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Analysis of foreign sales revenue and use of derivatives by listed companies in India

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Abstract

In today's globalized market, businesses operate across multiple currencies, exposing themselves to currency risks. Companies are increasingly turning to derivative instruments to mitigate these risks. This study compares the mean proportion of derivative usage and foreign sales between two distinct groups, upper- and third-quartile companies. The objective was to assess the differences in derivatives used by these companies. Data for the analysis were extracted from the annual reports of 18 upper quartile and 18 third quartile companies over five years (2019-2023), yielding 180 firm-year observations. A paired-sample test was conducted to compare the mean proportions between the two groups, revealing no statistically significant difference in the mean proportions of derivatives used for foreign sales. Interestingly, while upper-quartile companies generally utilize higher-value derivatives to hedge the higher value of foreign sales, the study findings show that both upper- and third-quartile companies exhibit a similar mean proportion in their derivative usage. Furthermore, the ANOVA test results illustrate the significant variations in the number of derivatives employed by the sampled companies. This study also highlights noteworthy differences in international sales revenue generated by these companies.

Keywords: Derivatives, Foreign sales revenue, Foreign exchange risk, Hedging, Indian listed companies.

Introduction

In today's globalized era and dynamic situation, all companies are exposed to various risks, and most try to minimize their risks by using derivatives. After globalization, Indian companies' exposure to foreign exchange risk expanded significantly. A recent study indicated that FDI inflows to India have significantly increased and that the country's economic policies were more successful at boosting FDI inflows. Derivatives are complex financial products whose value is "derived" from an underlying instrument or asset, such as a currency or a commodity. Companies can manage a wide range of risks using derivatives. A recent study found that about 83% of firms that employ derivatives do so to reduce foreign exchange risk, 76% adopt derivatives to hedge themselves against changes in interest rates, 56% use derivatives to protect against changes in commodity prices, and 34% use derivatives based on equity or stock markets.

Price volatility, market globalization, technological advancements, and financial theory breakthroughs played a significant role in the rapid increase in the use of derivatives. Risk management is one of the most complex and essential focuses of concentration for every organization, and derivatives are one of the most frequently used tools for risk reduction. Companies are attempting to manage their risks using derivatives. Foreign sales are the export revenues earned by the company from international sales. When a firm enters foreign sales, it is automatically exposed to the risk of currency fluctuation. Firms began to use more derivatives to manage these currency risks, and a positive and direct relationship was expected between international sales revenue and derivatives. Previous studies have provided empirical evidence of firm-specific factors influencing the decision to use derivatives and the amount of use. The findings show that the use of derivatives is negatively correlated with liquidity but positively correlated with firm size, market-to-book value, bank-firm relationship, and engagement of the firm in foreign business activities.

Derivative financial instruments are more complex and are influenced by many factors, including foreign sales, import payments, firm size, and foreign debt borrowing.

Among all the elements, foreign sales play a significant role; overseas sales and foreign currency receipts expose the firm to foreign exchange risk. Companies may enter derivative contracts to minimize these risks. By using derivatives, companies can transfer their foreign exchange risk to other parties. In this study, we concentrate on foreign sales and their influence on derivatives use. Additionally, many other factors contribute to the growing derivatives market in India. In a recent study, the efficiency of NSE was compared with the other seven selected markets and it was found that NSE is one of the most efficient markets with good indices.

In India, trading in derivatives began in 1875 with the establishment of the Cotton Trade Association but became legal in 1999. India is a developing nation with a growing derivative market. A recent survey shows that the National Stock Exchange (NSE) has emerged as the world's largest derivative exchange in 2022 based on the number of contracts traded. In today's globalized corporate environment, most Indian companies receive revenue in different currencies from different countries, which puts them at risk of currency exchange. Companies may use derivatives to manage these currency risks, and most prior research demonstrates a direct correlation between derivative use and overseas sales income. However, relatively few investigations have been undertaken in India, and all these studies were conducted outside India. Therefore, examining the relationship between overseas sales revenue and derivatives use is essential in the Indian context.

This study investigates the impact of foreign sales on derivatives use. This study benefits different stakeholder groups because it helps them understand the relationship between foreign sales and derivative use. Several studies have been conducted worldwide. The majority of the currently available literature focuses on identifying the various elements that influence a firm's choice to use derivatives by using linear regression techniques in this study, and the effect of the explanatory variable (foreign sales) on the explained variable (using derivatives) was determined using a simple linear regression model. The test results show a strong correlation between foreign sales and derivative use. These two variables move in the exact direction.

Review of Literature

Faff and Robert explore the different variables that impact Australian firms' use of derivatives. This study discovered that a firm's debt-equity position, company size, and liquidity significantly influence its decision to employ derivatives. However, managerial holdings do not influence derivatives use. Most other studies provide contrary results to the above research, and the researcher did not investigate the impact of foreign sales revenue. Alam *et al.*, examined the factors influencing derivative use in Pakistan. The analyses highlight the variables affecting corporations' use of interest rates and foreign exchange derivative products. The study discovered a direct correlation between the business level of derivative usage and fewer fiscal distress costs, significant debt value, underinvestment issues, and fewer board holdings, in their study, the researcher provides empirical proof that firm-specific variables influence whether to use derivatives. The researcher used Tobit regression models, and the results show that derivatives are inversely correlated with liquidity and positively correlated

with company size, market-to-book value, bank-business relationships, and participation in international sales, the researcher investigated the different variables impacting to use of derivatives in Malaysian-listed non-financial companies. This study discovered that liquidity ratios (LIQ) and market book value (MTBV) are the primary variables that motivate Malaysian corporations to employ derivatives, and researchers have ignored the investigation of foreign sales revenue, the study identifies the variables affecting the employment of derivatives in Japanese insurance firms. According to the research results, the use of derivatives by sample companies is directly correlated with organizational form, business size, level of debt equity, and the percentage of asset holdings in stocks and bonds but is adversely correlated with reinsurance dependence., in their study, the researcher looked at various firm-level variables influencing listed Philippine companies to adopt derivatives. The results showed that, on the one hand, corporate hedging was significantly influenced by business size and the presence of employee stock option schemes. Conversely, the availability of growth possibilities and liquidity have no detrimental impact on the use of derivatives in this study, the researcher examined the different foreign exchange rate exposure variables. The researcher investigated various factors affecting exchange rate exposure in the manufacturing and service sectors. According to the study report, service zone businesses in India are more sensitive to fluctuations in the exchange rate than are manufacturing businesses. The study's findings show that the market-to-book ratio (MTB) and proportion of international sales to total sales are both significant and positively correlated. However, the company's size is adversely correlated with its exposure to exchange rate risk in both sectors, but most other studies show that firm size has a positive correlation with derivative usage. Song *et al.*, looked into the elements influencing the Korean life insurance companies to employ derivatives. The research findings indicate that the adoption of derivatives is significantly affected by a firm's asset size, international holdings of assets and liabilities, percentage of deposit insurance, company's short-term financial position, and RBC. Strozynska-Szajek *et al.* investigate the variables affecting the derivative usage of non-financial firms. The studies analysed 308 non-financial companies registered on the Warsaw Stock Exchange, and the findings of the research analysis show that aspects such as company size, default risk, and debt consumption significantly influence the use of derivatives. The findings indicate no long-term, statistically significant association between Polish enterprises' use of derivatives and liquidity ratios, their study titled "Analysis of Factors Affecting Companies Using Derivates." The researcher aimed to identify the factors that influence companies' use of derivatives. The results show that the cost of debt and corporate governance significantly impact a firm's choice of derivatives. By contrast, foreign sales, risk management, and company size do not greatly influence the sample company's decision to use derivatives.

The literature review found that most studies belong to the international level and concentrate on the factors influencing the use of derivatives. Through a review, it was identified that a firm's size, market-to-book value, leverage, and foreign sales are the major factors that influence its decision to use derivatives. Most studies indicate that international sales revenue influences a company to use more derivatives;

however, some researchers argue that it will never lead a business to embrace derivatives. However, other studies do not consider overseas sales revenue as a variable. Therefore, it is essential to investigate the relationship between foreign sales and the use of derivatives. This study concentrates on the influence of foreign sales using derivatives.

Objectives of the study

The current study primarily intended to achieve the following objectives

1. To analyze the foreign sales revenue of the sample companies over a five-year period from 2017-18 to 2022-23.
2. To analyze the value of derivatives used by the sample companies from 2017-18 to 2022-23.
3. To compare the mean proportion of derivatives, use and foreign sales revenue between the upper and third quartiles of companies.

Hypotheses development

Based on the study objectives and discussion, the following hypotheses were developed

H₀: There is no significant difference in the amount of foreign revenue earned by the sample companies.

H₁: There is a significant difference in the amount of foreign revenue earned by the sample companies.

H₀: There is no significant difference in the value of derivatives used among the sample companies.

H₁: There is a significant difference in the values of derivatives used among the sample companies.

H₀: There is no significant difference in the mean proportion of derivatives used and foreign sales revenue between companies in the upper and third quartiles.

H₁: There is a significant difference in the mean proportion of derivatives used and foreign sales revenue between upper and third quartile companies.

Research Methodology

The methodology used in this study is as follows.

1. Population

The study population consisted of companies listed on the BSE. The Bombay Stock Exchange (BSE), commonly known as BSE Limited, has the largest Indian stock market. As of 10 January 2023 5309 companies were listed on the BSE.

2. Population Frame

BSE-100 listed companies were used as the population frame for this study. A company's total revenue is classified into domestic and foreign sales. Based on their foreign revenue to total revenue ratio, BSE-100 companies were ranked from high to low foreign revenue companies. Among the 100 companies, 28 were eliminated due to the unavailability of the latest annual reports and zero foreign revenue; however, the original population frame comes to 72 companies. The list of population-frame companies and their international and domestic revenue classifications are included in the annexure.

3. Sample

A quartile test was applied to the population frame list using the SPSS software, and the upper quartile value was 46.05. There were 18 companies with values above this value. The

third quartile value is between 46.05% and 11.08%, with 18 companies in the third quartile list. Upper and third quartile companies were chosen as the sample for this study. The reason for using the upper and third quartile samples is that these companies represent high foreign sales groups and are exposed to currency exchange risk. The study sample consists of seven industries. The quartile test results were as follows:

Table 1: Results of Quartile Test

| Quartiles | % of Foreign Revenue | No of firms |
|-----------------------------|----------------------|-------------|
| Fourth quartile (above 75%) | > 46.05 | 18 |
| Third quartile (50 to 75%) | 46.05 - 11.08 | 18 |
| Second quartile (25 to 50%) | 11.08 - 2.83 | 18 |
| First quartile (up to 25%) | >2.83 | 18 |
| Total | 100 | 72 |

Source of data

The current study relies mainly on secondary sources of information; the data for the analysis were gathered from the annual financial reports of 36 BSE-listed companies. The study period is five-year from 2018-19 to 2022-23. Five years of financial data were gathered from the annual reports of sample companies through the content analysis method, resulting in a 180-firm-year observation.

Results and Discussion

Foreign sales revenue: Foreign sales revenue refers to the export sales of the firm. Foreign sales revenue data were collected from the sample companies' annual reports, and are presented in Table 2. Using ANOVA, the study tested the first hypothesis that there is no significant difference in the amount of foreign revenue earned by the sample companies. The test results are as follows:

The company's total sales are broken down into Indian and foreign revenue. The above table presents the foreign sales revenue data of 18 companies over a five-year period, from 2018-19 to 2022-2023. When examining foreign sales revenue across all companies, it was observed that there was a consistent increase over the five-year period. The total revenue starts at 527205.00 in 2018-19 and steadily rises to 990458.00 in 2022-23. This indicates the overall growth in companies' foreign sales revenue during the specified timeframe.

Calculating the average foreign revenue per year, we find that the average revenue gradually increases from 29289.2 in 2018-19 to 39941.00 in 2022-23. This suggests a positive trend in the companies' average annual revenue over the five-year period. Analyzing the foreign sales revenue figures of individual companies, it is evident that there are variations in their performance. Companies such as TCS, INFY, and WIPRO demonstrated consistent revenue growth throughout the observed years. However, certain companies, such as LTI and MINDTREE, show relatively smaller revenue figures but still display an upward trend.

The variations in foreign revenue among the sample companies can be attributed to various factors, including market conditions, industry dynamics, company strategies, and economic fluctuations. Additionally, differences in revenue may also be influenced by company-specific factors, such as market share, client base, and product/service offerings. Overall, the table provides insights into the revenue patterns of the selected companies over a five-year period. The data show both the overall

growth in total revenue and variations in the performance of individual companies. These findings can serve as a foundation for further analysis and comparisons, enabling a

better understanding of the financial dynamics within the sample companies.

Table 2: Foreign sales revenue of upper quartile companies (Rs. in crore)

| Sl. No | Company Name | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | Average |
|--------|--------------|---------|----------|----------|----------|----------|---------|
| 1 | INFY | 71279 | 76992 | 97558 | 118126 | 1,42,906 | 101372 |
| 2 | HCLTECH | 58614 | 68344 | 73118 | 83039 | 97,521 | 76127 |
| 3 | TCS | 137089 | 148003 | 155804 | 181975 | 2,14,187 | 167412 |
| 4 | TECHM | 32658 | 33623 | 35092 | 41521 | 50,067 | 38592 |
| 5 | LTI | 8764 | 10102 | 11399 | 22630 | 28,944 | 16368 |
| 6 | MINDTREE | 6780 | 7451 | 7363 | 9678 | 28,944 | 12043 |
| 7 | MOTHERSON | 55,144 | 55,945 | 52,462 | 58,333 | 68,383 | 58053 |
| 8 | WIPRO | 55784 | 58334 | 57250 | 68705 | 79,874 | 63989 |
| 9 | TATAELXSI | 1405 | 1469 | 1607 | 2115 | 3092 | 1938 |
| 10 | DIVISLAB | 4294 | 4514 | 5915 | 7308 | 6,649 | 5736 |
| 11 | DRREDDY | 12770 | 14579 | 16190 | 17667 | 19,538 | 16149 |
| 12 | HINDALCO | 35,948 | 1,18,144 | 1,31,985 | 1,48,506 | 1,63,589 | 119634 |
| 13 | SUNPHARMA | 21218 | 22658 | 22444 | 24,982 | 29,116 | 24084 |
| 14 | CIPLA | 10145 | 10451 | 6920 | 8255 | 14685 | 10091 |
| 15 | UPL | 18056 | 20584 | 19417 | 25733 | 47,037 | 26165 |
| 16 | TORNT PHARM | 4439 | 4422 | 4266 | 4222 | 4,251 | 4320 |
| 17 | SRF | 2733 | 3064 | 4099 | 6060 | 6,161 | 4423 |
| 18 | BAJAJAUTO | 12161 | 12554 | 12685 | 15677 | 14,458 | 13507 |
| | TOTAL | 527205 | 578013 | 609818 | 718938 | 9,90,458 | 684886 |
| | Average | 29289.2 | 32111.8 | 33878.8 | 39941 | 39941 | 35032 |

Source: Annual reports of sample companies

Testing of hypothesis-1

An ANOVA test was used to compare the amount of foreign

sales revenue earned by the sample companies. The ANOVA test results are as follows.

Table 3: Result of ANOVA test to compare the foreign sales revenue among the upper quartile companies

| | Sum of Squares | DF | Mean square | F- value | Sig. |
|----------------|----------------|----|---------------|----------|---------|
| Between groups | 187865882321 | 17 | 11050934254.2 | 39.14 | < 0.001 |
| Within groups | 20328602369.2 | 72 | 282341699.57 | | |
| Total | 208194484690 | 89 | | | |

The one-way ANOVA table provides the results of testing the null hypothesis related to the differences in foreign sales revenue among the sample companies. The calculated F-value was 39.14, with a corresponding p-value < 0.001. Given that the p-value is below the predetermined significance level of 0.05, this study rejects the first null hypothesis, indicating significant differences in foreign revenue among the sample companies. The level of a company's foreign operations plays a significant role in determining foreign sales revenue. Companies with more significant and extensive foreign operations tend to generate higher foreign revenue than those with a limited international presence. Firm size, in terms of market share and resources, can also impact foreign sales revenue. Companies with greater market reach and financial capabilities may be better positioned to capitalize on international opportunities, resulting in higher foreign sales revenue. Furthermore, a company's quality of goods or services can influence its foreign sales revenue. Companies that offer superior-quality products or services in the global marketplace are more likely to attract international customers and generate higher revenue from foreign sales. The test result concludes that there are considerable differences exist in the amount of foreign revenue of the sample companies.

Table No 4 presents the value of derivatives used by the

sample companies over five years, ranging from 2018-19 to 2022-23. Examining the total derivatives usage across all companies, we observe an increasing trend over the five years. The total derivatives usage starts at 33845 crores in 2018-19 and steadily rises to 135401 crores in 2022-23. This indicates an upward trajectory in derivative usage among the sample companies during the specified timeframe. Calculating the average derivatives usage per year, we find that the average usage gradually increased from 1880 crores in 2018-19 to 7522 crores in 2022-23. This suggests an increasing trend in the average annual derivatives usage among the sample companies over the five-year period.

By analysing the derivative usage of individual companies, we observe variations in their usage patterns. Companies such as INFY, LTI, and HINDALCO consistently grew in derivatives usage throughout the observed years. On the other hand, certain companies, such as DIVISLAB and CIPLA, showed minimal or no use of derivatives during the specified period. The variations in derivatives usage among the sample companies may be attributed to various factors, including risk-management strategies, foreign sales revenue, and exposure to market fluctuations. It is essential to consider these factors when analysing and comparing derivative usage across different companies.

Table 4: Value of derivatives used by upper quartile companies (Rs. in crore)

| SL. No | Company name | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | Average |
|--------|--------------|---------|---------|---------|---------|----------|---------|
| 1 | INFY | 14535 | 15398 | 15432 | 20459 | 24,421 | 18049 |
| 2 | HCLTECH | 1627 | 4996 | 4419 | 4,787 | 9,716 | 5109 |
| 3 | TCS | 1,696 | 2611 | 2,694 | 2,694 | 628 | 2064.6 |
| 4 | TECHM | 372 | 464 | 537 | 646 | 546 | 513 |
| 5 | LTI | 8701 | 11,198 | 12,964 | 30,575 | 37,743 | 20236.2 |
| 6 | MINDTREE | 84 | 336 | 209 | 349 | 37,743 | 7744.2 |
| 7 | MOTHERSON | 75 | 87 | 218 | 220 | 209 | 161.8 |
| 8 | WIPRO | 127 | 296 | 407 | 347 | 2087 | 652.8 |
| 9 | TATAELXSI | 2 | 3 | 19 | 10 | 12 | 9.2 |
| 10 | DIVISLAB | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | DRREDDY | 11 | 36 | 92 | 190 | 850 | 235.8 |
| 12 | HINDALCO | 686 | 2431 | 1751 | 3671 | 6,852 | 3078.2 |
| 13 | SUNPHARMA | 76 | 79 | 80 | 75 | 24 | 66.8 |
| 14 | CIPLA | 2,347 | 2,527 | 4,001 | 4,248 | 5,621 | 3748.8 |
| 15 | UPL | 1079 | 578 | 233 | 1,746 | 1,214 | 970 |
| 16 | TORNT PHARM | 138 | 161 | 170 | 194 | 163 | 165.2 |
| 17 | SRF | 1,067 | 2,301 | 4,412 | 7,510 | 7,572 | 4572.4 |
| 18 | BAJAJAUTO | 1222 | 1369 | 1486 | 1326 | 0 | 1080.6 |
| | Total | 33,845 | 44,871 | 49,124 | 79,047 | 1,35,401 | 68457.6 |
| | Average | 1,880 | 2,493 | 2,729 | 4,392 | 7,522 | 3803.2 |

Source: Annual reports of sample companies

Testing of hypothesis-2

To compare the amount of derivative used among the sample companies we used ANOVA test and the test result is as follows.

Table 5: Result of ANOVA test to compare value of derivatives used among upper quartile companies

| | Sum of squares | DF | Mean square | F-Value | Sig. |
|----------------|----------------|----|-------------|---------|---------|
| Between groups | 3062982626 | 17 | 180175448 | 6.53 | < 0.001 |
| Within groups | 1986747195 | 72 | 27593711 | | |
| Total | 5049729822 | 89 | | | |

An ANOVA test was conducted to examine the differences in the value of derivatives used among the sample companies over the five years. The test results indicate a significant variation in the amounts of derivatives used by the sample companies. The p-value obtained from the test was < 0.001, which was less than the significance level of

0.05. This indicates that the observed differences in the values of the derivatives used were highly statistically significant. Additionally, the computed F-value was 14.14, further supporting the presence of a significant difference among the sample companies.

Acceptance of the alternative hypothesis and rejection of the null hypothesis imply that the amounts of derivatives used by the sample companies differ significantly over the five years. The use of derivatives is influenced by several variables including international sales, import payments, company size, liquidity situation, and leverage level. As these factors differ across firms, derivatives' values also vary significantly. Overall, the findings indicate that the use of derivatives is not uniform among the sample companies, with significant differences. This emphasises the importance of considering the influence of foreign sales on the use of derivatives.

Table 6: Upper quartile companies mean proportion of average derivative usage and average foreign Sales

| Company Name | Average foreign revenue of 5 years (A) | Average derivatives used for 5 years (B) | Mean proportion (B/A) |
|--------------|--|--|-----------------------|
| INFY | 94470 | 16592 | 0.17563 |
| HCLTECH | 71539 | 4632.333 | 0.06475 |
| TCS | 158755 | 2069.667 | 0.01304 |
| TECHM | 37033 | 587.6667 | 0.01587 |
| LTI | 14769 | 17746 | 1.20157 |
| MINDTREE | 10894 | 6459.667 | 0.59296 |
| MOTHERSON | 56574 | 139.3333 | 0.00246 |
| WIPRO | 61720 | 701.1667 | 0.01136 |
| TATAELXSI | 1816 | 8 | 0.00441 |
| DIVISLAB | 5336 | 0 | 0 |
| DRREDDY | 15436 | 200.8333 | 0.01301 |
| HINDALCO | 105896 | 2789.833 | 0.02635 |
| SUNPHARMA | 23072 | 57.33333 | 0.00248 |
| CIPLA | 9957 | 3463 | 0.3478 |
| UPL | 23380 | 960.8333 | 0.0411 |
| TORNT PHARM | 4200 | 164.3333 | 0.03913 |
| SRF | 3963 | 3893.5 | 0.98246 |
| BAJAJAUTO | 12653 | 1169.167 | 0.0924 |
| Total | 711463 | 61634.7 | 0.08663 |
| Average | 39525.7 | 3424.15 | 0.08663 |

The table above shows the mean proportion of derivatives to total international revenue during a five-year period for Q4 companies. This analysis examines and compares each company's use of derivatives in relation to its foreign sales revenue. Companies such as LTI, SRF, and MINDTREE have a greater use of derivatives relative to their average international sales. It is possible that these businesses use derivatives more aggressively to reduce risk or manage their finances. However, businesses such as

DIVISLAB, SUNPHARMA, and MOTHERSON show extremely low mean percentages, indicating little or less use of derivatives relative to their overseas revenue. This may indicate more conservative behaviour in managing financial risk. The overall average mean proportion in the above table is around 0.08663, meaning that, on average, derivatives account for 8.663% of the average international income of the companies under examination over a five-year period.

Table 7: Q3 foreign sales revenue of third quartile companies foreign sales (Rs in crore)

| SL. No | Company Name | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | Average |
|--------|--------------|----------|----------|----------|----------|----------|----------|
| 1 | VEDL | 18462 | 16404 | 33621 | 57573 | 58305 | 36873 |
| 2 | ADANIEMENT | 12,355 | 18,554 | 16,388 | 27,581 | 49,876 | 24950.8 |
| 3 | RELIANCE | 3,04,201 | 2,97,404 | 2,07,681 | 2,87,432 | 3,95,777 | 298499 |
| 4 | TATACONSUM | 3276 | 3460 | 3819 | 3714 | 4049 | 3663.6 |
| 5 | DABURINDIA | 2312 | 2454 | 2524 | 2809 | 2882 | 2596.2 |
| 6 | VBL | 14,798 | 14,798 | 17,026 | 33242 | 57573 | 27487.4 |
| 7 | HINDZINC | 4254 | 3697 | 5710 | 7174 | 9787 | 6124.4 |
| 8 | MARICO | 1364 | 1,660 | 1,859 | 2,179 | 2,413 | 1895 |
| 9 | JSWSTEEL | 17,907 | 17,907 | 20,809 | 45,813 | 60,495 | 32586.2 |
| 10 | LT | 19191 | 18631 | 17053 | 20099 | 18605 | 18715.8 |
| 11 | SIEMENS | 2666 | 2334 | 2305 | 2739 | 2637 | 2536.2 |
| 12 | ITC | 3446 | 3062 | 5177 | 9319 | 10407 | 6282.2 |
| 13 | GRASIM | 1,960 | 2,681 | 1,960 | 3,567 | 3,549 | 2743.4 |
| 14 | GODREJCP | 2612 | 2518 | 2752 | 3059 | 3297 | 2847.6 |
| 15 | TATASTEEL | 6,635 | 6,566 | 9,523 | 17,488 | 9,052 | 9852.8 |
| 16 | INDIGO | 40,396 | 68,699 | 18,694 | 46,345 | 1,16,505 | 58127.8 |
| 17 | GAIL | 8,316 | 6,519 | 4,593 | 8,990 | 15,126 | 8708.8 |
| 19 | BOSCHLTD. | 967 | 886 | 1006 | 1306 | 1376 | 1108.2 |
| | Total | 4,65,118 | 4,88,234 | 3,72,500 | 5,80,429 | 8,21,711 | 5,45,598 |
| | Average | 25839.88 | 27124.11 | 20694.44 | 32246.1 | 45650.6 | 30311 |

Source: Annual reports of sample companies

The table above shows the foreign sales revenue of Q3 companies over a period of five years from 2018-19 to 2022-23. The total value of exports increased significantly over the five years, from 465118 crore to 821711 crore. All companies' average foreign sales revenue increased steadily, rising from 25839.88 crore to 45650.6 crore. Firms such as VEDL, ADANIEMENT, RELIANCE, and JSW Steel have shown remarkable growth, with significant increases in their

overseas sales revenue. Furthermore, several companies demonstrated steady growth in their overseas sales, highlighting their ongoing presence in the international market and revenue generation. Among all Q3 companies, the reliance company has the highest foreign sales revenue, while Bosch Ltd has the lowest foreign sales revenue among all other companies.

Table 8: Result of ANOVA test to compare foreign sales revenue of third quartile companies

| | Sum of squares | DF | Mean square | F-Value | Sig. |
|----------------|----------------|----|-------------|---------|---------|
| Between groups | 400729459194 | 17 | 23572321129 | 58.363 | < 0.001 |
| Within groups | 29080188878 | 72 | 403891512 | | |
| Total | 429809648073 | 89 | | | |

The ANOVA table presents the results of a statistical test comparing the export sales of Q3 firms across various companies. The F-value, which is derived by dividing the "Between Groups" mean square by the "Within Groups" mean square, is 58.564. The large F-value suggests that there is significant variation between the groups and that there is a substantial disparity in the means of overseas sales among companies. The p-value, or "Sig" is less than 0.001,

and it is less than the chosen level of significance, indicating a high degree of statistical significance. The results of the ANOVA test suggest significant variation in foreign sales among Q3 companies. The high F-value and low significance level indicate that the observed differences in foreign sales among these companies were statistically significant. This suggests that the companies within the Q3 group significantly differ in terms of their foreign sales.

Table 9: Value of derivatives used by third quartile companies (Rs in core)

| SL. No | Company name | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | Average |
|--------|--------------|---------|----------|---------|----------|----------|----------|
| 1 | VEDL | 46 | 551 | 66 | 249 | 98 | 202 |
| 2 | ADANIEMENT | 162 | 115 | 37 | 42 | 110 | 93.2 |
| 3 | RELIANCE | 20,759 | 1,17,116 | 40,808 | 1,42,318 | 1,45,921 | 93384.4 |
| 4 | TATACONSUM | 131 | 383 | 736 | 212 | 228 | 338 |
| 5 | DABURINDIA | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | VBL | 169 | 183 | 91 | 117 | 29 | 117.8 |
| 7 | HINDZINC | 2,285 | 1656 | 1223 | 1051 | 880 | 1419 |
| 8 | MARICO | 112 | 147 | 158 | 135 | 166 | 143.6 |
| 9 | JSWSTEEL | 228 | 294 | 212 | 450 | 478 | 332.4 |
| 10 | LT | 168 | 278 | 201 | 97 | 218 | 192.4 |
| 11 | SIEMENS | 628 | 717 | 655 | 557 | 1,181 | 747.6 |
| 12 | ITC | 2741 | 1505 | 1256 | 1084 | 701 | 1457.4 |
| 13 | GRASIM | 386 | 1729 | 2,018 | 2,926 | 2,774 | 1966.6 |
| 14 | GODREJCP | 1317 | 2714 | 1488 | 335 | 845 | 1339.8 |
| 15 | TATASTEEL | 905 | 2622 | 1243 | 1699 | 2596 | 1813 |
| 16 | INDIGO | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | GAIL | 812 | 731 | 676 | 1859 | 1877 | 1191 |
| 18 | BOSCHLTD | 405 | 177 | 165 | 133 | 135 | 203 |
| | Total | 31,254 | 1,30,918 | 51,033 | 1,53,264 | 1,58,237 | 1,04,941 |
| | Average | 1736.33 | 7273.22 | 2835.16 | 8514.67 | 8790.94 | 5830.07 |

Source: Annual reports of sample companies

The above table presents the use of derivatives by Q3 enterprises over a period of five years, namely, from 2018-19 to 2022-23. Financial instruments, known as derivatives, are used to hedge against future changes in asset prices or hedge risks. Reliance Industries were among the prominent corporations that often used derivatives, and their use showed a noticeable growing trend. In contrast, during

these five years, businesses such as Dabur India and IndiGo shunned using derivatives. Over the span of five years, the total number of derivatives used by the Q3 companies varied significantly. It began at 31254 in 2018-19, peaked at 158237 in 2022-23, the average derivative use across companies varied within a closer range from 0 to 93384.4.

Table 10: Result of ANOVA test to compare value of derivatives used among third quartile companies

| | Sum of squares | DF | Mean square | F-Value | Sig. |
|----------------|----------------|----|-------------|---------|---------|
| Between groups | 40501885943 | 17 | 2382463879 | 12.455 | < 0.001 |
| Within groups | 13772492471 | 72 | 191284617 | | |
| Total | 54274378414 | 89 | | | |

The results of the ANOVA test suggest significant variation in foreign sales among Q3 companies. The high F-value and low significance level indicate that these companies' observed differences in foreign sales were statistically significant. The differences in derivative usage among Q3 companies were evaluated using ANOVA. The 'Between Groups' sum of squares, representing the variance between companies, is 40,501,885,943, significantly higher than the 'Within Groups' sum of squares (13,772,492,471). This indicates a notable variability in derivative usage among Q3 companies compared with the variation within each company. The calculated f-value in the table above is 12.455, and the corresponding p-value is less than 0.001, which is less than 0.05. This indicates that the null hypothesis is rejected and concludes that there is a significant difference in the amount of derivative used among the Q3 companies.

The mean proportion of derivative use in relation to average

overseas sales over a five-year period for different Q3 corporations is displayed in the above table. The information illustrates the connection between companies' use of derivatives and their corresponding overseas sales, providing insights into the use of derivatives in relation to foreign sales activities. Among Q3 companies, there are notable differences in the average proportions of derivative use with respect to average overseas sales. Certain companies, including IndiGo and Dabur India, have very low proportions and no history of derivative use. Others, such as Adani Enterprises and VBL, have insignificant proportions, suggesting that their overseas sales depend less on derivatives. Some companies, such as Grasim, GodrejCP, and ITC, have higher mean proportions than others, indicating greater reliance on derivatives in relation to their overseas sales. In some cases, the proportion surpassed 0.4. This finding suggests that these corporations may use derivatives more actively.

Table 11: Mean proportion of average derivative usage and average foreign sales of third quartile companies

| SL. No | Company name | Average foreign sales of 5 years | Average derivatives used for 5 years | Mean proportion |
|--------|--------------|----------------------------------|--------------------------------------|-----------------|
| 1 | VEDL | 36873 | 202 | 0.0055 |
| 2 | ADANIEMENT | 24950.8 | 93.2 | 0.0037 |
| 3 | RELIANCE | 298499 | 93384.4 | 0.3128 |
| 4 | TATACONSUM | 3663.6 | 338 | 0.0923 |
| 5 | DABURINDIA | 2596.2 | 0 | 0 |
| 6 | VBL | 27487.4 | 117.8 | 0.0043 |
| 7 | HINDZINC | 6124.4 | 1419 | 0.2317 |
| 8 | MARICO | 1895 | 143.6 | 0.0758 |
| 9 | JSWSTEEL | 32586.2 | 332.4 | 0.0102 |
| 10 | LT | 18715.8 | 192.4 | 0.0103 |
| 11 | SIEMENS | 2536.2 | 747.6 | 0.2948 |
| 12 | ITC | 6282.2 | 1457.4 | 0.232 |
| 13 | GRASIM | 2743.4 | 1966.6 | 0.7168 |
| 14 | GODREJCP | 2847.6 | 1339.8 | 0.4705 |
| 15 | TATASTEEL | 9852.8 | 1813 | 0.184 |
| 16 | INDIGO | 58127.8 | 0 | 0 |
| 17 | GAIL | 8708.8 | 1191 | 0.1368 |
| 18 | BOSCHLTD | 1108.2 | 203 | 0.1832 |
| | Total | 545598.4 | 104941.2 | 2.9647 |
| | Average | 30311.02 | 5830.06 | 0.1647 |

Table 12: Result of paired sample test to compare mean proportion of derivatives used and foreign sales revenue of upper and third quartile companies

| Companies | Mean | Std. dev | Paired differences | | | T-Value | DF | Sig |
|--------------|--------|----------|--------------------|----------|-----------------|---------|----|-------|
| | | | Mean | Std. Dev | Std. error mean | | | |
| Q4 companies | 0.2014 | 0.3596 | 0.03696 | .04434 | 0.1045 | 0.352 | 17 | 0.729 |
| Q3 companies | 0.1647 | 0.1940 | | | | | | |

The above table paired sample test results compare the mean proportion of derivatives used and foreign sales between the upper and third quartile companies. For third-quartile companies, the average proportion of derivative use was 0.1647, with a standard deviation of 0.1940. Conversely, the upper quartile companies show a minor standard deviation of 0.3596, along with a more significant mean proportion of 0.2014. This indicates that, on average, Q4 companies' mean proportion of derivative use was slightly higher than that of Q3 companies. The paired differences between the mean proportions of Q4 and Q3 companies result in a value of 0.03678, suggesting a relatively small difference. The t-value computed using 17 degrees of freedom was 0.4434. The calculated level of significance was 0.729 which was higher than the chosen level of significance (0.05). Therefore, the study accepts the null hypothesis, and the test results conclude that there is no significant difference in the utilisation of the mean proportion of companies in the upper and third quartiles.

Findings and Conclusion

The analysis conducted on the mean proportions of derivative use between third and upper quartile companies reveals an intriguing insight into their strategies concerning foreign sales and derivative utilization. Despite the different revenue tiers, where the upper quartile companies represent high foreign revenue and the third quartile companies represent moderate foreign revenue, the observed mean proportions of derivative use do not demonstrate a significant difference between these groups. This finding indicates that, on average, the level of mean proportion, which signifies the extent of derivative use in relation to foreign sales, remains similar between third- and upper-level companies.

Typically, companies with higher foreign revenue (Q4) are

expected to utilise a higher mean proportion of derivatives than those with lower foreign revenue (Q3). However, the analysis challenges this expectation, suggesting that despite the varying revenue tiers, the mean proportion of derivative use remains comparable between the third and upper quartile companies. This equality in mean proportions implies that third- and upper-quartile companies might adopt similar strategies regarding their foreign sales, irrespective of their revenue differences. The data suggest a uniform approach to utilising derivatives concerning their foreign sales strategies, indicating a consistent approach regardless of the scale of their foreign revenues. The conclusion drawn from the analysis highlights the similarity in the mean proportions of derivative use between the third and upper quartile companies. This insight suggests homogeneity in their strategies regarding derivative utilization in the context of foreign sales, challenging the expected variations based on different revenue tiers.

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Annexure

Foreign sales revenue ratios of population-frame companies.

| SL. No | Company name | Foreign Revenue% |
|---------------------|--------------|------------------|
| Q1 Companies | | |
| 1 | INFY | 97.11 |
| 2 | HCLTECH | 96.95 |
| 3 | TCS | 94.9 |
| 4 | TECHM | 93 |
| 5 | LTI | 92.7 |
| 6 | MINDTREE | 92.66 |
| 7 | MOTHERSON | 89.22 |
| 8 | WIPRO | 86.39 |
| 9 | TATAELXSI | 84.1 |
| 10 | DIVISLAB | 82.3 |
| 11 | DRREDDY | 82 |
| 12 | HINDALCO | 78.28 |
| 13 | SUNPHARMA | 67 |
| 14 | CIPLA | 60 |
| 15 | UPL | 50.18 |
| 16 | TORNT PHARM | 50 |
| 17 | SRF | 48.74 |
| 18 | BAJAJAUTO. | 47.3 |
| Q2 Companies | | |
| 19 | VEDL | 44.81 |
| 20 | ADANIEMENT | 41.43 |
| 21 | RELIANCE | 36.25 |
| 22 | TATACONSUM | 32.92 |
| 23 | DABURINDIA | 26.4 |
| 24 | VBL | 26.35 |
| 25 | HINDZINC | 25.87 |
| 26 | MARICO | 23.1 |
| 27 | JSWSTEEL | 20.82 |

| | | |
|---------------------|------------|-------|
| 28 | LT | 19.89 |
| 29 | SIEMENS | 17.77 |
| 30 | ITC | 17.39 |
| 31 | GRASIM | 16.05 |
| 32 | GODREJPROP | 14.38 |
| 33 | TATASTEEL | 13.7 |
| 34 | INDIGO | 12.77 |
| 35 | GAIL | 11.72 |
| 36 | BOSCHLTD. | 11.08 |
| Q3 Companies | | |
| 37 | PIDILTIND | 10.76 |
| 38 | EICHERMOT | 8.65 |
| 39 | BERGEPAIN | 7.62 |
| 40 | NAUKRI | 7.03 |
| 41 | MARUTI | 6.89 |
| 42 | BRITANNIA | 5.7 |
| 43 | TATAMOTORS | 5.45 |
| 44 | M&M | 4.68 |
| 45 | ADANIPTS | 4.45 |
| 46 | NESTLEIND | 4.37 |
| 47 | HINDUNILVR | 3.71 |
| 48 | HAVELLS | 3.46 |
| 49 | BPCL | 3.42 |
| 50 | IOC | 3.26 |
| 51 | SBIN | 3.24 |
| 52 | ONGC | 3.21 |
| 53 | HEROMOTOCO | 3 |
| 54 | ULTRACEMCO | 2.88 |
| Q4 Companies | | |
| 55 | BEL | 2.78 |
| 56 | ICICIBANK | 1.77 |
| 57 | HAL | 1.6 |
| 58 | NTPC | 1.34 |
| 59 | PGHH | 1.25 |
| 60 | PAYTM | 0.79 |
| 61 | TITAN | 0.53 |
| 62 | TATAPOWER | 0.48 |
| 63 | PAGEIND | 0.46 |
| 64 | UNITDSPR | 0.45 |
| 65 | ASIANPAINT | 0.37 |
| 66 | BHARTIARTL | 0.33 |
| 67 | AXISBANK | 0.3 |
| 68 | KOTAKBANK | 0.08 |
| 69 | POWERGRID | 0.056 |
| 70 | SHREECEM | 0.02 |
| 71 | LICI | 0.012 |
| 72 | HDFCBANK | 0.01 |

Note: The code names of the companies were taken from the BSE website