ | PH | PE Ratio | R&D Exp/ Sales | Export to Sales | $\ln EV$ |
|--------------------|-------|--------|-----------|--------|---------|-------|----------|-------------------|--------------------|----------|
| Mean | 0.191 | 0.837 | 464.495 | 1.408 | 24.546 | 0.550 | 25.255 | 0.020 | 0.149 | 25.448 |
| Median | 0.151 | 0.317 | 26.981 | 1.006 | 24.390 | 0.561 | 26.557 | 0.000 | 0.041 | 25.256 |
| Standard Deviation | 0.228 | 3.222 | 3881.082 | 1.399 | 1.298 | 0.175 | 193.435 | 0.213 | 0.232 | 1.209 |
| Range | 2.986 | 55.532 | 68797.88 | 15.614 | 8.538 | 1.000 | 1464.304 | 3.947 | 1.631 | 9.758 |
| Minimum | 0.000 | 0.000 | 0 | 0.101 | 20.539 | 0.000 | 0 | 0.000 | 0.000 | 19.865 |
| Maximum | 2.986 | 55.532 | 68797.889 | 15.714 | 29.078 | 1.000 | 1464.304 | 3.947 | 1.631 | 29.624 |
| Count | 349 | 349 | 349 | 349 | 349 | 349 | 348 | 349 | 349 | 349 |

(D/TA-Debt to total assets, D/NW-Debt to Networth, ICR-Interest coverage ratio, AR-Quick ratio, $\ln R$ -Log of revenue, PH-Promoter's holdings as a % of total holdings, PE Ratio-Price/Earnings ratio, R&D Exp/ Sales-Research & Development expenses/ Sales, Export/total sales $\ln EV$ - Log of enterprise value)

Table I provides the descriptive statistics of all the variables considered for the study. The average debt employed by companies under study was 19.1% of

the total assets. There were few companies which did not employ any debt. The maximum value was 2.986 indicating that, around 3 times of the total assets were in the form of borrowings. The average debt in proportion to equity was 0.837. The companies had adequate earnings to meet the interest obligations. The average interest coverage ratio was 464.95 times. The short -term liquidity position of the companies was comfortable. The average quick ratio was 1.408

which indicates that the companies had liquid assets which are 1.4 times more than their short-term liabilities. The promoter's holdings were on an average 55% of the total holdings. The companies on an average were spending 2% of the total sales towards research and development. On an average, 14.9% of the total sales was in the form of exports. The table finally indicates that the companies were highly leveraged and had adequate liquidity to meet their obligations.

Table II

| | |
|---------------------------------|-----|
| Companies using Derivatives | 257 |
| Companies not using Derivatives | 92 |
| Total | 349 |

Number of Companies using/not using Derivatives

(Source- Author's classification)

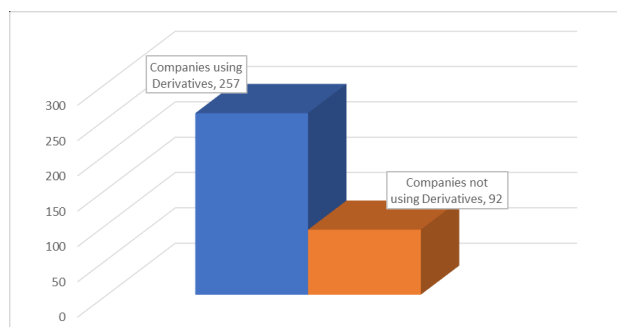
Figure I


Table II provides the number of companies which use currency derivatives for managing currency risk as well as the number of companies which do not employ derivatives. From the table, it is found that majority of the companies ($257/349=.74/74\%$) use derivatives to manage currency risk. Around 26% of the companies do not employ any derivative instruments in managing currency risks.

Table III

| | |
|------------------------------------------|-----|
| Companies with Foreign Currency Loans | 189 |
| Companies without Foreign Currency Loans | 160 |
| Total | 349 |

Number of Companies with/without Foreign Currency Loans

(Source- Author's classification)

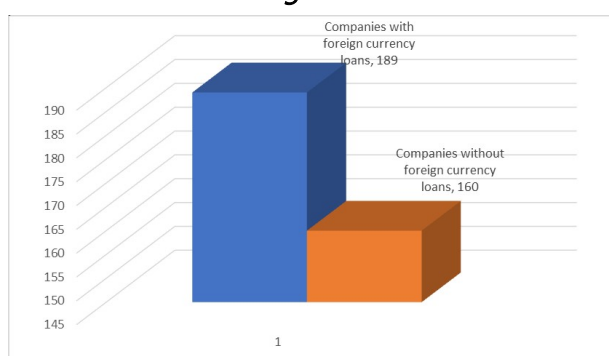
Figure II


Table III provides the number of companies which have borrowings denominated in foreign currencies and the number of companies which do not have overseas borrowings. From the table, it is found that 55% of the companies ($189/349=.55/55\%$) have raised money from overseas markets for meeting financing requirements. Around 45% of the companies have not raised any money from overseas markets.

Table IV

| | |
|----------------------------------------------------|-----|
| Forward Contracts | 180 |
| Others (Combination of Futures, Options and Swaps) | 77 |
| Total | 257 |

Types of Derivative used by Companies

(Source- Author's classification)

Figure III

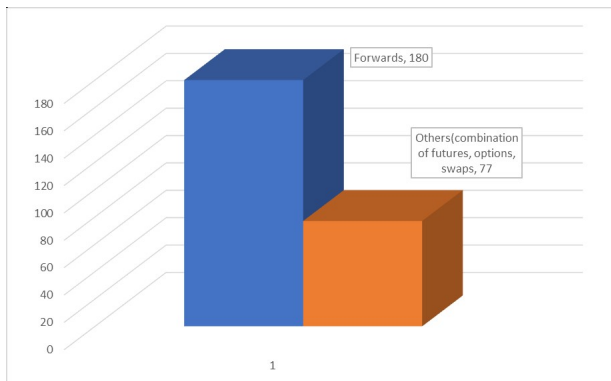


Table IV shows that majority of companies (180/257=.70/70%) use forward contracts to hedge currency risks. Around 30% of the companies employ a combination of futures, options, swaps and other exotic derivative products to manage currency risks.

Table V
Results of Univariate Analysis (Difference between means of Users Vs Non-Users of Derivatives)

| Variables | Users of Derivatives | | Non-Users of Derivatives | | t- statistic | p value | Theory |
|--------------|----------------------|----------|--------------------------|----------|--------------|---------|--------|
| | Mean | Variance | Mean | Variance | | | |
| D/TA | 0.209 | 0.058 | 0.14 | 0.0333 | -2.465 | 0.007* | U>NU** |
| D/NW | 0.971 | 14.25 | 0.46 | 0.7 | -1.2725 | 0.1 | U>NU** |
| ICR | 188.95 | 985663 | 1228.6 | 546558 | 2.158 | .015* | U>NU** |
| QR | 1.296 | 2.435 | 1.72 | 1.805 | 2.45 | .007* | NU>U** |
| lnR | 24.709 | 1.787 | 24.117 | 1.331 | -3.74 | .00* | U>NU** |
| PH | 0.5829 | 0.0318 | 0.532 | 0.0271 | 2.26 | .012* | U>NU** |
| PER | 23.66 | 17094 | 54.733 | 29078 | 1.76 | .03* | U>NU** |
| R&D/Sales | 0.0067 | 0.0003 | 0.0554 | 0.172 | 1.83 | .03* | U>NU** |
| Export/Sales | 0.175 | 0.062 | 0.073 | 0.026 | -3.64 | .001* | U>NU** |
| lnEV | 25.465 | 1.68 | 25.428 | 0.934 | -0.24 | 0.405 | U>NU** |

*p<.05, ** U-User group, NU-Non-User group

Table V shows the results of univariate analysis for derivative users and non-users of derivatives as groups. As indicated by the p values, users were statistically significant from non- users with respect to D/TA (Debt to total assets), lnR(natural logarithm of revenue), Export/Sales and PH (Promoters Holdings as a% of total holdings). The p values of non-users were statistically significant with respect to PER(Price/Earnings), ICR (Interest Coverage ratio), QR (Quick Ratio), R&D/Sales. The mean values for the variables namely, D/NW (Debt to Networth) and lnEV(natural logarithm of enterprise value) were not statistically significant between the groups. The prediction for difference in means was consistent for all variables except for PER, R&D/Sales, IC

Table VI
Variables in the Equation

| | β | S.E. | Wald | df | Sig. | EXP(β) | 95% C.I. for EXP(β) | |
|----------|---------|-------|--------|----|--------|----------------|-----------------------------|--------|
| | | | | | | | Lower | Upper |
| QR | -.173 | .103 | 2.834 | 1 | .042** | .841 | .688 | 1.029 |
| lnR | .819 | .196 | 17.469 | 1 | .000* | 2.268 | 1.545 | 3.329 |
| PER | -.001 | .001 | 1.140 | 1 | .286 | .999 | .997 | 1.001 |
| RDS | -5.894 | 4.127 | 2.040 | 1 | .153 | .003 | .000 | 8.975 |
| EXS | 1.848 | .666 | 7.701 | 1 | .006* | 6.347 | 1.721 | 23.408 |
| lnEV | -.653 | .198 | 10.876 | 1 | .001* | .521 | .353 | .767 |
| Constant | -2.109 | 3.149 | .449 | 1 | .503 | .121 | | |

*significant @1%, significant@5% Nagelkerke R .362

The total variables for the study which were 10 earlier is reduced to 6. The decision to select 6 variables for the study is based on Akaike Information Criterion (AIC). AIC estimates the relative amount of information lost by a given model and the lesser the value better is the model. The details are provided in Appendix I.

Positive Influence on Derivative Use-

Results from Table IV shows that firm size has a positive influence on derivatives use thus suggesting that scale determines the derivatives usage of Indian companies. The results from the table shows that the proxy variable for 'Scale' is lnR (Natural log of revenue) and the Exp(?) [Exponential beta] of 2.268 is statistically significant @1%($p < 0.01$). Since the '?' is more than one, it can be inferred that the chance of a firm using derivatives is high if the size in terms of economies of scale is large. In other words, for every unit change in the lnR variable, there is a 2.268 times higher chance of using derivatives to not using derivatives. The results are understandable because of the relatively new market in India. The OTC markets may require higher notional principals for taking derivatives positions and thus scale is an important variable for determining derivatives usage. Another variable which has a positive influence on derivatives usage is Export/Sales (EXS). The results in the table indicate the Exp(?) value to be 6.347 which is statistically significant @1%($p < .01$). This shows that companies with export sales are most likely to use derivatives to hedge forex risks. Since the '?' is more than one, it can be inferred that the chance of a firm using derivatives is high if the company has international operations. In other words, for every unit change in the EXS variable, the chance of using derivatives is 6.347 times higher than not using derivatives.

Negative Influence on Derivative Usage

The results from Table V indicate that Quick Ratio (QR) and lnEV (Natural Log of Enterprise Value) have negative impact on the likelihood of companies using derivatives to hedge risks. The Exp(?) value of QR is

0.841 and is statistically significant @5%($p < 0.05$). This indicates that the chance of using derivatives to hedge decreases by (1-.0841) 0.159 times when compared to not using derivatives to hedge. The negative association indicates that having a larger short-term liquidity acts as a substitute for hedging activities using derivatives. Thus, higher the quick ratio lower is the incentive to hedge risks with derivatives. The Exp(?) of lnEV is 0.521 and the parameter is statistically significant @ 1%($p < 0.01$). The results show that the chance of using derivatives to hedge decreases by (1-.521) 0.479 times when compared to not using derivatives to hedge. The negative association indicates that larger the firm size, lesser is the chance of derivatives usage. Thus, small firms are likely to use derivatives for hedging risks.

Factors with no Significant Influence on Derivatives Usage

RDS (R&D Expenses/Sales) and PER (Price to Earnings Ratio) are the variables which do not have any significant influence on the likelihood of companies using derivatives. The Exp(?) of 0.999 is not statistically significant @1%($p > 0.01$). Similarly, the Exp(?) of PER is also not statistically significant @1%($p > 0.01$). The results are contrary to the earlier findings that R&D expenses/Sales is positively related to derivatives usage. The results are on expected lines as the R&D expenses/Sales is very minor among the Indian Companies (refer Table I). On an average, companies spend 2% of the sales on R&D.

Table VII

| Classification Table | | | | |
|--------------------------|---|-------------------|-----|-----------|
| Observed | | Derivatives (1/0) | | Predicted |
| | | 0 | 1 | |
| Derivatives (1/0) | 0 | 1 | 90 | 1.1 |
| | 1 | 1 | 256 | 99.6 |
| Overall Percentage | | | | 73.9 |
| a. The cut value is .200 | | | | |

Hosmer and Lemeshow Test Chi-Square- 7.562 (sign0.477)

Table VI shows the classification table. The classification table presents whether the predicted values match with the observed values in terms of

classifying companies as 'Derivatives User' and 'Non-Derivatives User'. The model is accurate as 73.9% of the total sample could be predicted as 'Derivatives User'. Hosmer and Lemeshow test shows that the observed values and predicted values are similar. Thus, the model is a good fit for the given data.

Table VIII
Variables in the Equation

| | β | S.E. | Wald | df | Sig. | EXP(β) | 95% C.I. for EXP(β) | |
|----------|---------|-------|--------|----|--------|----------------|-----------------------------|-------|
| | | | | | | | Lower | Upper |
| DTA | 7.044 | .950 | 54.979 | 1 | .000* | 11.46 | 17.805 | 73.76 |
| lnR | .529 | .158 | 11.156 | 1 | .001* | 1.697 | 1.244 | 2.315 |
| EXS | 1.622 | .537 | 9.131 | 1 | .003* | 5.062 | 1.768 | EXS |
| lnEV | -.262 | .159 | 2.701 | 1 | .100** | .769 | .563 | lnEV |
| Constant | -7.741 | 2.868 | 7.284 | 1 | .007 | .000 | | |

*Significant@1% **Significant @10% Nagelkerke R .341

The total variables for the study which were 10 earlier is reduced to 4. The decision to select 4 variables for the study is based on Akaike Information Criterion (AIC). AIC estimates the relative amount of information lost by a given model and the lesser the value better is the model. The details are provided in Appendix I.

Positive Influence on Usage of Foreign Currency Loans

The results of the model are shown in Table VII. The variables such as DTA (Debt to Total Assets), lnR and EXS have positive influence on the likelihood of companies raised funds through foreign currency loans. The EXP(?) values are statistically significant @1% ($p < 0.01$). Since the ? values of all the variables are more than one, the likelihood of companies raising funds through foreign currency loans are higher than not raising funds through foreign currency loans. For instance, for every one-unit change in DTA, the chance of raising funds through foreign currency loans is 11.46 times higher than not raising funds through foreign currency loans. Therefore, economies of scale, extent of international operations and financial distress are likely to have a positive impact on the likelihood of companies raising funds through foreign currency loans.

Negative Influence on Usage of Foreign Currency Loans

The study finds that lnEV (Natural log of Enterprise value) has a negative influence on the likelihood of companies raising funds from overseas markets. The EXP(?) of 0.769 is statistically significant at 10% ($p < .10$). Since ? value is less than one, the chance of companies employing foreign currency loans decreases by $(1 - 0.769)0.231$ times. This implies that smaller companies are likely to raise foreign currency loans for funding their operations.

Table IX

| Classification Table | | | | |
|------------------------------|---|------------------------------|-----|--------------------|
| Observed | | Predicted | | |
| | | Foreign Currency Loans (1/0) | | Percentage Correct |
| | | 0 | 1 | |
| Foreign Currency Loans (1/0) | 0 | 130 | 42 | 75.6 |
| | 1 | 54 | 122 | 69.3 |
| Overall Percentage | | | | 72.4 |
| a. The cut value is .500 | | | | |

Hosmer and Lemeshow Test Chi-Square- 10.122 (sign0.257)

Table VIII shows the classification table. The

classification table presents whether the predicted values match with the observed values in terms of classifying companies as 'Users of Foreign Currency Loans' and 'Non-Users of Foreign Currency Loans'. The model is accurate as 72.4% of the predicted values were similar to observed values in terms of usage of foreign currency loans. Hosmer and Lemeshow test shows that the observed values and predicted values are similar. Thus, the model is a good fit for the given data.

VI. Findings and Discussion

The study found that around 74% of the sample companies use derivatives to hedge currency exposure. Forward contract is the major derivative instrument used by companies in their hedging activities. Around 70% of the companies employ forward contracts as a hedging tool. Other derivatives used by companies include a combination of futures, options and swaps. 55% of the sample companies have raised money through foreign currency loans to meet their financial requirements. The descriptive statistics as shown in Table I indicates that the sample companies were highly levered and had adequate liquidity to meet its short-term obligations.

The study focussed on the factors and their probable impact on the likelihood of companies using derivatives to hedge risk. The study explored whether economies of scale and extent of internationalisation had a positive impact on the likelihood of companies using derivatives to hedge risk. The findings were consistent with the results of Nance et al., (1993), Allayannis et al., (2001), Velasco (2014) and Charumathi et al., (2012). Size measured in terms of enterprise value and hedging substitutes measured in terms of quick ratio had a negative impact on the likelihood of using derivatives in hedging activities. The results were also consistent with the findings of Nance et al., (1993), Froot et al., (1993) thereby concluding that companies with more liquidity such as cash are not likely to use derivatives for managing currency risks. The present findings however contradict the findings of Mortaza Naghai et al., (2018).

Their study concluded that no theory was supporting the motives behind the companies' decision to hedge.

The study also focussed on the factors which will have an impact on the likelihood of companies raising funds through foreign currency loans. Financial distress, economies of scale and extent of international operations are the variables which are likely to have a positive impact on companies raising foreign currency loan. The results are consistent with the findings of earlier studies Keloherju et al.,(2001), Allayannis et al., (2001). To conclude, it is the factors such as economies of scale, extent of internationalisation, hedging substitutes and financial distress which have an impact on companies regarding usage of derivatives and raising funds through foreign currency loans.

VII. Directions for Future Research

The study provides the following directions for future research-

- a. A qualitative research/survey of practising managers on what motivates them to use derivatives can add value to the existing literature. The study is highly essential because majority of companies in the present study have used forward contracts as a derivative tool and borrowed funds in the form of foreign currency loans.
- b. Future studies can include variables such as tax rates, growth opportunities, profitability, stock options of employees etc in studying their impact on the usage of derivatives by companies.
- c. Future studies can also focus on Industry specific factors and their impact on the likelihood of hedging by companies using derivatives.
- d. Many companies within the study have used multiple hedging techniques and may have created noise in isolating hedging instruments. Future studies can use a larger sample to greater

effect to isolate the instrument choice and exposure type.

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Appendix-I

Derivatives usage

Start: AIC=253.39

.outcome ~ '\Debt to Total Asset\' + '\Debt to Networth\' +

'\Interest Coverage Ratio\' + '\Quick Ratio\' + '\Natural log of Revenue\' +

'\Promoters holdings as a% of total holdings\' + '\PE Ratio\' +

'\R&D Expenses to Sales\' + '\Export to Sales\' + '\Natural Log of EV\' Df Deviance AIC

- '\Debt to Total Asset\' 1 231.51 251.51

- '\Debt to Networth\' 1 231.78 251.78

- '\Promoters holdings as a% of total holdings\' 1 232.04 252.04

- '\PE Ratio\' 1 233.04 253.04

<none> 231.39 253.39

- '\Interest Coverage Ratio\' 1 233.90 253.90

- '\Quick Ratio\' 1 234.65 254.65

- '\R&D Expenses to Sales\' 1 235.08 255.08

- '\Natural Log of EV\' 1 235.66 255.66

- '\Natural log of Revenue\' 1 238.94 258.94

- '\Export to Sales\' 1 250.76 270.76

Step: AIC=251.51

.outcome ~ '\Debt to Networth\' + '\Interest Coverage Ratio\' +

'\Quick Ratio\' + '\Natural log of Revenue\' + '\Promoters holdings as a% of total holdings\' +

'\PE Ratio\' + '\R&D Expenses to Sales\' + '\Export to Sales\' +

'\Natural Log of EV\'

Df Deviance AIC

- '\Promoters holdings as a% of total holdings\' 1 232.16 250.16

- '\Debt to Networth\' 1 232.38 250.38

- '\PE Ratio\' 1 233.33 251.33

<none> 231.51 251.51

- '\Interest Coverage Ratio\' 1 234.20 252.20

- '\Quick Ratio\' 1 235.33 253.33

- '\R&D Expenses to Sales\' 1 235.46 253.46

- '\Natural Log of EV\' 1 235.76 253.76

- '\Natural log of Revenue\' 1 239.16 257.15

- '\Export to Sales\' 1 251.09 269.09

Step: AIC=250.16

.outcome ~ '\Debt to Networth\' + '\Interest Coverage Ratio\' +

'\Quick Ratio\' + '\Natural log of Revenue\' + '\PE Ratio\' +

'\R&D Expenses to Sales\' + '\Export to Sales\' + '\Natural Log of EV\'

Df Deviance

AIC

- '\Debt to Networth\' 1 233.04 249.04

- '\PE Ratio\' 1 233.76 249.76

<none> 232.16 250.16

- '\Interest Coverage Ratio\' 1 235.12 251.12

- '\\Quick Ratio\\' 1 235.74 251.74
 - '\\R&D Expenses to Sales\\' 1 236.04 252.04
 - '\\Natural Log of EV\\' 1 236.88 252.88
 - '\\Natural log of Revenue\\' 1 240.72 256.72
 - '\\Export to Sales\\' 1 253.05 269.05

Step: AIC=249.04

.outcome ~ '\\Interest Coverage Ratio\\' + '\\Quick Ratio\\' +

'\\Natural log of Revenue\\' + '\\PE Ratio\\' + '\\R&D Expenses to Sales\\' +

'\\Export to Sales\\' + '\\Natural Log of EV\\'

Df Deviance

AIC

<none> 233.04 249.04

- '\\PE Ratio\\' 1 235.21 249.21
 - '\\Interest Coverage Ratio\\' 1 236.10 250.10
 - '\\Natural Log of EV\\' 1 237.34 251.34
 - '\\R&D Expenses to Sales\\' 1 237.35 251.35
 - '\\Quick Ratio\\' 1 237.58 251.58
 - '\\Natural log of Revenue\\' 1 241.24 255.24
 - '\\Export to Sales\\' 1 253.88 267.88

Foreign Currency Loans

Start: AIC=288.12

.outcome ~ 'Debt to Total Asset' + 'Debt to Networkth'
 + 'Interest Coverage Ratio' +

'Quick Ratio' + 'Natural log of Revenue' +
 'Promoters holdings as a% of total holdings' +

'PE Ratio' + 'R&D Expenses to Sales' + 'Export to Sales' +

'Natural Log of EV'

Df Deviance

AIC

- 'Quick Ratio' 1 266.14 286.14
 - 'Debt to Networkth' 1 266.72 286.72
 - 'Promoters holdings as a% of total holdings' 1 266.88 286.88
 - 'PE Ratio' 1 267.35 287.35
 - 'R&D Expenses to Sales' 1 267.38 287.38
 <none> 266.12 288.12
 - 'Natural Log of EV' 1 269.31 289.31
 - 'Interest Coverage Ratio' 1 269.50 289.50
 - 'Natural log of Revenue' 1 272.45 292.45
 - 'Export to Sales' 1 272.83 292.83
 - 'Debt to Total Asset' 1 274.41 294.41

Step: AIC=286.14

.outcome ~ 'Debt to Total Asset' + 'Debt to Networkth'
 + 'Interest Coverage Ratio' +

'Natural log of Revenue' + 'Promoters holdings as a% of total holdings' +

'PE Ratio' + 'R&D Expenses to Sales' + 'Export to Sales' +

'Natural Log of EV'

Df Deviance

AIC

- 'Debt to Networkth' 1 266.74 284.74
 - 'Promoters holdings as a% of total holdings' 1

266.90 284.90

| | | | |
|-----------------------------|---|--------|--------|
| - 'PE Ratio' | 1 | 267.35 | |
| | | | 285.35 |
| - 'R&D Expenses to Sales' | 1 | 267.38 | 285.38 |
| <none> | | 266.14 | 286.14 |
| - 'Natural Log of EV' | 1 | 269.41 | 287.41 |
| - 'Interest Coverage Ratio' | 1 | 269.82 | 287.82 |
| - 'Natural log of Revenue' | 1 | 272.67 | 290.67 |
| - 'Export to Sales' | 1 | 273.16 | 291.16 |
| - 'Debt to Total Asset' | 1 | 275.00 | 293.00 |

Step: AIC=284.74

.outcome ~ 'Debt to Total Asset' + 'Interest Coverage Ratio' +

'Natural log of Revenue' + 'Promoters holdings as a% of total holdings' +

'PE Ratio' + 'R&D Expenses to Sales' + 'Export to Sales' +

'Natural Log of EV'

| | Df | Deviance | AIC |
|------------------------------------------------|----|----------|--------|
| - 'Promoters holdings as a% of total holdings' | 1 | 267.37 | 283.37 |
| - 'R&D Expenses to Sales' | 1 | 268.03 | 284.03 |
| - 'PE Ratio' | 1 | 268.13 | 284.13 |
| <none> | | 266.74 | 284.74 |
| - 'Natural Log of EV' | 1 | 269.67 | 285.67 |
| - 'Interest Coverage Ratio' | 1 | 270.29 | 286.29 |
| - 'Natural log of Revenue' | 1 | 272.82 | 288.82 |
| - 'Export to Sales' | 1 | 273.56 | 289.56 |
| - 'Debt to Total Asset' | 1 | 295.69 | 311.69 |

Step: AIC=283.37

.outcome ~ 'Debt to Total Asset' + 'Interest Coverage Ratio' +

'Natural log of Revenue' + 'PE Ratio' + 'R&D Expenses to Sales' +

'Export to Sales' + 'Natural Log of EV'

| | Df | Deviance | AIC |
|-----------------------------|----|----------|--------|
| - 'R&D Expenses to Sales' | 1 | 268.74 | 282.74 |
| - 'PE Ratio' | 1 | 268.83 | 282.83 |
| <none> | | 267.37 | 283.37 |
| - 'Natural Log of EV' | 1 | 269.89 | 283.89 |
| - 'Interest Coverage Ratio' | 1 | 270.70 | 284.70 |
| - 'Natural log of Revenue' | 1 | 272.86 | 286.86 |
| - 'Export to Sales' | 1 | 273.79 | 287.79 |
| - 'Debt to Total Asset' | 1 | 296.51 | 310.51 |

Step: AIC=282.74

.outcome ~ 'Debt to Total Asset' + 'Interest Coverage Ratio' +

'Natural log of Revenue' + 'PE Ratio' + 'Export to Sales' +

'Natural Log of EV'

| | Df | Deviance | AIC |
|-----------------------------|----|----------|--------|
| - 'PE Ratio' | 1 | 270.05 | 282.05 |
| <none> | | 268.74 | 282.74 |
| - 'Interest Coverage Ratio' | 1 | 271.73 | 283.73 |
| - 'Natural Log of EV' | 1 | 272.24 | 284.24 |
| - 'Export to Sales' | 1 | 274.38 | 286.38 |
| - 'Natural log of Revenue' | 1 | 276.08 | 288.08 |
| - 'Debt to Total Asset' | 1 | 300.79 | 312.79 |

Step: AIC=282.05

.outcome ~ 'Debt to Total Asset' + 'Interest Coverage Ratio' +

'Natural log of Revenue' + 'Export to Sales' +
'Natural Log of EV'

| | Df | Deviance | AIC |
|-----------------------------|----|----------|--------|
| <none> | | 270.05 | 282.05 |
| - 'Interest Coverage Ratio' | 1 | 272.86 | 282.86 |
| - 'Natural Log of EV' | 1 | 274.31 | 284.31 |
| - 'Export to Sales' | 1 | 276.19 | 286.19 |
| - 'Natural log of Revenue' | 1 | 278.44 | 288.44 |
| - 'Debt to Total Asset' | 1 | 305.58 | 315.58 |

Annexure II

List of Companies Selected for the Study

| Company | Derivatives(1/0) | Foreign Currency Loans(1/0) |
|---------------------------------------|------------------|-----------------------------|
| 3M India Ltd | 0 | 0 |
| 8K Miles Software Services Ltd | 0 | 1 |
| Aarti Industries Ltd. | 1 | 1 |
| ABB India Ltd | 1 | 0 |
| Abbott India Ltd | 1 | 0 |
| ACC Ltd | 0 | 0 |
| Adani Ports and Special Economic Zone | 1 | 1 |
| Adani Power Ltd | 1 | 1 |
| Adani Transmission Ltd | 1 | 1 |
| Aegis Logistics Ltd | 1 | 1 |
| AIA Engineering Ltd | 1 | 1 |
| Ajanta Pharma Ltd | 1 | 0 |
| Akzo Nobel India Ltd | 1 | 0 |
| Alembic Pharmaceuticals Ltd | 1 | 0 |
| Alkem Laboratories Ltd | 1 | 1 |
| AllCargo Logistics Ltd | 1 | 1 |
| Amara Raja Batteries Ltd | 0 | 0 |
| Apar Industries Ltd | 1 | 1 |
| Apollo Tyres Ltd | 1 | 1 |
| Asahi India Glass Ltd | 1 | 1 |
| Ashok Leyland Ltd | 1 | 1 |
| Asian Paints Ltd | 1 | 1 |
| Astral Polytechnik Ltd | 1 | 1 |
| Atul Ltd. | 1 | 1 |
| Aurobindo Pharma Ltd | 1 | 1 |
| Avanti Feeds Ltd | 1 | 0 |
| Bajaj Auto Ltd | 1 | 0 |
| Bajaj Corp Ltd | 1 | 1 |
| Bajaj Electricals Ltd | 1 | 1 |
| Balkrishna Industries Ltd | 1 | 1 |
| Balmer Lawrie & Co. Ltd. | 1 | 0 |
| Balrampur Chini Mills Ltd | 1 | 0 |
| BASF India Limited | 1 | 1 |
| Bata India Limited | 1 | 0 |
| Bayer CropScience Ltd India | 1 | 0 |
| BEML Ltd | 1 | 1 |
| Berger Paints India Ltd | 1 | 1 |
| Bharat Electronics Ltd | 1 | 0 |
| Bharat Forge Ltd | 1 | 1 |
| Bharat Heavy Electricals Ltd | 0 | 1 |
| Bharat Petroleum Corp Ltd | 1 | 1 |
| Bharti Airtel Ltd | 1 | 1 |
| Bharti Infratel Ltd. | 1 | 0 |
| Biocon Ltd | 1 | 1 |
| Birla Corp Ltd | 1 | 1 |
| Blue Dart Express Ltd | 1 | 0 |
| Blue Star Ltd | 1 | 0 |

| Company | Derivatives(1/0) | Foreign Currency Loans(1/0) |
|------------------------------------------------|------------------|-----------------------------|
| Bombay Burmah Trading Corp Ltd. | 1 | 0 |
| Bombay Dyeing & Manufacturing Co Ltd | 1 | 1 |
| Britannia Industries Ltd. | 1 | 0 |
| Cadila Healthcare Ltd | 1 | 1 |
| Caplin Point Laboratories Ltd | 0 | 1 |
| Carborundum Universal Ltd | 1 | 1 |
| Castrol India Ltd | 1 | 0 |
| CCL Products (India) Ltd. | 1 | 0 |
| CEAT Ltd | 1 | 1 |
| Century Plyboards India Ltd | 1 | 1 |
| Century Textile & Industries Ltd | 1 | 1 |
| Cera Sanitaryware Ltd | 1 | 0 |
| CESC Ltd | 1 | 1 |
| CG Power and Industrial Solutions Ltd | 1 | 1 |
| Chennai Petroleum Corp Ltd | 1 | 1 |
| Cipla Ltd/India | 1 | 1 |
| Coal India Ltd | 0 | 0 |
| Cochin Shipyard Ltd | 1 | 0 |
| Colgate-Palmolive India Ltd | 0 | 0 |
| Container Corp Of India | 0 | 0 |
| Coromandel International Ltd | 1 | 1 |
| Cox & Kings Ltd | 1 | 0 |
| Crompton Greaves Consumer Electricals Ltd | 1 | 0 |
| Cummins India Ltd | 1 | 0 |
| Cyient Ltd | 0 | 0 |
| Dabur India Ltd | 1 | 1 |
| DCM Shriram Ltd | 1 | 1 |
| Deepak Fertilisers & Petrochemicals Corp. Ltd. | 1 | 0 |
| Deepak Nitrite Limited | 1 | 1 |
| Delta Corp. Ltd. | 1 | 0 |
| Dhanuka Agritech Ltd | 1 | 0 |
| Dilip Buildcon Ltd | 0 | 0 |
| Dish TV India Ltd | 1 | 0 |
| Divi's Laboratories Ltd | 0 | 0 |
| DLF Ltd | 1 | 1 |
| Dr Reddy's Laboratories Ltd | 1 | 1 |
| Dr. Lal PathLabs Ltd | 0 | 0 |
| eClerx Services Ltd | 1 | 0 |
| Eicher Motors Ltd | 0 | 0 |
| EID Parry India Ltd | 1 | 1 |
| EIH Ltd | 1 | 1 |
| Elgi Equipments Ltd. | 1 | 1 |
| Emami Ltd | 1 | 0 |
| Endurance Technologies Ltd | 1 | 1 |
| Entertainment Network India | 0 | 0 |
| Eris Lifesciences Ltd | 0 | 0 |
| Escorts Ltd | 0 | 0 |
| Essel Propack Ltd. | 1 | 1 |
| Eveready Industries India Ltd | 1 | 1 |
| Exide Industries Ltd | 0 | 0 |

| Company | Derivatives(1/0) | Foreign Currency Loans(1/0) |
|-------------------------------------------------------------|------------------|-----------------------------|
| FDC Ltd | 0 | 0 |
| Finolex Cables Ltd | 1 | 0 |
| Finolex Industries Ltd | 1 | 0 |
| Firstsource Solutions Ltd | 1 | 0 |
| Force Motors Ltd | 0 | 0 |
| Fortis Healthcare Ltd. | 1 | 0 |
| Future Lifestyle Fashions Limited | 1 | 0 |
| Future Retail Ltd | 1 | 0 |
| Gail India Ltd | 1 | 1 |
| GE Power India Ltd | 1 | 0 |
| GE T&D India Ltd | 1 | 0 |
| GHCL Ltd | 1 | 0 |
| GlaxoSmithKline Consumer Healthcare Ltd | 0 | 0 |
| GlaxoSmithKline Pharmaceuticals Ltd | 0 | 0 |
| Glenmark Pharmaceuticals Ltd | 0 | 1 |
| GMR Infrastructure Ltd | 1 | 1 |
| Godfrey Phillips India Ltd | 1 | 1 |
| Godrej Agrovvet Ltd | 1 | 1 |
| Godrej Consumer Products Ltd | 1 | 1 |
| Godrej Industries Ltd | 1 | 1 |
| Godrej Properties Ltd | 0 | 0 |
| Granules India Ltd | 1 | 1 |
| Graphite India Ltd. | 1 | 1 |
| Grasim Industries Ltd | 1 | 1 |
| Great Eastern Shipping Co Ltd/The | 1 | 1 |
| Greaves Cotton Ltd. | 1 | 0 |
| Greenply Industries Ltd. | 1 | 1 |
| Grindwell Norton Ltd | 1 | 0 |
| Gujarat Alkalies & Chemicals Ltd. | 0 | 1 |
| Gujarat Fluorochemicals | 1 | 1 |
| Gujarat Gas Ltd | 0 | 0 |
| Gujarat Mineral Development Corp Ltd | 0 | 0 |
| Gujarat Narmada Valley Fertilizers and Chemicals Limited | 1 | 1 |
| Gujarat Pipavav Port Ltd | 0 | 0 |
| Gujarat State Fertilisers & Chemicals Ltd | 1 | 1 |
| Gulf Oil Lubricants India Ltd | 1 | 1 |
| Hatsun Agro Products Ltd | 1 | 1 |
| Havells India Ltd | 0 | 0 |
| HCL Technologies Ltd | 1 | 0 |
| HEG Ltd | 1 | 1 |
| HeidelbergCement India Ltd. | 1 | 1 |
| Heritage Foods Ltd | 1 | 0 |
| Hero MotoCorp Ltd | 1 | 0 |
| Hexaware Technologies Ltd | 1 | 0 |
| Himachal Futuristic Communications Ltd | 1 | 0 |
| Himadri Speciality Chemical Ltd | 1 | 1 |
| Himatsingka Seide | 1 | 1 |
| Hindalco Industries Ltd | 1 | 1 |
| Hindustan Copper | 1 | 1 |

| Company | Derivatives(1/0) | Foreign Currency Loans(1/0) |
|------------------------------------------------------|------------------|-----------------------------|
| Hindustan Petroleum Corp Ltd | 1 | 1 |
| Hindustan Unilever Ltd | 1 | 0 |
| Hindustan Zinc Ltd | 1 | 0 |
| Housing Development & Infrastructure Ltd | 0 | 0 |
| HSIL Ltd | 1 | 1 |
| Idea Cellular Ltd | 1 | 1 |
| IFB Industries Ltd | 1 | 0 |
| IL&FS Transportation Networks Ltd | 1 | 1 |
| India Cements Ltd | 1 | 0 |
| Indiabulls Real Estate Ltd | 0 | 0 |
| Indian Hotels Co Ltd | 0 | 0 |
| Indian Oil Corp Ltd | 1 | 1 |
| Indo Count Industries Ltd | 1 | 1 |
| Indraprastha Gas Ltd | 0 | 0 |
| Infibeam Incorporation Ltd | 0 | 0 |
| Info Edge (India) Ltd. | 0 | 0 |
| Infosys Ltd | 1 | 0 |
| Inox Leisure | 0 | 0 |
| Inox Wind Ltd | 1 | 1 |
| Intellect Design Arena Ltd. | 1 | 1 |
| InterGlobe Aviation Ltd | 0 | 1 |
| Ipca Laboratories Ltd | 1 | 1 |
| IRB Infrastructure Developers Ltd | 0 | 0 |
| ISGEC Heavy Engineering Ltd | 1 | 1 |
| ITC Ltd | 1 | 0 |
| ITD Cementation India Ltd | 1 | 0 |
| ITI Ltd | 1 | 0 |
| J. K. Tyre Industries Ltd | 1 | 1 |
| J.B.Chemicals & Pharmaceuticals Ltd. | 1 | 0 |
| J.K. Cement Ltd. | 1 | 1 |
| Jagran Prakashan Ltd | 0 | 0 |
| Jai Corp Ltd | 1 | 0 |
| Jain Irrigation Systems Ltd | 1 | 1 |
| Jaiprakash Associates Ltd | 0 | 1 |
| Jamna Auto Industries Ltd | 1 | 1 |
| Jindal SAW Ltd | 1 | 1 |
| Jindal Stainless (Hisar) Ltd | 1 | 1 |
| Jindal Stainless Ltd. | 1 | 1 |
| Jindal Steel & Power Ltd | 1 | 1 |
| JK Lakshmi Cement Ltd | 1 | 1 |
| Johnson Controls -Hitachi Air Conditioning India Ltd | 1 | 0 |
| JSW Energy Ltd | 1 | 1 |
| Jubilant FoodWorks Ltd | 0 | 0 |
| Jubilant Life Sciences Ltd | 1 | 1 |
| Just Dial Ltd | 0 | 0 |
| Jyothy Laboratories Ltd | 1 | 0 |
| Kajaria Ceramics Ltd. | 1 | 1 |
| Kalpataru Power Transmission Ltd | 1 | 0 |
| Kansai Nerolac Paints Ltd. | 0 | 0 |

| Company | Derivatives(1/0) | Foreign Currency Loans(1/0) |
|-----------------------------------------|------------------|-----------------------------|
| Kaveri Seed Co Ltd | 0 | 0 |
| KEC International Ltd/India | 1 | 1 |
| KEI Industries Ltd | 1 | 1 |
| Kirloskar Oil Engines Ltd | 1 | 0 |
| KNR Constructions Ltd | 0 | 0 |
| KPR Mill Ltd | 1 | 1 |
| KRBL Ltd | 1 | 1 |
| Kwality Ltd | 1 | 1 |
| L&T Technology Services Ltd | 1 | 1 |
| Lakshmi Machine Works Ltd | 0 | 1 |
| Larsen & Toubro Infotech Ltd | 1 | 1 |
| Larsen & Toubro Ltd | 1 | 1 |
| Laurus Labs Ltd | 1 | 1 |
| Lupin Ltd | 1 | 0 |
| Mahanagar Gas Ltd | 0 | 0 |
| Mahindra & Mahindra Ltd | 1 | 1 |
| Mahindra CIE Automotive Ltd | 0 | 0 |
| Mahindra Holidays & Resorts India Ltd | 0 | 1 |
| Mahindra Lifespace Developers Ltd | 1 | 0 |
| Mangalore Refinery & Petrochemicals Ltd | 0 | 1 |
| Manpasand Beverages Ltd | 0 | 0 |
| Marico Ltd | 1 | 0 |
| Maruti Suzuki India Ltd | 1 | 0 |
| Meghmani Organics Ltd | 1 | 1 |
| Minda Corporation Ltd | 1 | 0 |
| Minda Industries Ltd | 0 | 0 |
| MindTree Ltd | 1 | 1 |
| MMTC LTD | 1 | 1 |
| MOIL Ltd | 0 | 0 |
| Monsanto India Ltd | 0 | 0 |
| Motherson Sumi Systems Ltd | 1 | 1 |
| Mphasis Ltd | 1 | 0 |
| MRF Ltd | 1 | 1 |
| Narayana Hrudayalaya Ltd | 1 | 1 |
| Natco Pharma Ltd | 0 | 1 |
| National Aluminium Co Ltd | 1 | 0 |
| Nava Bharat Ventures Ltd | 1 | 1 |
| Navin Fluorine International Ltd. | 1 | 0 |
| Navkar Corporation Ltd | 1 | 0 |
| Navneet Education Ltd | 1 | 0 |
| NBCC (India) Ltd | 0 | 0 |
| NCC Ltd/India | 0 | 1 |
| Nestle India Ltd | 1 | 0 |
| Network 18 Media & Investments Ltd | 0 | 0 |
| NHPC Ltd | 0 | 1 |
| NIIT Technologies Ltd | 1 | 0 |
| Nilkamal Ltd | 1 | 0 |
| NLC India Ltd | 0 | 1 |
| NMDC Ltd | 0 | 0 |
| NOCIL Ltd. | 1 | 0 |
| NTPC Ltd | 1 | 1 |

| Company | Derivatives(1/0) | Foreign Currency Loans(1/0) |
|------------------------------------------------|------------------|-----------------------------|
| Oberoi Realty Ltd | 0 | 0 |
| Oil India Ltd | 1 | 1 |
| Omaxe Ltd | 0 | 0 |
| Oracle Financial Services Software Ltd | 1 | 0 |
| Orient Cement Ltd | 0 | 0 |
| Page Industries Ltd | 0 | 0 |
| Parag Milk Foods Ltd | 0 | 1 |
| PC Jeweller Ltd. | 1 | 0 |
| Persistent Systems Ltd | 1 | 0 |
| Petronet LNG Ltd | 1 | 1 |
| Pfizer Ltd (India) | 0 | 0 |
| Phillips Carbon Black Ltd | 1 | 1 |
| Phoenix Mills Ltd | 0 | 0 |
| PI Industries Ltd | 1 | 1 |
| Pidilite Industries Ltd | 1 | 0 |
| Piramal Enterprises Ltd | 1 | 1 |
| PNC Infratech Ltd | 0 | 0 |
| Power Grid Corp of India Ltd | 0 | 1 |
| Prestige Estates Projects Ltd | 0 | 0 |
| Prism Johnson Ltd | 1 | 1 |
| PTC India Ltd | 1 | 1 |
| PVR Ltd | 0 | 0 |
| Radico Khaitan Ltd | 1 | 1 |
| Rain Industries Limited | 0 | 0 |
| Rajesh Exports Ltd | 1 | 0 |
| Rallis India Ltd | 1 | 0 |
| Ramco Cements Ltd | 1 | 0 |
| Ratnamani Metals & Tubes Ltd | 1 | 0 |
| Raymond Ltd. | 1 | 1 |
| Redington India Ltd | 1 | 0 |
| Relaxo Footwears Ltd | 1 | 0 |
| Reliance Industries Ltd | 1 | 1 |
| Reliance Infrastructure Ltd | 1 | 1 |
| Reliance Naval and Engineering Ltd | 1 | 1 |
| Reliance Power Ltd | 1 | 1 |
| S H Kelkar and Company Ltd | 1 | 1 |
| Sadbhav Engineering Ltd | 1 | 1 |
| Sanofi India Ltd | 1 | 0 |
| Schaeffler India Ltd | 1 | 1 |
| Schneider Electric Infrastructure Ltd. | 1 | 1 |
| Security and Intelligence Services (India) Ltd | 0 | 0 |
| Shankara Building Products Ltd | 0 | 0 |
| Sharda Cropchem Limited | 1 | 0 |
| Sheela Foam Ltd | 0 | 0 |
| Shilpa Medicare Ltd | 1 | 1 |
| Shipping Corp of India Ltd | 0 | 1 |
| Shoppers Stop Ltd | 1 | 0 |
| Shree Cement Ltd | 0 | 0 |
| Siemens India Ltd (oct- sept) | 1 | 0 |
| SJVN Ltd | 0 | 1 |

| Company | Derivatives(1/0) | Foreign Currency Loans(1/0) |
|-------------------------------------|------------------|-----------------------------|
| SKF India Ltd | 0 | 0 |
| Sobha Limited | 0 | 0 |
| Solar Industries India Ltd | 1 | 1 |
| Somany Ceramics Ltd | 1 | 0 |
| SRF Ltd | 1 | 1 |
| Star Cement Ltd | 0 | 1 |
| Sterlite Technologies Ltd. | 1 | 1 |
| Sudarshan Chemical Industries | 1 | 1 |
| Sun Pharma Advanced Research Co Ltd | 0 | 0 |
| Sun Pharmaceutical Industries Ltd | 0 | 0 |
| Sun TV Network Ltd | 0 | 0 |
| Sundaram Fastners | 1 | 1 |
| Sunteck Realty Ltd | 0 | 0 |
| Suprajit Engineering Ltd | 1 | 0 |
| Supreme Industries | 1 | 1 |
| Supreme Petrochem Ltd. | 1 | 0 |
| Swan Energy Ltd. | 0 | 0 |
| Symphony Ltd | 0 | 0 |
| Syngene International Ltd | 1 | 1 |
| Take Solutions Ltd | 1 | 1 |
| Tamilnadu Newsprint & Papers | 1 | 1 |
| Tata Chemicals Ltd | 1 | 1 |
| Tata Coffee Ltd. | 1 | 1 |
| Tata Consultancy Services Ltd | 1 | 0 |
| Tata Elxsi Ltd | 1 | 0 |
| Tata Global Beverages Ltd | 1 | 1 |
| Tata Metaliks Ltd. | 1 | 0 |
| Tata Motors Ltd | 1 | 0 |
| Tata Power Co Ltd | 1 | 1 |
| Tata Steel Ltd | 1 | 1 |
| Tech Mahindra Ltd | 1 | 0 |
| Tejas Networks Ltd | 1 | 0 |
| Texmaco Rail & Engineering Ltd. | 1 | 1 |
| Thermax Ltd | 0 | 0 |
| Thomas Cook (India) Ltd | 1 | 0 |
| Thyrocare Technologies Ltd | 0 | 0 |
| Time Technoplast Ltd. | 1 | 1 |
| Timken India Ltd. | 0 | 0 |
| Titan Co Ltd | 1 | 0 |
| Torrent Pharmaceuticals Ltd | 1 | 1 |
| Torrent Power Ltd | 1 | 1 |
| Trent Ltd. | 1 | 0 |
| Trident Ltd. | 1 | 1 |
| Triveni Turbine Limited | 1 | 0 |
| TTK Prestige Ltd | 1 | 0 |
| TV18 Broadcast Ltd | 0 | 0 |
| TVS Motor Co Ltd | 1 | 1 |
| TVS Srichakra Ltd | 1 | 0 |
| Uflex Ltd | 0 | 1 |
| UltraTech Cement Ltd | 1 | 1 |

| Company | Derivatives(1/0) | Foreign Currency Loans(1/0) |
|-----------------------------------|------------------|-----------------------------|
| Unichem Laboratories Ltd | 1 | 0 |
| United Breweries Ltd | 1 | 1 |
| UPL Ltd | 1 | 1 |
| V-Guard Industries Ltd | 1 | 0 |
| V-Mart Retail Limited | 0 | 0 |
| VA Tech Wabag Ltd | 1 | 0 |
| Vakrangee Ltd | 0 | 1 |
| Varun Beverages Ltd | 1 | 1 |
| Vedanta Ltd | 1 | 1 |
| Vinati Organics Ltd | 0 | 0 |
| VIP Industries Ltd | 1 | 0 |
| Voltas Ltd | 1 | 0 |
| VST Industries Ltd. | 1 | 0 |
| WABCO India Ltd | 0 | 0 |
| Welspun Corp Ltd | 1 | 1 |
| Welspun India Ltd. | 1 | 0 |
| Whirlpool of India Ltd | 1 | 0 |
| Wipro Ltd | 1 | 1 |
| Wockhardt Ltd | 1 | 1 |
| Zee Entertainment Enterprises Ltd | 0 | 0 |
| Zensar Technologies Ltd | 1 | 0 |
| Zydus Wellness Ltd | 0 | 0 |
| Companies using Derivatives | 257 | |
| Companies not using Derivatives | 92 | |