Journal of Business Thought, *DOI: 10.18311/jbt/2024/44733, Vol 15, 2024*

Determinants of Currency Hedging in Indian Non-Financial Firms: A Study of Pre-COVID, COVID and Post-COVID Era

Kritika Mathur and Sarita Singh*

Dr. B. R. Ambedkar University Delhi, Delhi – 110006, India; kritika@aud.ac.in, sarita.19@stu.aud.ac.in

Received: 29 June 2024 **Accepted:** 13 November 2024 **Published:** 18 December 2024

Abstract

The present study examines the determinants of currency hedging in Indian non-financial firms. The study uses a sample of 512 Indian non-financial firms for 2016 to 2022, during the pre-COVID, COVID and post-COVID period. The study uses panel logistic regression with the dependent variable taking a binary form with firms using currency derivatives assigned a value of 1 and those not using them receiving a value of 0. The study also uses different firm-level internal factors as independent variables. The present research can improve corporate managers' risk management practices to shield themselves from currency fluctuations.

Keywords: India, Corporate Hedging Theories, Corporate Panel Regression, Non-Financial Companies, Risk Management Practices

JEL Classification: C33, G1, G13, G32

1. Introduction

Since the Bretton Woods System collapse in 1973, risk management has remained a constant concern for most organisations; particularly, the exchange rate fluctuations have been a significant risk for businesses engaged in trade (Bartram, 2008). Even though firms now face various financial risks, foreign exchange (FX) risk remains the most significant, particularly for developing nations. Financial hedging with forwards, futures, and option-based contracts can protect against foreign exchange risk (Ullrich, 2009). Corporate finance theory indicates that hedging can raise the value of the company by lowering expected taxes, the costs of financial distress, and agency costs (Nance *et al.*, 1993). Firms' internal and external factors influence how they implement their hedging policies (Allayannis *et al.*, 2012). Currency fluctuations and the whole amount of foreign debt that the company has are examples of external factors that can influence hedging policy (Wahyudi *et al.*, 2019).

Although many studies have examined the factors that influence corporate hedging practices, the factors that influence corporate hedging in developing economies are frequently overlooked. In this study, the reasons behind corporate hedging in India are examined. Indian businesses are becoming more exposed to currency risk. Comparing the currency to the major foreign currencies over the years reveals that it has also gone through substantial fluctuations (Figure 1). Based on data from OECD, Figure 1, shows that the Indian rupee had an annual trend of strengthening against the US dollar from December 2016 to December 2017, but from December 2017 to December 2020 it tended to weaken against the US dollar exchange rate. It again strengthened from December 2020 to December 2021. Since December 2021

*Author for correspondence

it however has followed a weakening annual trend against the US dollar. Further, the Indian rupee depreciated by more than 10 per cent in the year 2022 and in October 2022, plunged to a historic low of Rs. 83 per dollar mark and reached Rs. 83.26 per dollar.

The Reserve Bank of India (RBI) periodically releases guidelines for the management of currency risk. As per the RBI circular (2015), RBI introduced several new derivative instruments, such as cross-currency futures and exchange-traded cross-currency options. It is therefore pertinent to analyse currency hedging in the current environment. Given the volatility of the Indian currency market, it would be intriguing to study the effects of COVID-19 on the hedging strategy of Indian non-financial firms.

The present study is primarily driven by the need to test hedging theories in a developing market like India as the Indian rupee experiences high volatility in exchange rates. Hence, due to the high level of currency rate volatility in India, it is essential to conduct a comprehensive study on the determinants of hedging and the impact of COVID-19 on the determinants of hedging.

Several studies have shed light on the determinants of foreign currency hedging in a global context (Allayannis & Ofek, 2001; Hagelin, 2003). However, empirical research on the choice of hedging strategies and factors influencing hedging of foreign exchange risk seem to reflect managers' choices in developed countries, where it has been found that in developed countries, there is a presence of superior institutional and legal frameworks, reduced information asymmetry, and well-functioning capital markets.

This study argues that outside of the developed world, the determinants of hedging practices would be different because of unique firm-specific characteristics. A few studies in India have investigated the foreign exchange determinants. For instance, Raghu and Palaniappan (2014), and Mahadevan (2021) used cross-sectional data to identify the variables that affect the hedging decisions of the firm. This study uses a panel data set to determine the hedging characteristics of Indian firms, an emerging market, as panel data carries more information, more significant variability, and more proficiency than pure time series information or cross-sectional information.

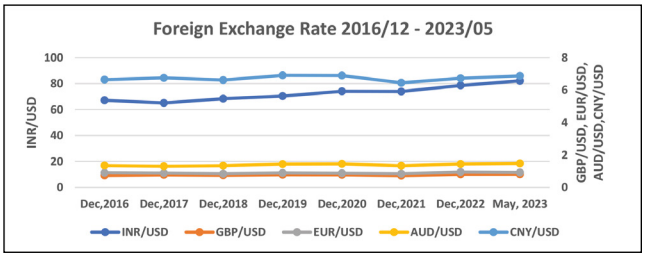


Figure 1. Movement of major currencies exchange rate to us dollar, 2017-2023 based on data from OECD.

Further, the study contends that by incorporating ownership variables, it expands on previous research that looked at how ownership structure affects the factors that determine risk management tactics, as well as how managerial incentives and outside oversight affect the choice to use derivatives (Whidbee & Wohar, 1999). The study estimates the prudent law hypothesis, the well-known hedging determinant, in the Indian context using institutional ownership as a proxy variable. Besides, while there have been many studies on how COVID-19 has affected the economy, not much has been done to examine how it has affected the hedging decisions of Indian firms. Hence, the study considers the impact of COVID-19 on the determinants of hedging.

The remaining sections of the study are as follows- Section 2 explores related literature on corporate hedging theories especially focussing on determinants of hedging. Section 3 details the research methodology shedding light on data sources and sample framework, and the models used in the study followed by research findings examined in Section 4. The paper is finally concluded in Section 5, which summarises the major conclusions and implications drawn from the research.

2. Review of Literature

Well-known market imperfections that drive businesses to use derivatives to hedge their investment risks include the expected cost of financial distress, underinvestment costs, size, hedging substitutes, managerial risk aversion, and prudent law hypothesis between shareholders and managers, according to related literature on corporate hedging.

2.1 Liquidity as a Hedging Substitute

Liquidity is the ability with which an asset can be bought or sold on the open market without causing a decline in its value. A company with insufficient liquidity may experience financial difficulties and ultimately be forced into insolvency (Monda *et al.*, 2013). According to Nance

et al. (1993) and Froot *et al.* (1993), companies can reduce their dividend payout or retain a larger short-term liquidity position to reduce the expected cost of financial distress and agency costs. In general, having liquid assets will help a firm avoid financial difficulties. Nguyen and Faff (2002) and Kim and Sung (2005) discover that there is a significant and negative relationship between liquidity and the probability of hedging. A high level of liquidity indicates a decreased likelihood of financial distress. As a result, companies with high liquidity use fewer derivatives.

The current ratio has been employed by Mian (1996) as a proxy for liquidity. The study was conducted on the variables impacting corporate hedging strategies. Clark and Mefteh (2010); and Gay *et al.* (2011) use quick ratio for measuring liquidity. The research findings indicate a negative relation between quick ratio and derivatives hedging. Liquid firms can pay off their short-term debt, they don't need to hedge as much against financial distress or other risks. Hosama and Setyawan (2022) and Lestari and Pratiwi (2023) find that liquidity has a significant negative impact on hedging decisions.

2.2 Financial Distress

When a decline in earnings implies that a company won't be able to make interest and principal payments on its debt, the company is said to be in financial distress.

Financial distress is an undesirable circumstance due to funding issues, bankruptcy expenses, and other market imperfections. Firms need to lower the costs of financial distress as prior research has demonstrated that it proves costly for any kind of organisation. By hedging, a company might be able to lower the anticipated costs of financial distress.

Omar *et al.* (2022) find robust evidence in favour of financial distress theories in Malaysian non-financial firms. According to Nguyen and Faff (2002), companies that overuse debt to finance their assets will have higher levels of leverage. Because of the benefits associated with debt, businesses may find themselves using debt as a means of access. However, if they are unable to make the payment, they may be in danger of going bankrupt, particularly if this is a time of economic downturn. As a result, companies with high leverage ratios typically use derivatives for more hedging. As currency derivatives can reduce currency fluctuations, hence, hedging gives the company assurance when taking on debt at a set rate without compromising their long-term planning.

The financial distress hypothesis, which holds that financially risky firms require more derivatives used in risk hedging, is refuted by Shu and Chen's (2003) study. They conclude that companies with low debt ratios are more likely to do hedging with derivatives. Mahasari and Rahyuda (2020) find the impact of leverage on hedging decisions is negative and insignificant in Indonesian non-financial firms.

Hagelin (2003) looks at how Swedish companies use currency derivatives; the study discovers no meaningful correlation between leverage and derivatives usage. Mian (1996) also conclude that there is no relationship between leverage and hedging. Gewar and Suryantini (2020) find the negative insignificant relationship between leverage and hedging decisions of Indonesian non-financial firms.

2.3 Firm Size

Various studies have empirically found that the size of the firm has an impact on the risk management practices of the firm. Nance *et al.*, 1993; Dolde, 1995; Getzy *et al.*, 1997 and Mahasari and Rahyuda (2020) state that hedging is more common in larger firms. The activities of the company become more complex as it expands, and the amount of risk it faces also rises.

According to Reynolds and Boyle (2005), because of the scale of their business transactions, large companies are more likely to hedge as they are operating under the principle of economies of scale. Jutila (2020) states that economies of scale are an important factor in the hedging decisions of non-financial firms in Finnish markets.

2.4 Profitability

A business's ability to earn a profit is essential. It displays a company's overall effectiveness and performance. Jang and Park (2011) observe a significant positive relationship between profitability and firm growth. The profitability of the company increases with its growth. High-profitability firms experience fewer problems with financial distress. They are therefore not required to undertake hedging. Several empirical studies have employed return on assets (ROA) as a proxy for profitability. Sudiarta and Setyawan (2022) and Clark and Mefteh (2010) discover a positive and significant relationship between hedging and ROA.

However, according to Hsin *et al.* (2007) and Gay *et al.* (2011), there exists a significant and negative relationship between hedging and ROA. A greater ROA lowers a firm's

risk exposure and, consequently, the cost of financial distress. Consequently, firms will use fewer derivatives.

2.5 Underinvestment

The underinvestment issue occurs when a company lacks internally generated funds and cannot afford to make capital investments because of the high cost of external financing. Consequently, a highly geared company might be compelled to adopt less-than-ideal investment strategies and forego rewarding investment opportunities—this is known as the "underinvestment problem" (Myers, 1989). Bessembinder (1991) and Froot *et al.* (1993) claim that the possibility of underinvestment is decreased by effective risk management. This happens when management chooses not to contribute to low-risk initiatives to increase their wealth at bondholders' expense.

According to Goldberg *et al.* (1998), companies use derivative hedging to lower risk exposure, ensure internal funding for value-enhancing investments, lower the costs of financial distress, and reduce the issue of underinvestment resulting from disputes between shareholders and debt holders.

2.6 International Operations

According to cash flow models, foreign exchange exposure should be correlated with net foreign currency revenues, which are defined as total foreign revenues less costs. This makes sense because higher foreign sales would result in a greater need for currency derivatives. The intensity of a company's export and import activity, its involvement in overseas operations, the currencies of its competitors, and the competitiveness of its input and output markets should all be taken into consideration when determining how much an exchange rate change affects a company's cash flows. Hence, many studies find a positive relationship between international operations and decisions to hedge (Ameer, 2010; Mahadevan, 2021; Bhagawan & Lukose, 2017).

2.7 Managerial Ownership

As per agency theory managerial ownership motivates managers to assist the firm in making a profit and reducing risk (Smith & Stulz, 1985). In other words, if they fail to effectively manage the company, they will bear a greater risk to their earnings and those of the shareholders. As a result, as managerial ownership increases, conflicts between managers and shareholders reduce, which lowers agency costs.

Géczy *et al.* (1997) find that companies that use currency derivatives hold more managerial options than those that do not. In other words, there is a positive correlation between managerial ownership and derivatives hedging.

Numerous empirical studies have proxied the number of shareholders for managerial ownership. Nguyen and Faff (2002) locate a positive correlation between management shareholders and hedging. The study stated that managers are more concerned with the firm's profits if there are more management shareholders. Managers choose corporate risk management which minimises their own risk over a strategy that maximises value to a well-diversified shareholder. As a result, managers use derivatives more frequently to protect themselves from market risks that are beyond their control.

However, Fok *et al.* (1997) obtained a negative relationship between managerial ownership and derivatives hedging. Managers with larger stock or option holdings will hedge less. This is primarily due to the possibility that their option contracts will increase in value if the company's earnings volatility increases (Seng & Thaker, 2018). Tufano (1996) carried out research on corporate risk management in the North American gold mining sector. Firms that hold more options from managers are less involved in hedging the volatility of the gold price, whereas businesses that hold fewer options from managers are more involved. Gewar and Suryantini (2020) discover a negative but insignificant impact of managerial ownership on the hedging decisions of Indonesian non-financial firms.

2.8 Institutional Ownership as Prudent Man Law Hypothesis/Asymmetric Information

Institutional investors are widely recognised as the most important category of external shareholders (Bushee & Goodman, 2007). They are mainly made up of investment advisors, banks, insurance companies, pensions, and endowments. Institutional investors can enhance the performance of firms, influence risk taking conduct, rearrange the board of directors, and restrict executive remuneration of investee companies (Gine & Mousawwi, 2006).

Given their larger stake in the companies, institutional investors might also be open to playing the role of active invigilator in the investee firms. The prudent man law, as it is also called, safeguards investors by compelling managers' fiduciaries to make investments in a manner consistent with that of the prudent man hypothesis (Del Guercio, 1996). Thus, institutional investors are likely to strengthen the hedging positions of the investee company to reduce risk exposures and stabilise the value of the stocks they own, by this prudent man law. Vural-Yavas (2016) used institutional ownership as a proxy for asymmetric information but found no significant impact on the probability of hedging.

Conversely, institutional investors may be advocating for managers. Institutional shareholders can also encourage managers' risk-taking behaviour by voting in favour of risky investments that could result in disproportionate earnings at the expense of debt holders and/or small stockholders (Wright *et al.*, 1996). The current study proposes to employ the large shareholder hypothesis, according to which the amount that a firm hedges with derivatives is inversely correlated with institutional ownership.

3. Research Methodology

3.1 Data Source and Sample Framework

The present study focuses on the non-financial firms amongst the top 1000 companies, as per the market capitalisation listed at BSE India as on 31st March 2023. Since financial firms are considered derivative traders and not end-users (Nguyen *et al.*, 2018), only the non-financial companies are considered for the analysis given that financial firms may use foreign currency for different reasons such as speculation (Ahmed *et al.*, 2014) other than hedging (Alam & Gupta, 2018; Yang *et al.*, 2022). Thus, out of 1000 companies, 119 have not been considered in the study. Additionally, government companies or Public Sector Undertakings (PSUs) were excluded from the sample due to the possibility that government regulations could influence their choices instead of just being market-driven (Alam & Gupta, 2018). These were 62 in number. Following the methodology adopted by Barbi and Moressi (2023) the study further checked the annual reports of the companies to investigate, if they disclose the presence of foreign exchange exposure/currency risk in their market risk segment. A sample of 512 companies was finally selected for the analysis after excluding companies for which complete data was not available and companies which do not disclose foreign exchange exposure in their annual reports. This process to arrive at the number 512 is also detailed in Table 1.

The dependent variable is expressed in binary form, with firms using currency derivatives assigned a value of 1 and those not using them receiving a value of 0. A company is classified as a 'Derivative User' if it utilises any of the following derivative instruments- Forwards,

Table 1. The process adopted to arrive at the final sample of companies.

Sample Selection Criterion	No. of Companies
Top 1000 firms listed at BSE India on 31st March 2023	1000
Financial Companies	119
Government Companies	62
Missing data on different variables used in the study	307
Final Sample with a dummy variable for Hedging	*512*

Table 2. Description of variables and measurement.

Variables	Symbol	Proxy for	Reference
Current Ratio	CR	Hedging Substitutes	Nguyen and Faff (2002)
Debt to Total Assets	DTA	Financial Distress	Mahadevan (2021)
Log of Total Assets	LTA	Size	Mahadevan (2021)
PPE/Total Asset* Leverage	UN	Cost of Underinvestment	Vural-Yavas (2016)
Return on Assets	ROA	Profitability	Seng and Thaker (2018)
Export/Total Sales	EXS	International Operations	Mahadevan (2021)
Promoter's holding as to total holdings	PH	Agency Theory	Reynolds and Boyle (2005)
Institutional Ownership to total ownership	IO	Prudent Man Law	Tai *et al.* (2014)

Futures, Options, Swaps, for hedging foreign exchange exposure as recorded in their annual reports. Data for the study is collected from annual reports of the companies and the prowess database.

To account for the endogeneity problem in any of the independent variables, we take the lagged values of all explanatory variables (Géczy *et al.*, 1997; Greene, 2003). The independent variables are defined in Table 2.

Our study covers the period from 2016 to 2022. Data on derivative usage is available only after new accounting standards (IndAS) which converge with International Financial Reporting Standards, became effective. The analysis is carried out by separating the samples into the pre-COVID-19 pandemic period (2016–2019), COVID-19 pandemic period (2020 and 2021) and post-COVID-19 pandemic period (2022) to examine the influence of COVID-19 on these determinants.

3.2 Empirical Model

The study models the likelihood of making hedging decisions against non-hedging decisions using the logistic estimation method (Whidbee & Wohar, 1999; Pennings, 2002). We apply the random effect logit model to investigate the drivers of hedging decisions. Since the dependent variable in the study is a binary variable, *i.e.,* to hedge or not to hedge; the best model to represent such a decision is the logit model. Hence, the random effect logit model is employed to investigate the variables that could impact the likelihood of hedging.

The following logit model is employed in the research.

$$\ln\left(\frac{p}{1-p}\right)=\beta_0+\beta_1X_{1t-1}+\beta_2X_{2t-1}+\beta_3X_{3t-1}+\ldots+\beta_kX_{kt-1} \quad (1)$$

$\ln\left(\frac{p}{1-p}\right)$ = Log odds of firms hedging against non-hedging

X_{1t-1}, X_{2t-1}, $X_{3t-1}\ldots X_{kt-1}$, are the independent variables employed with a lag. The details about the independent variables are given in Table 2.

The probability of a firm hedging is modelled as follows:

$$P=\frac{1}{1+e^{-(\beta_0+\beta_1X_{1t-1}+\beta_2X_{2t-1}+\beta_3X_{3t-1}+\ldots+\beta_kX_{kt-1})}} \quad (2)$$

4. Empirical Analysis

4.1 Descriptive Analysis

According to the descriptive statistics given in Table 3, the firms under study were in a good place in terms of short-

Table 3. Descriptive statistics.

Variable	CR	DTA	LTA	UN	ROA	EXS	PH	IO
Obs	3,584	3,584	3,584	3,584	3,584	3,584	3,584	3,584
Mean	1.8369	0.1924	10.0172	0.0154	0.0757	0.2352	0.5632	0.1745
Std. dev.	1.5196	0.4051	1.4449	0.1585	0.1030	0.2886	0.1488	0.1390
Min	0.01	0	3.7401	0	-1.2592	0	0	0
Max	25.56	14.1552	16.0899	5.0362	1.0889	1.231	0.995	0.7933

Table 4. Correlation matrix and VIF for variables.

	CR	DTA	LTA	UN	ROA	EXS	PH	IO	VIF	Tolerance
CR	1								1.16	0.8599
DTA	-0.2176***	1							1.38	0.7247
LTA	-0.1239***	0.0426**	1						1.55	0.6453
UN	-0.0180	-0.0138	-0.0524***	1					1.11	0.9004
ROA	0.3242***	-0.495***	-0.0646***	-0.2408***	1				1.61	0.6208
EXS	0.1398***	-0.0432***	-0.0363**	0.0605***	0.1313***	1			1.05	0.9514
PH	0.0449***	0.016	-0.1948***	0.0227	0.0713***	-0.0794***	1		1.43	0.7000
IO	0.0440***	-0.1127***	0.5543***	-0.0349**	0.0922***	0.0333**	-0.5094***	1	2.03	0.4922

Note: ***, **, * indicate 1 per cent, 5 per cent and 10 per cent level of significance.

term liquidity. The companies had current assets that were around two times greater than their short-term liabilities, as indicated by the average current ratio of 1.837.

The average debt employed by the sample companies was 19 per cent of total assets. There were few firms which did not use any debt. The highest value 14.15 showed that borrowings accounted for nearly fourteen times the total assets.

The institutional ownership on average was 17.4 per cent of total holdings. Promoters hold an average of 56 per cent of total holdings. On average 23 per cent of sales were in the form of exports. The average return on assets for the firm was 7.5 per cent.

4.2 Correlation Matrix

To rule out multicollinearity before moving further with the analysis, Pearson correlation coeffecients of the independent variables are reported in Table 4. Most correlations are quite weak. All correlations are within the acceptable limits indicating the absence of a multicollinearity problem. Besides, to assess even more straightforwardly whether the data experiences multicollinearity, each independent variable's Variance Inflation Factor (VIF) statistics are also examined. VIF values above 10 generally indicate the presence of strong multicollinearity. Moreover, the tolerance (1/VIF) is computed to verify the multicollinearity level. If the tolerance value is less than 0.1, and the matching VIF value is greater than 10, then, there is multicollinearity (Gujarati & Porter, 2009). Every VIF value is low, as the table illustrates, and none is greater than 10. Not a single tolerance value is smaller than 0.1. Consequently, it can be said that multicollinearity does not pose a major problem in the data.

Table 5. Logistic regression results.

Variables	Model 1 (2016-2020) Pre-COVID Period Coefficient	Model 2 (2021-2022) COVID Period Coefficient	Model 3 (2023) Post COVID Period Coefficient
Constant	-11.7527*** (2.6049)	-13.4796*** (3.9290)	-6.0984*** (1.0940)
CR	-0.8091*** (.1798)	-1.0294*** (.2135)	-0.1997*** (.0771)
DTA	3.1422** (1.3049)	0.6672 (2.6375)	0.4125* (.2225)
LTA	1.1065** (.2243)	1.4443*** (.3361)	0.5792*** (.1013)
UN	-0.4678 (4.9369)	1.8752 (2.1320)	-0.9495 (1.9956)
ROA	9.2141** (2.7051)	1.6045 (4.7319)	4.0438*** (1.2918)
EXS	8.0854*** (1.1188)	9.3642*** (1.3949)	2.4500*** (.4135)
PH	0.4731 (2.2297)	-0.3707 (3.1231)	-0.078 (.7518)
IO	2.1456 (2.5057)	3.3214 (4.3518)	-0.3688 (.9613)
No. of observations	2048	1024	512
LR Test	1045.36***	672.97***	102.56***
Wald chi2(8)	100.16***	151.27***	100.16***
Prob > chi2	0	0	0

Note: Standard errors are given in parantheses. ***, **, *. indicate significant at 1 per cent, 5 per cent and 10 per cent level of significance respectively.

4.3 Empirical Findings

Table 5 presents the results of the random effects logit model for pre-COVID, COVID and post-COVID periods with the hedging decision as a dependent variable and different firm internal factors as independent variables. The model's significance was tested from the Wald test with a probability of 0.0000. The likelihood ratio test is also found to be significant. The results are listed in Table 5.

4.3.1 Determinants of Hedging: Pre-COVID Period

Regression results from Table 5 reveal that the current ratio, debt to total assets, exports to total sales ratio, log of total assets, and return on assets were significant in determining corporate hedging practices during the pre-COVID period.

The findings reveal that liquidity measured by the current ratio (CR) is negative and significant. This supports the theory of liquidity as a hedging substitute. As per the liquidity theory, a high level of liquidity indicates a decreased likelihood of financial distress. As a result, companies with high liquidity use fewer derivatives. The inverse relationship suggests that having more short-term liquidity serves as an alternative to utilising derivatives for hedging purposes. Consequently, there is less incentive to use derivatives to hedge risks when the current ratio is higher.

Financial distress measured by the debt to total assets (DTA) ratio has a positive and significant impact on derivatives usage, hence exerting a positive effect on corporates' hedging decisions. Most earlier studies have confirmed this finding (Nguyen & Faff, 2002; Haushalter, 2000). Additionally, this supports the Modigliani-Miller Theory (1958). As per the financial distress hypothesis, more derivatives for risk hedging are demanded by distressed firms, which is supported by the results of the study. The analysis in this study indicates that in emerging markets firms hedge to increase their debt capacity.

Firm size (LTA) measured by the log of total assets is positive and significant for the pre-COVID period. This suggests that size determines the usage of derivatives among Indian non-financial firms. Large companies prefer hedging for reasons other than economies of scale advantages because they are typically more exposed to risk. They would look for more advanced instruments for risk management, like derivatives. Given the dynamic and intricate nature of hedging, larger companies can allocate additional resources towards the establishment of an appropriate hedging unit. Mian (1996) and Nance *et al.* (1993), have provided proof in favour of this line of reasoning.

The variable profitability (ROA) has a positive and significant impact on hedging. These findings are similar to the study conducted by Vural-Yavas (2016) using return on equity (ROE) as a proxy for profitability. Findings suggest that highly profitable companies are more likely to hedge even though they have lower financial distress and underinvestment costs. This explanation could be attributed to the reason that profitable companies in emerging markets have enough funds to employ an expert staff that will monitor financial risks and use derivatives to hedge (Vural-Yavas, 2016). Transaction costs have the potential to deter businesses from using derivatives. It seems that highly profitable companies control expenses. They can therefore make use of derivatives to hedge their risks.

The variable export to total sales (EXS) ratio has a positive significant influence on derivative usage. This demonstrates that companies that export are more likely to use currency derivatives as a hedge against foreign exchange risk. It should come as no surprise that exporter companies are more susceptible to currency risk. For this reason, the use of derivatives by exporters to lower their currency risk is more common (Vural-Yavas, 2016).

Cost of underinvestment (UN) has a negative but non-significant impact on hedging in the pre-COVID period. Promoters' holdings (PH) also have a positive but insignificant impact on the dependent variable. Hence, companies with greater managerial ownership engage in more derivatives hedging due to their risk-averse nature but the impact does not significantly affect the hedging decision. Institutional Ownership (IO) proxied for prudent man law is found to have a positive but insignificant impact on hedging behaviour of non-financial firms.

4.3.2 Determinants of Hedging: COVID Period

It does appear that COVID-19 has had an impact on determinants of hedging in Indian non-financial firms. The theory of liquidity as a hedging substitute is supported due to the negative and significant relationship between the CR and the hedging decision. Size (LTA) is positive and significant which implies that size affects the hedging decision even during the COVID period. Export to total

sales (EXS) ratio also has a positive significant influence on hedging decision during the COVID period.

DTA was positive but found to be insignificant during the COVID period. The financial distress hypothesis thus is not supported during the COVID period. The probable reason could be that distressed firms during turbulent periods were not confident in doing hedging. Companies under financial stress may have lacked the resources to maintain effective hedging strategies leading to insignificant relationships.

ROA is also positive but insignificant. Findings suggest that COVID caused unprecedented market volatility, making it difficult for hedging strategies to perform as intended. During the pandemic, many companies shifted their focus to short-term survival strategies rather than long-term hedging practices. Further, the cost of underinvestment (UN) is found to be insignificant. Also, the promoters' holdings appear to negatively affect the hedging decision in the COVID period but are found to be insignificant. Institutional Ownership is also found to have a non-significant impact in the COVID period.

4.3.3 Determinants of Hedging: Post-COVID Period

Post COVID period has similar findings to the pre-COVID period. Liquidity measured by the current ratio (CR) has a negative and significant impact on the dependent variable, supporting the liquidity theory as a hedging substitute. The impact of debt to total assets (DTA) is positive and significant, hence exerting a positive effect on corporates' hedging decisions. The ratio of export to total sales (EXS) has a positive and significant influence on derivative usage. Firm size (LTA) also has a positive and significant impact on derivative usage. The impact of profitability measured by ROA is also positive and significant. The theory of underinvestment (UN), prudent law (IO) and agency theory (PH) do not appear to hold a significant impact as is reflected in the regression results. Most of the regression results during the post-COVID period are similar to the pre-COVID period. Hence, the results in Table 5 indicate that during normal periods theory of liquidity, financial distress, scale economies, international operations, and profitability are significant in determining the probability of hedging by Indian non-financial firms.

5. Conclusions and Implications

Most people agree that when a nation's political and economic conditions shift overall, firms become more vulnerable to fluctuations in foreign exchange rate risk, which raises the risk level for the business. As a result, many firms use derivatives to manage their exposure to foreign exchange risk (Afza & Alam, 2011). The present study examined the factors that influence the hedging decision of Indian non-financial firms for the period 2016 to 2022 with a focus on the impact of COVID-19 on these factors.

Based on the results the study concludes that only the theories of liquidity, scale economies, and international operations, were significant in determining hedging decisions during the COVID period.

However, during pre-COVID and post-COVID periods the theories of liquidity, financial distress, scale economies, international operations and profitability are found relevant in determining the probability of hedging. The theory of underinvestment, agency theory and prudent man law are not found significant in all the three periods of the study. These can be further investigated using other variables such as analyst coverage, and enterprise risk management.

Further, there is evidence of a connection between corporate hedging to the degree of financial distress experienced by firms. High-leveraged firms use hedging to reduce some cash flow uncertainties. Rather than wasting more time worrying about cash flow volatility, management could use this important time to look for more "good-risk" investments. In addition to offering some respite to management, the stability that comes with hedging would also satisfy certain creditors. There is also a significant positive relationship between profitability and the probability of hedging during normal times, *i.e.,* pre-COVID and post-COVID. More profitable firms typically have greater financial resources to invest in hedging strategies and instruments, allowing them to implement more comprehensive risk management practices. Hedging can stabilise the company's cash flows and provide certainty in cost structures, supporting long-term planning and investment.

The study provides evidence to the policymakers on the firm's hedging behaviour during normal and turbulent times. It has policy implications as COVID-19 has affected almost all sectors and the management should be prepared to handle such adversities in future. COVID-19 had a

significant impact on currency hedging determinants in India as there was high volatility experienced in the foreign exchange during COVID-19 periods. The study comprehends the factors which are relevant to the hedging decisions of the firm managers. Comprehending these factors can assist companies in modifying their hedging strategies to correspond with their overall financial and operational objectives. Understanding the factors that lead firms to hedge can assist policymakers in creating rules that promote responsible risk management without placing undue burden on compliance. Policymakers can more accurately evaluate systemic risks in the financial system by understanding how businesses hedge against risks. Efficient hedging strategies can lessen the possibility of business collapses that could cause more widespread economic instability.

The results are important for individual and institutional investors as they are informed about the factors which are relevant in hedging decisions during normal and turbulent times. Knowing the key elements influencing Indian corporate hedging practices can assist businesses in properly planning their risk management and day-to-day operations. Investors also can consider the findings of this study before making any investment decisions.

It would be interesting to do a post-COVID analysis for a longer window of time. One of the difficulties faced was the unavailability of annual reports for the financial year 2023-24, hence, the post-COVID period in the study was limited to one year only. A variable like the "extent of hedging", *i.e.,* the notional value of derivatives used in different periods would have been a better dependent variable to understand the impact of determinants on the extent of hedging activities.

6. References

Afza, T., & Alam, A. (2011). Determinants of corporate hedging policies: A case of foreign exchange and interest rate derivative usage. *African Journal of Business Management*, *5*(14), 5792.

Ahmed, H., Azevedo, A., & Guney, Y. (2014). The effect of hedging on firm value and performance: Evidence from the nonfinancial UK firms. *European Financial Management Association*, *44*, 1-5.

Alam, N., & Gupta, A. (2018). Does hedging enhance firm value in good and bad times? *International Journal of Accounting and Information Management*, *26*(1), 132-152. https://doi.org/10.1108/IJAIM-03-2017-0041

Allayannis, G., & Ofek, E. (2001). Exchange rate exposure, hedging, and the use of foreign currency derivatives. *Journal of international money and finance*, *20*(2), 273-296. https://doi.org/10.1016/S0261-5606(00)00050-4

Allayannis, G., Lel, U., & Miller, D. P. (2012). The use of foreign currency derivatives, corporate governance, and firm value around the world. *Journal of International Economics*, *87*(1), 65-79. https://doi.org/10.1016/j.jinteco.2011.12.003

Ameer, R. (2010). Determinants of corporate hedging practices in Malaysia. *International Business Research*, *3*(2), 120-130. https://doi.org/10.5539/ibr.v3n2p120

Barbi, M., & Morresi, O. (2023). Corporate hedging, family firms, and CEO identity. *The European Journal of Finance*, *29*(10), 1106-1143. https://doi.org/10.1080/1351847X.2022.2081090

Bartram, S. M. (2008). What lies beneath: Foreign exchange rate exposure, hedging and cash flows. *Journal of Banking and Finance*, *32(8)*, 1508-1521. https://doi.org/10.1016/j.jbankfin.2007.07.013

Bessembinder, H. (1991). Forward contracts and firm value: Investment incentive and contracting effects. *Journal of Financial and Quantitative Analysis*, *26*(4), 519-532. https://doi.org/10.2307/2331409

Bhagawan, M. P., & Lukose P. J. J. (2017). The determinants of currency derivatives usage among Indian non-financial firms: An empirical study. *Studies in Economics and Finance*, 34(3), 363-382. https://doi.org/10.1108/SEF-09-2014-0172

Bushee, B. J., & Goodman, T. H. (2007). Which institutional investors trade based on private information about earnings and returns? *Journal of Accounting and Research, 45(2),* 289-321. https://doi.org/10.1111/j.1475-679X.2007.00234.x

Clark, E., & Mefteh, S. (2010). Foreign currency derivatives use, firm value and the effect of the exposure profile: Evidence from France. *International Journal of Business*, *15*(2), 183-196.

Del Guercio, D. (1996). The distorting effect of the prudent-man laws on institutional equity investment. *Journal of Financial Economics, 40(1),* 31-62. https://doi.org/10.1016/0304-405X(95)00841-2

Dolde, W. (1995). Hedging, leverage, and primitive risk. *Journal of Financial Engineering*, *4*, 187-216.

Fok, R. C., Carroll, C., & Chiou, M. C. (1997). Determinants of corporate hedging and derivatives: A revisit. *Journal of Economics and Business*, *49*(6), 569-585. https://doi.org/10.1016/S0148-6195(97)00040-4

Froot, K., Scharfstein, D., & Stein, J. (1993). Risk management: Coordinating corporate investment and financing policies. *Journal of Finance, 48,* 1624-1658. https://doi.org/10.1111/j.1540-6261.1993.tb05123.x

Gay, G. D., Lin, C. M., & Smith, S. D. (2011). Corporate derivatives use and the cost of equity. *Journal of Banking and Finance*, *35*(6), 1491-1506. https://doi.org/10.1016/j.jbankfin.2010.10.033

Géczy, C., Minton, B. A., & Schrand, C. (1997). Why firms use currency derivatives. *the Journal of Finance*, *52*(4), 1323-1354. https://doi.org/10.1111/j.1540-6261.1997.tb01112.x

Gewar, M. M., & Suryantini, N. P. S. (2020). The effect of leverage, managerial ownership, and dividend policy on hedging decisions in manufacturing companies. *American Journal of Humanities and Social Sciences Research*, *4*(1), 382-389.

Gine, M., & Moussawi, R. (2006). *Governance mechanisms and effective activism: Evidence from shareholder proposals on poison pills*. Working paper. https://doi.org/10.2139/ssrn.968425

Goldberg, S. R., Godwin, J. H., Kim, M. S., & Tritschler, C. A. (1998). On the determinants of corporate usage of financial derivatives. *Journal of International Financial Management and Accounting*, *9*(2), 132-166. https://doi.org/10.1111/1467-646X.00034

Greene, W. H. (2003). Econometric analysis. Pretence Hall.

Gujarati, D. and Porter, D. (2009). Basic econometrics (5th ed.). McGraw Hill/Irwin.

Hagelin, N. (2003). Why firms hedge with currency derivatives: An examination of transaction and translation exposure. *Applied Financial Economics*, *13*(1), 55-69. https://doi.org/10.1080/09603100110094501

Haushalter, G. D. (2000). Financing policy, basis risk, and corporate hedging: Evidence from oil and gas producers'. *The Journal of Finance*, *55*(1), 107-152. https://doi.org/10.1111/0022-1082.00202

Hosama, E., & Setyawan, I. R. (2022). Determinants of hedging decisions in state-owned and private manufacturing firms on the IDX. *Journal of Economics, Finance and Management Studies*, *5*(11), 3157-3164. https://doi.org/10.47191/jefms/v5-i11-05

Hsin, C. W., Shiah-Hou, S. R., & Chang, F. Y. (2007). Stock return exposure to exchange rate risk: A perspective from delayed reactions and hedging effects. *Journal of Multinational Financial Management*, 17(5), 384-400. https://doi.org/10.1016/j.mulfin.2006.12.005

Jang, S. S., & Park, K. (2011). Inter-relationship between firm growth and profitability. *International Journal of Hospitality Management*, *30*(4), 1027-1035. https://doi.org/10.1016/j.ijhm.2011.03.009

Jutila, A. (2020). The determinants of currency hedging: Evidence from the finnish markets. [Master Degree, University of VAASA, School of Accounting And Finance].

Kim, W., & Sung, T. (2005). What makes firms manage FX risk? *Emerging Markets Review*, *6*(3), 263-288. https://doi.org/10.1016/j.ememar.2005.06.002

Lestari, W. R., & Pratiwi, B. N. (2023). Determinants of hedging decisions with derivative instruments in foreign exchange banks listed on the Indonesia Stock Exchange. *Jurnal Ekonomi*, *12*(01), 1113-1123.

Mahadevan, S. (2021). Predicting the likelihood of hedging by companies in India – A Logit model approach. *Journal of Commerce and Accounting Research*, *10*(3), 1-12.

Mahasari, A. A. K. R., & Rahyuda, H. (2020). The effect of firm size, leverage, and liquidity on hedging decisions of consumer goods industry on the Indonesia Stock Exchange. *American Journal of Humanities and Social Sciences Research*, *4*(10), 106-113.

Mian, S. L. (1996). Evidence on corporate hedging policy. *Journal of Financial and quantitative Analysis*, *31*(3), 419-439. https://doi.org/10.2307/2331399

Modigliani, F. and Miller, M. H. (1958), The cost of capital, corporation finance and the theory of investment, *The American Economic Review*, *48*(3), 261-297.

Monda, B., Giorgino, M., & Modolin, I. (2013). Rationales for corporate risk management - A critical literature review. *Munich Personal RePEc Archive* (*MPRA) Paper No. 45420*. https://doi.org/10.2139/ssrn.2203546

Myers, S. C. (1989). Signaling and accounting information. *National Bureau of Economic Research*. https://doi.org/10.3386/w3193

Nance, D. R., Smith, C. W., & Smithson, C.W. 1993. On the determinants of corporate hedging. *The Journal of Finance*, *48*, 267–284. https://doi.org/10.1111/j.1540-6261.1993.tb04709.x

Nguyen, H., & Faff, R. (2002). On the determinants of derivative usage by Australian companies. *Australian Journal of Management*, *27*(1), 1-24. https://doi.org/10.1177/031289620202700101

Nguyen, Q., Kim, T., & Papanastassiou, M. (2018). Policy uncertainty, derivatives use, and firm-level FDI. *Journal of International Business Studies*, *49*, 96-126. https://doi.org/10.1057/s41267-017-0090-z

Omar, A. B., Khurram, H., Parveen, M., Kashif, A. R., Shehzad, M. A., & Bukhari, N. (2022). Corporate risk management: An empirical evidence on foreign currency derivatives' use by Malaysian nonfinancial firms. *Journal of Public Value and Administrative Insight*, *5*(1), 24-36. https://doi.org/10.31580/jpvai.v5i1.2443

Pennings, J. M. (2002). Pulling the trigger or not: Factors affecting behavior of initiating a position in derivatives markets. *Journal of Economic Psychology*, *23*(2), 263-278. https://doi.org/10.1016/S0167-4870(02)00067-3

Raghu, R. R., & Shanmugam, V. P. (2014). The determinants of currency hedging in Indian IT firms. *Journal of Business and Financial Affairs (OMICS publication groups)*, *3*(3), 1-7.

RBI (2015) Guidelines on trading of Currency Futures and Exchange Traded Currency Options. RBI (2015) Guidelines on trading of Currency Futures and Exchange Traded Currency Options in Recognized Stock Exchanges – Introduction of Cross-Currency Futures and Exchange Traded Option Contracts. Available at:

htttps://www.rbi.org.in/scripts/BS_CircularIndexDisplay.aspx?Id=10172 (accessed April 17, 2023)

Reynolds, M., & Boyle, G. (2005). Derivative use and investment: An empirical analysis of New Zealand listed companies. *Unpublished working paper, University of Otago, Dunedin, NZ and Victoria University of Wellington, Kelburn, NZ*.

Seng, C. K., & Thaker, H. M. T. (2018). Determinants of corporate hedging practices: Malaysian evidence. *Report on Economics and Finance*, 4(4), 199-220. https://doi.org/10.12988/ref.2018.8418

Shu, P. G., & Chen, H. C. (2003). The determinants of derivatives use: Evidence from non-financial firms in Taiwan. *Review of Pacific Basin Financial Markets and Policies*, *6*(04), 473-500. https://doi.org/10.1142/S0219091503001171

Smith, C., & R. Stulz, (1985). The determinants of firms' hedging policies. *Journal of Financial and Quantitative Analysis, 20*, 391-405. https://doi.org/10.2307/2330757

Sudiarta, B. H., & Setyawan, I. R. (2022). Determining Factors Of Hedging Decisions In Indonesia Stock Exchange. *Jurnal Muara Ilmu Ekonomi dan Bisnis*, *6*(1), 95-103. https://doi.org/10.24912/jmieb.v6i1.11909

Tai, V. W., Lai, Y. H., & Lin, L. (2014). Local institutional shareholders and corporate hedging policies. *The North American Journal of Economics and Finance*, *28*, 287-312. https://doi.org/10.1016/j.najef.2014.03.009

Tufano, P. (1996). Who manages risk? An empirical examination of risk management practices in the gold mining industry. *Journal of Finance, 51*(4), 1097-1137. https://doi.org/10.1111/j.1540-6261.1996.tb04064.x

Ullrich, A. 2009. *Forecasting and hedging in the foreign exchange markets*. Berlin, Heidelberg: Springer-Verlag. https://doi.org/10.1007/978-3-642-00495-7

Vural-Yavas, C. (2016). Determinants of corporate hedging: evidence from emerging market. *International Journal of Economics and Finance*, *8*(12), 151-162. http://dx.doi.org/10.5539/ijef.v8n12p151

Wahyudi, S. (2019). The determinants of corporate hedging policy: A case study from Indonesia. *International Journal of Economics and Business Administration*, *7*(1). 113-129. https://doi.org/10.35808/ijeba/199

Whidbee, D. A., & Wohar, M. (1999). Derivative activities and managerial incentives in the banking industry. *Journal of Corporate Finance*, *5*(3), 251-276. https://doi.org/10.1016/S0929-1199(99)00005-X

Wright, P., Ferris, S. P., Sarin, A., & Awasthi, V. (1996). Impact of corporate insider, blockholder and institutional equity