FOREIGN CURRENCY DERIVATIVES FOR HEDGING: EFFECT ON FIRM VALUE, FIRM PERFORMANCE AND THE MODERATING ROLE OF CORPORATE GOVERNANCE

Thesis

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By

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DECLARATION

I, RASHAD. P. P do hereby declare that this thesis entitled "**Foreign currency derivatives for hedging: effect on firm value, firm performance and the moderating role of corporate governance"** is a bonafide record of research work done by me under the guidance of Prof. (Dr.) SATHEESH EK, Registrar, University of Calicut. I further declare that this thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship, or other similar title of recognition.

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This is to certify that the thesis entitled "**Foreign currency derivatives for hedging: effect on firm value, firm performance and the moderating role of corporate governance**" submitted to the University of Calicut in partial fulfillment of the requirements for the award of the Degree of Philosophy in Commerce, is a bonafide record of research work carried out by Mr. Rashad PP under my supervision and guidance and no part of this thesis has formed the basis for the award of any degree, diploma, associateship, fellowship or other similar title to any candidate in any university. He is permitted to submit the thesis to the University for Evaluation.

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LIST OF ABBREVIATIONS

FCD	–	Foreign Currency Derivatives
ROE	–	Return on Equity
ROA	–	Return on Assets
CG	–	Corporate governance
CGI	–	Corporate Governance Index
RMC	–	Risk Management Committee
CRO	–	Chief Risk Officer
NSE	–	National Stock Exchange
SEBI	–	Securities and Exchange Board of India
INR	–	Indian Rupee
USD	–	United States Dollar
IDV	–	Independent Variable
DV	–	Dependent Variable
CV	–	Control Variable
VIF	–	Variance Inflation Factor
EME	–	Emerging Market Economies
BOD	–	Board of Directors
WOS	–	Web of Science
FE	–	Foreign Exchange
OTC	–	Over the Counter

CHAPTER 1
INTRODUCTION

1.1 Introduction

Derivatives are financial weapons of mass destruction.

—Warren E. Buffett, 2003 Berkshire Hathaway Annual Report

A currency's exchange rate is its price relative to another currency. After the Bretton Woods system collapsed in 1970, countries were forced to adopt a flexible exchange rate regime (Garber, 1993), resulting in more exchange rate volatility. Since the 1990s, the acceleration of globalization has led many businesses to expand their operations into foreign markets in order to gain a competitive edge and economies of production (Afza & Alam, 2011). When the market expanded, it created an opportunity to improve profitability, but it also caused income variability due to volatility in foreign exchange (FX) rates. Different kinds of risks are affecting each firm. Exchange rate volatility created a new type of risk that is termed "foreign exchange risk." Internal hedging techniques and external hedging techniques are two broad methods adopted by firms to mitigate foreign exchange risk. Foreign currency derivatives are an important method adopted by firms, otherwise known as external hedging techniques (Luo & Wang, 2018) and use of such derivatives are increased at higher rate in last few decades (Campbell et al., 2019).

Prior studies have two opposing view on the effect of corporate hedging on firm value (Bachiller et al., 2021). Various studies supporting the concept that hedging increases firm value have discovered various reasons, for that relationship, such as: Hedging aids in the reduction of earnings volatility and tax burden (Smith & Stulz, 1985b),lower the consequences of financial distress cost (Leland, 1998; Stulz, 1996) and alleviate under investment problems (Bessembinder, 1991) etc. On the other hand,

there are also some studies arguing hedging does not bring firm value. Such studies found that, managers use the derivatives for speculation instead of hedging and that leads to increase in risk (Adam et al., 2017), managers give importance for self-interest(Knopf et al., 2002) and as a whole the derivatives are not effective in managing exposure(Copeland & Joshi, 1996; Hagelin & Pramborg, 2004). An essential question that arises is whether the use of FCDs has any effect on firm value and performance. The existing literature presents inconsistent results (Bachiller et al., 2020). Further review of literature shows the moderating role of corporate governance on the relation between derivatives and hedging premium. Highly governed firms are involved with more hedging activities and such firms are less likely to exposed to currency risk (Kim & Kim, 2015). In this background, the study initially attempted to find an answer to the question of whether foreign currency derivatives (FCD) usage has any effect on firm value and firm performance. Later in the study, we examine whether corporate governance practices influence FCD usage and whether governance plays a moderating role in the relationship between FCD usage and hedging premium.

1.2 Significance of the study

The volatility of a currency indicates how frequently and how much its value fluctuates in relation to another currency. Currency volatility are commonplace in a global economy where large transactions take place in currencies and whose exchange rates are controlled by the market. The volatility of currency pairs involving the US dollar, the euro, the pound, the yen, the Canadian dollar, the Australian dollar, and the Swiss franc is often low, while currency pairs involving emerging market economies (EME) are quite high(Nath et al., 2022).Decisions on international trade and investment are complicated by the high volatility of exchange rates, which raises the associated risk. The risk of incurring financial loss due to fluctuations in exchange rates is referred to as exchange rate risk. Obviously, companies that engage in export-import activities are vulnerable to the effects of fluctuations in the currency markets (Bae et al., 2018). Foreign currency derivatives (FCD) is a popular hedging strategy used by firms to reduce their exposure to currency rate fluctuations (Seok et al.,

2020).FCD's impact on a company's value is always a hotly contested topic, with research yielding conflicting findings (Bachiller et al., 2020).As a result, the study's original intent was to examine how FCD affects the firm value and firm performance.

The hedging choice of the company is influenced by a number of different factors, particularly the use of FCD (Lel, 2012). Derivatives usage is reported to be influenced by the board of directors and the risk management committee in several annual reports. Corporate governance (CG) includes elements such as the board composition and a risk management committee, and governance plays a moderating role in the connection between FCD and firm value (Allayannis et al., 2012). For this reason, the study also intends to investigate relation between corporate governance and FCD, and the moderating role of governance in the relation between FCD with firm value and firm performance.

1.3 Statement of the problem

Firms are susceptible to a variety of risks, with foreign currency risk being an important one, particularly significant for those involved in international trade. Therefore, Exchange rate fluctuations and the concerns they pose have emerged as a central topic in international finance (Muller & Verschoor, 2006). None, one, or both internal and external hedging measures are employed by firms to mitigate currency rate risk. FCD is an important method for hedging that falls under external techniques. An essential question that arises before companies is that whether the use of FCDs has any effect on firm value and performance. So that it’s adoption can be justified. However, the existing literature presents inconsistent results (Bachiller et al., 2020) with regard to the same.

Further reading in the derivatives or FCD literature shows some interesting findings. Highly governed firms are involved with more hedging activities and such firms are less likely to exposed to currency risk (Kim & Kim, 2015). Different studies analyzed the factors influencing the derivative usage while the FCD is a paucity, apart from this, the influence of CG on the FCD usage is also an import area that needs to be more investigated. Hedging enhances firm value if the motive is to increase

shareholder value; on the other hand, hedging diminishes firm value if the rationale is to speculate or satisfy managers' self-interest (Sikarwar & Gupta, 2019). Well governed firms are use derivatives for hedging not for speculation or satisfy managers self-interest (Allayannis et al., 2012). Few other studies also reported the same result (Hege et al., 2021; Huang et al., 2018; Lel, 2012). These researchers were highlighted the significance of corporate governance in relation between derivative usage and firm value and firm performance.

In this background, the study addresses the following research questions.

- Whether the foreign currency derivatives (FCD) usage has any effect on firm value and firm performance?
- Do the corporate governance practices have any influence on FCD usage?
- Does corporate governance moderate the relationship between FCD usage and firm value as well as firm performance

1.4 Scope of the study

The main purpose of the study is to identify the effect of FCD usage on firm value and firm performance. The study also focuses on the influence of corporate governance on FCD usage and finding out the moderating role of corporate governance in FCD and firm value and firm performance relationship. The sample firms are confined to large non-financial firms included in the NSE 100 list and period is limited to the financial year 2011-12 to 2020-21.

1.5 Variables list

Major objective of the study is to analyze the effect of FCD usage on firm value and performance. Firm value is measured using Tobin's Q and market capitalization whereas performance is measure using Return on Equity (ROE) and Return on Assets (ROA). The variables influencing the firm value and performance were included as control variables. The independent, dependent and control variables for first and second objective is given below.

Dependent variable:

Firm value

a. Tobin's Q = (Market Value of equity +Market Value of preference share + Book Value of debt) / Total assets

b. Market capitalization: Total value of all company's shares of stock

Firm Performance:

ROE = Net income / Total equity

ROA = Net income / Total assets

Independent variable:

FCD= Notional value of FCD

Control variables:

a. Firm size: log of total assets

b. Dividend yield = Dividend per share / Market Value of share

c. Leverage: Total debt ratio= Total debt / total assets

d. Liquidity: Quick ratio or acid-test ratio = (Cash + Marketable Securities+ Account receivables) / Current liabilities

e. Growth opportunities = Capital expenditure / Total sales

f. Geographical Diversification: foreign sales / the total sales

g. R & D ratio = R & D expenses / total assets

h. Year dummy: (based on yearly fluctuation of INR to USD)

i. Industry dummy

The third objective is to measure the influence of corporate governance practices on the FCD usage. Here the independent variable is CG and dependent variable is FCD. Initially the governance index is created using the following points.

1. At least six members on the board
2. At least 5 meetings in a year
3. Disclosure of expertise/skills of directors
4. Risk management committee (details about RMC is provided)
5. Exposure is quantified and hedging details are disclosed
6. Appointed Chief Risk Officer (CRO)
7. Independent director as Chairman of RMC
8. Non-executive director as Chairman of RMC

After developing the governance index, variables identified in the literature which has an impact on the FCD or derivative usage were incorporated into the econometric model as control variables. Then the influence of individual variables on FCD usage is identified by considering 16 variables, the list of such variables is given in the table 4.1 of chapter 4. The control variables include:

a. Export ratio: foreign sales / the total sales
b. Import ratio: foreign purchase / the total purchase
c. Firm size: log of total assets
d. Current ratio: Current assets / Current liabilities
e. Liquidity: (Cash + Marketable Securities+ Account receivables) / Current liabilities
f. Leverage: Total debt ratio= Total debt / total assets
g. Gearing ratio: Total debt / Shareholders equity.

h. Dividend rate: Dividend per share / Market Value of share

i. Growth opportunities: Capital expenditure / Total sales

j. R & D ratio: R & D expenses / total assets

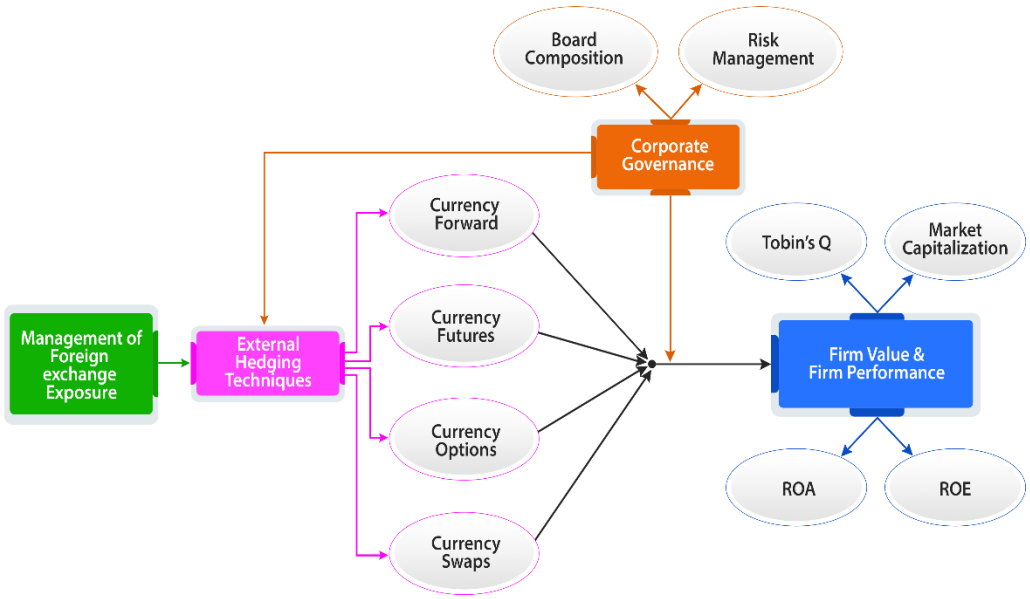
The fourth objective is to evaluate the moderating role of CG practices on the relationship between FCD usage and firm value and performance. This analysis considers the CG index to be the moderating variable. The independent variable is FCD, while the dependent variables are firm value and firm performance. The firm value and firm performance are measured by taking the variables used in the first and second objective. The control variables are also same.

1.6 Conceptual Model

The preceding section describes the variables of the study. The graphical representation of the theoretical relationships between these variables, known as the conceptual model or framework of the study, is depicted below.

Figure 1.1

Conceptual Model



1.7 Operational definition

The following are operational definitions of concepts relevant to the present study.

- Large firm:

Large firms refer to the firms listed in the NSE NIFTY100 list.

- Foreign currency derivatives:

Foreign currency derivatives are a form of financial derivative instruments that are usually utilized to hedge foreign exchange risk (Huang et al., 2019). Firms report the notional value of foreign currency derivatives in their annual reports at the end of the financial year.

- Corporate governance index.

An eight-point index created by considering variables related to board of directors (Chams & García-Blandón, 2019) and risk management of firms (Durst et al., 2019).

- Highly governed firms

If firms' corporate governance score is six or more out of eight is referred as highly governed firms.

- Moderately governed firms

If firms' corporate governance score is four or five out of eight, it is considered to be moderately governed.

- Low governed firms.

If firms' corporate governance score is three or less out of eight is termed as highly governed firms.

- Home currency

Home Currency here means the Indian rupee.

- Foreign currency

Foreign currency means the currency other than home currency (Bernoth & Herwartz, 2021). In the year dummy, foreign currency means the US dollar.

1.8 Chapter scheme

The thesis has been presented in eight chapters as follows.

Chapter 1: Introduction

The first chapter introduces the study. It includes significance of the study, problem statement, scope of the study, operational definition for various terms used in thesis, list of variables, and conceptual framework of showing the connection between variables.

Chapter 2: Review of literature

The review of available literature was presented in the second chapter. The chapter is divided into two sections. The first section discusses the literature related to Currency derivatives on Firm value and Firm performance, it also includes the bibliometric information, and the second section includes the literature on corporate governance on currency derivatives and moderating role on Firm value & performance. Finally, the research gap identified is given.

Chapter 3: Theoretical framework of the study

Theoretical framework of the topic is explained in the third chapter. The chapter starts with discussion on foreign exchange and types of exchange rates. In the later sections, theories of exchange rate determination, foreign exchange exposure, management of foreign exchange exposure and corporate governance, derivative usage, and value creation. The chapter ends with conceptual framework of the study, which shows the theoretical relationship between variables.

Chapter 4: Research Methodology

This chapter provides information on the methodology employed for this study. It includes, method of research, research questions, objectives of the study, description about data, and description of the variables, hypotheses developed for testing, econometric methodology, moderation analysis and limitation of the study.

Chapter 5: Foreign currency derivative usage on firm value and firm performance**.**

Analysis results of first and second objective of the study is given in chapter five. The chapter initially shows the analysis result of the effect of foreign currency derivatives usage on firm value and then the analysis result of the effect of foreign currency derivatives usage on firm performance. Chapter summary and conclusion is also provided.

Chapter 6: Corporate governance on foreign currency derivative usage and moderating role in firm value and firm performance.

Chapter six includes the analysis result of third and fourth objectives of the study. Influence of corporate governance practices on FCD usage is discussed initially later the analysis result of moderating role of CG on the relation with FCD on firm value and firm performance is provided. The chapter concluded with summary and conclusion of third and fourth objectives.

Chapter 7: Findings, suggestions, and conclusions

The summary, findings of the study, as well as suggestion and conclusions derived from those findings, are outlined in the seventh chapter.

Chapter 8: Implications and Direction for future research

The eighth chapter discusses practical implications of the study. In addition to that, the final chapter also gave a roadmap for future research.

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CHAPTER 2
REVIEW OF LITERATURE

2.1 Introduction

Reviews attempt to gather voluminous information in an understandable and concise format (Rozas & Klein, 2010). The following are some of the goals of the literature review: to summarize and consolidate the previous research done on the subject; determine where study is lacking and supply framework as well as background for a research study. This study's review of the relevant literature covers the following fields:

1. Currency hedging on Firm value and Firm performance.
2. Corporate governance on currency derivatives and moderating role on Firm value & performance.

After the collection of publications from the Web of Science and Scopus databases using customized search strings, a narrative review and bibliometric analysis were undertaken, and research gaps were identified.

2.2 Effect of Currency hedging on firm value and Firm performance

One of the most highly contested topic in risk management is ‘corporate hedging and its effects on firm value’ (Bachiller et al., 2020). Empirical studies have reported controversial results. Some studies have reported positive effect of hedging on firm value (Ahmed et al., 2020; Allayannis et al., 2012; Allayannis & Weston, 2001a; Bartram et al., 2011; Boubaker et al., 2020; Campbell et al., 2019; Clark & Judge, 2009; Clark & Mefteh, 2010a; Fisch & Puhr, 2021; Giraldo-Prieto et al., 2017; Gómez-González et al., 2012; J. Graham & Rogers, 2000; Hadian & Adaoglu, 2020; Laing et al., 2020; H. (Robin) Luo & Wang, 2018; Magee, 2013b; Nova et al., 2015;

Panaretou, 2014; Paulo, n.d.; Pramborg, 2004a; Pyeman et al., 2019; Vivel Búa et al., 2015; Wang & Makar, 2019) on the other hand some studies are reported or found a negative or negligible influence of hedging on firm value (Ayturk et al., 2016; Belghitar et al., 2013; Buyukkara et al., 2019; Danisman & Demirel, 2019; dos Santos et al., 2017; Khediri & Folus, 2010; Li et al., 2014; Seok et al., 2020; Walker et al., 2014). The researcher was driven to investigate the actual influence of hedging, specifically currency derivatives on firm value, because of the contradictory results published by different studies from the same nation or during the same era.

The researcher used the Web of science data base to extract existing literature (Meho & Kiduk, 2013; Vieira & Gomes, 2009). Initially, the researcher found some of the major studies in 'Currency derivatives and firm value' from google scholar and collected important keywords. For collecting maximum literature in a single search, the following combination of keywords were developed and applied in web of science database.

ALL= (((“currency derivatives” or “foreign currency derivatives” or “currency hedging”) and (“firm value” or “value-enhancing” or “firm performance”)))

The search result includes 46 documents. The documents comprise of45 articles and one conference paper. In order to identify the research gap through a systematic review, only articles were included and all other documents were excluded(Fahimnia et al., 2015; Kaur et al., 2021; Sigala et al., 2021; Singh & Walia, 2022). In the preliminary screening of title and abstract, 2 articles were excluded which are not directly linked to the concerned theme. After exclusion of unrelated documents, 31 articles were remaining for literature review. In addition to the article directly collected from Web of Science, the researcher used a forward and backward search method to collect additional literature, which resulted in the inclusion of an additional 16 articles. A total of 47 articles were considered for the literature review, including 31 articles from the Web of Science list and an additional 16 articles.

In a perfect market condition, hedging activities are undertaken by a firm is irrelevant to its value (Modigliani, Franco & Miller, 1965) but the real market conditions are away from perfect market condition and many reasons are proposed by

different authors to support the statement that 'hedging helps to improve firm value'. Hedging helps to reduce earnings volatility and tax burdens (Smith & Stulz, 1985b), as well as the costs of financial distress and underinvestment issues(Leland, 1998; Stulz, 1996)(Bessembinder, 1991). Some research, on the other hand, claim that hedging does not provide reliable value. Managers utilize derivatives for speculation rather than hedging (Adam et al., 2017), they prioritize self-interest (Knopf et al., 2002)and derivatives as a whole are ineffective in managing exposure (Copeland & Joshi, 1996; Hagelin & Pramborg, 2004).

The empirical studies provided different results on hedging and firm value. (Allayannis & Weston, 2001b)the effect of foreign currency derivatives (FCD) on firm value was investigated using 720 large non-financial firms from the United States, and it was discovered that firms with exchange rate exposure gain from this hedging approach, their firm value increasing by 4.87 percent. Several research, such as (Campbell et al., 2019; Fisch & Puhr, 2021; Gómez-González et al., 2012; Laing et al., 2020; H. (Robin) Luo & Wang, 2018; Wang & Makar, 2019), backed up this idea of derivatives having a favorable impact on firm value.(Clark & Mefteh, 2010a)investigated the efficiency of hedging by taking exposure into account, and find that firms with significant exposure had a 5.5 times higher firm value. It suggests that firms that are more exposed to risk will gain greatly from the adoption of hedging products. Apart from the aforementioned theme, another study from Malaysia (Zamzamir@Zamzamin et al., 2021) examined the impact of managerial ownership on hedging and discovered a positive relationship between hedging and firm value, however managers hedge less when they own more shares.(Giraldo-Prieto et al., 2017) reported 6.3% hedging premium for firms exposed to exchange rate exposure and taken the hedging instruments as weapon against the exposure, the study used Tobin's Q as a means for measuring firm value as done by majority of existing studies. Using 81 private non-financial enterprises registered on the Colombian stock exchange between March 1995 and December 2008, (Gómez-González et al., 2012)examined the effect of hedging on company value and discovered that hedgers had a positive firm value of nearly 2% on average. In line with prior research from the United States, foreign exchange hedging is related with a 6.33 percent rise in firm

value. The study used Tobin's Q as a proxy for firm value and a sample of 408 big US non-financial enterprises from 1996 to 2000 (Magee, 2013a). Three studies that used data from 2004 onwards reported premiums on firm value (Afza & Alam, 2016; Personal & Archive, 2008; Vivel Búa et al., 2015). The Greek study revealed a 9.6 percent foreign exchange hedging premium, whereas the Spanish study reported a 1.53 percent premium and Pakistani enterprises earned a 6.5 percent premium. In align with the above researches, two research (R. H. Luo, 2016) from China and (Ayturk et al., 2016) from Turkey found a positive association between foreign currency derivative usage and firm value, but neither found a significant hedging premium. For these two studies, the data collection period is bound to 2007-2013. The majority of data collected during and after the recession reveal negative firm value employing foreign currency hedging, while some studies suggest positive connections but no value is considerable. By countering this view, study from Colombia reported 6.3 percentage premium for currency hedgers by collecting data during the period of 2008 to 2014 (Giraldo-Prieto et al., 2017). The major limitation for the study is the sample size, it consists only 39 non-financial firms.

Some studies showed opposing views on currency hedging or hedging in general and firm value, with studies demonstrating a negative impact of hedging on firm value. In a study of Korean firms' effects of hedging,(Seok et al., 2020)find that low hedgers employ derivatives ineffectively, but comprehensive hedgers use hedgers effectively. Effect of FCD is negatively affect for exporters but a positive influence is find for non-exporters(Choi et al., 2020). When the research paper consider the use of cash flows and market value sensitives as proxy for derivative use instead of notional value of derivatives and surprisingly found a negative influence of derivatives on firm value from US market and they suggest to rethink the existing empirical studies reported the positive result of hedging on firm value (Guay & Kothari, 2003b). By applying mixed research methodology, (Danisman & Demirel, 2019) identified a negative influence of hedging on firm value. The study used secondary data analysis along with qualitative research methodology, where the researchers conducted in-depth interview, both the methods revealed a negative effect of hedging on firm value Some researchers have had a negative impact on other studies since their data is out

of date and the derivative market has changed significantly. Studies such as(Guay & Kothari, 2003b)conducted research utilizing data from 1997, arguing that non-financial enterprises use derivatives at a low level (Campbell et al., 2019). However, the market environment has completely transformed, and derivative contracts have surged by approximately 700% since 1998.

When analyzing the meta-analysis studies, (Geyer-Klingeberg et al., 2021) conducted a meta-regression analysis of 1016 estimates from 71 studies reported a hedging premium of 1.8% for foreign currency hedgers while negative firm value were identified for interest rate and commodity price hedgers at -0.8% and -0.6% respectively. An another meta-analysis study conducted by (Bachiller et al., 2021)by reviewing 51 studies, it was discovered that the use of foreign currency derivatives, alone or in combination with other derivatives, increases firm value positively. In addition, the study revealed another finding that hedging increases firm value for all firms in developed countries that follow common law. Both the meta-analysis studies were reported hedging premium for currency derivative hedgers by analyzing 71 and 51 earlier studies, so it is an indication of positive influence of currency derivatives on firm value. Following a thorough review of financial derivatives research, (Campbell et al., 2019)determined that more studies are needed to address more complex questions about the true implications of financial derivatives, as well as industry-specific research addressing the impact of derivatives on firm exposure and firm value. Many of the older researchers concentrated their efforts on industries such as oil and gas.

The latest researchers have identified some interesting results on derivatives and firm value. (Dai et al., 2020) shown that lower duration gap derivatives perform better and associated with profitability and higher firm value when compared to longer duration derivatives. An another study from Bangladesh by(Choi et al., 2020)by taking data from 2010 to 2018, the effect of FCD usage on firm value was significant in non-financial enterprises. Specifically, the FCD effect on firm value is negative for exporters and positive for non-exporters; although, when exchange rate volatility is high, the FCD effect on firm value is consistently positive for non-exporters. Latest

study from banking industry found that derivative usage reduces value of banking firms and it is not beneficial for reducing risk, however bank can reduce instability by using derivatives (Bazih & Vanwalleghem, 2021). Is the hedging being really effective? (Qiao et al., 2020) has made a different approach to answer the question. The study checked the effect of hedging in firms IPO market and found that hedged firm faces low price revision and underwriting fees and also it reduces the under-pricing issues. Which firms are more likely to hedge with derivatives? The study from Korea, an emerging market was found that large firms with more leverage, high growth opportunity and geographically diversification are positively correlated while profitability and less industrial diversification are negatively correlated with derivative usage(Bernal-Ponce et al., 2020).

From the above discussion, the researcher could not find a unanimous answer for the question on whether the hedging especially currency hedging really leads to firm value? The controversial results open for the researcher to study more on currency derivatives and firm value. Some of the above-mentioned studies are made conclusion based on a single year data on hedging, while most of the studies used only a single measure for seeking the value of firm. The present study tries to overcome these limitations.

Most research employed Tobin's Q to determine the firm value, which was the dependent variable. Different methods are available for measuring the firm value. However, most of the studies checked the influence of hedging on firm value solemnly depends on Tobin’s Q or different versions of Tobin’s Q and the researcher couldn’t find any article which used different methods to evaluate firm value and made a comparison of these methods. The following table shows some of the studies which are used only Tobin’s Q to measure firm value.

Table 2.1

Studies used Tobin's Q for measuring 'Firm value'.

Study	Title
Belghitar et al., (2013)	Foreign currency derivative use and shareholder value
Khediri & Folus, (2010)	Does hedging increase firm value? Evidence from French firms
Li et al., (2014)	Foreign Currency Derivatives and Firm Value: Evidence from New Zealand
Vivel Búa et al., (2015)	Is value creation consistent with currency hedging?
Allayannis & Weston, (2001)	The use of foreign currency derivatives and firm market value
Allayannis et al., (2012)	The use of foreign currency derivatives, corporate governance, and firm value around the world
Zamzamir et al., (2021)	Hedging, managerial ownership and firm value
Pramborg, (2004)	Derivatives hedging, geographical diversification, and firm market value
H.RobinLuo & Wang, (2018)	Foreign currency risk hedging and firm value in China
Clark& Mefteh, (2010)	Foreign Currency Derivatives Use, Firm Value and the Effect of the Exposure Profile: Evidence from France

Source: Author Compilation

While reviewing the existing literature, the researcher discovered another limitation: when analyzing the effect of currency derivatives on firm value or performance, most studies use independent variable represented by the currency derivative as a categorical non-metric variable rather than the taking notional value of currency derivatives. This is a significant limitation identified in the existing literature. Here presenting some of the major studies used the currency derivatives as non-metric variable that takes the value of 1 if firms hedged using currency derivatives 0 otherwise.

Table 2.2

Research papers used Currency derivatives as binary or non-metric variable.

Title	Journal Name	Study (Ref)
Exchange rate exposure, hedging, and the use of foreign currency derivatives	Journal of International Money and Finance	(Allayannis & Ofek, 2001a)
The Real and Financial Implications of Corporate Hedging	The Journal of Finance	(Campello et al., 2011)
The use of foreign currency derivatives, corporate governance, and firm value around the world	Journal of International Economics	(Allayannis et al., 2012)
The determinants of foreign exchange hedging in Alternative Investment Market firms	European Journal of Finance	(Marshall et al., 2013)
Exchange Rate Risk and Corporate Hedging: Evidence from Turkey	Emerging Markets Finance and Trade	(Buyukkara et al., 2019)
Is corporate hedging always beneficial? A theoretical and empirical analysis	European Journal of Finance	(Ahmed et al., 2020)
Does corporate hedging affect firm valuation? Evidence from the IPO market	Journal of Futures Markets	(Qiao et al., 2020)
Foreign currency derivative usage and firm value in Bangladesh: comparative analysis between exporters and non-exporters under exchange rate movements	International Journal of Emerging Markets	(Choi et al., 2020)

Source: Author Compilation

The researcher compiled a country-by-country list of all studies related to hedging and discovered that most of the studies were contributed by developed countries, particularly the United Kingdom and United States, with only a small number of studies from developing countries, and this proportion will repeat when looking at studies specifically in the 'Currency derivatives' theme. As a result, more

research is needed in developing countries, particularly in India, as the country grows and more enterprises extend their markets in foreign countries, leading more firms exposed to currency risk. The following table depicts the name of country and number of studies in each country.

Table 2.3

Number of studies contributed by different countries.

Rank	Country	Articles
1	United Kingdom	13
2	USA	10
3	France	07
4	China	05
5	Germany	04
6	Korea	04
7	Ireland	03
8	Australia	02
9	Spain	02
10	Turkey	02

Source: Web of science database.

2.3 Bibliometric Information

In addition to the systematic literature review, the researcher presents certain bibliometric data for a better understanding of the research theme. The researcher used the Scopus data base for the bibliometric analysis. The researcher's keyword combination was run through the Scopus database and retrieved 573 documents. There are 499 articles, 17 books, 25 book chapters, 12 conference papers, and 20 reviews among the documents.

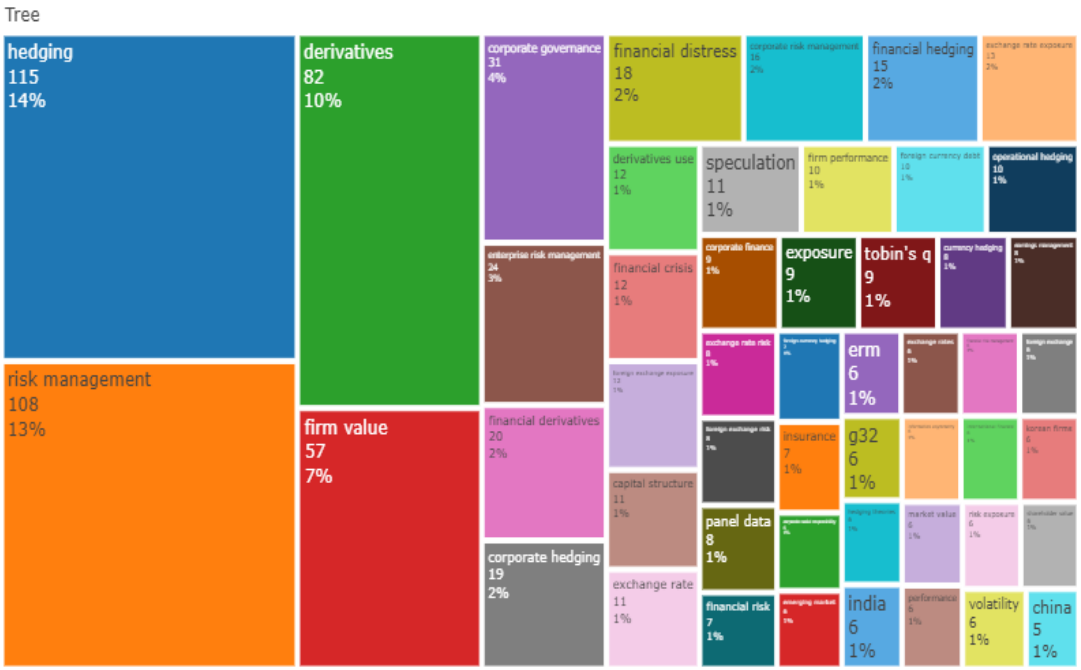
2.3.1 Most occurred keywords:

Initially, the researcher looked for the most often occurring keywords in this field of study. The results suggest that 'hedging' is the most often used keyword, with 115 occurrences, followed by risk management (108 occurrences). Derivatives, firm

value, corporate governance, enterprise risk management, financial derivatives, and other terms are frequently used. The tree map of author keywords is depicted in the figure below.

Figure 2.1

Tree map of author keywords



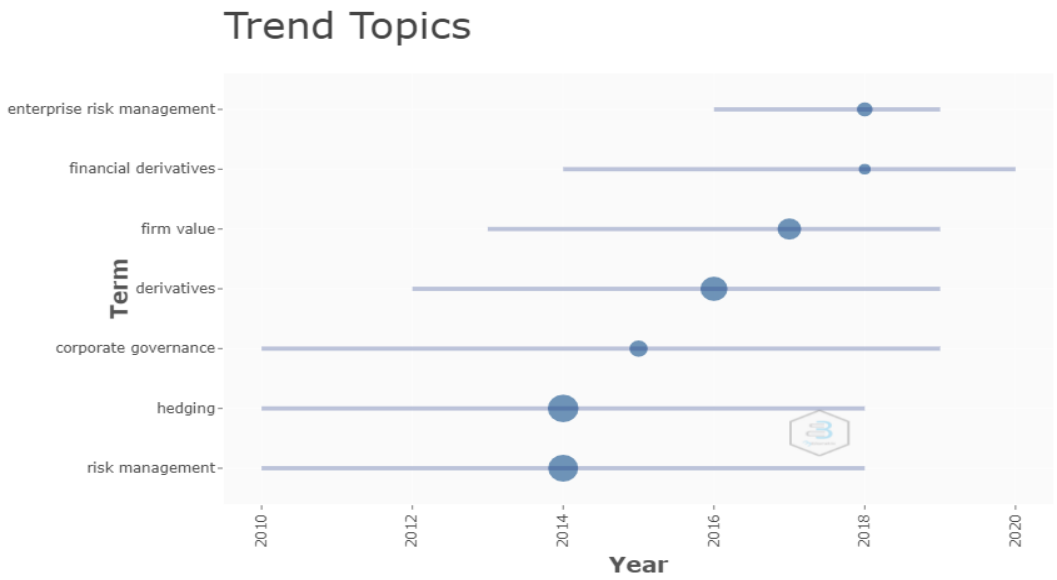
Source: Retrieved from Biblioshiny

2.3.2 Trend topics in different time periods:

Trending subjects can also be discovered using the author's keywords. 'Biblioshiny,' an extension of the bibliomerix R package, was used to discover trending topics over time by using author keyword as a base for analysis. The graph below demonstrates the trending themes in currency derivative research.

Figure 2.2

Trend topics in 'Currency derivative' research domain.



Source: Retrieved from Biblioshiny

The figure illustrates that risk management and hedging were key study themes in 2014, but their prominence has been prolonged through 2018. 'Corporate governance' was another prominent subject in the 2015s, and it is expected to continue into the 2020s. Derivatives and firm value received increased attention later in the period, and their significance remains. Recently, the majority of research have concentrated on financial derivatives and enterprise risk management.

2.3.3 Co-citation analysis:

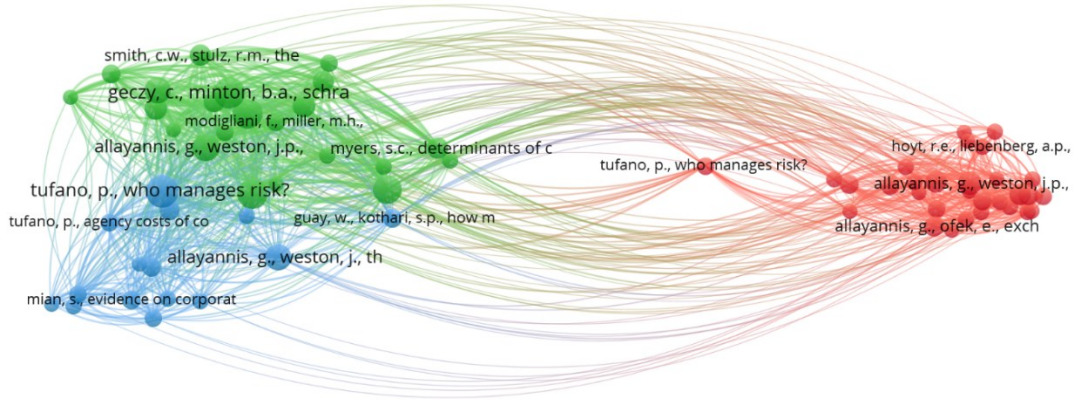
Co-citation is a data clustering technique suggested by (Measure, 1973), articles are co-cited if they appear in the same reference list of another article. Articles A and B, for example, are said to be co-cited, if article C is referenced both of those articles (Surwase et al., 2011). If two or more articles are referenced together by other articles, it is probable that all of these articles are linked and fall under the same subject area (Hjørland, 2013) and co-citation is very popular among academicians for clustering articles (Fahimnia et al., 2015; Xu et al., 2018) .

Researcher used VOSviewer to do co-citation mapping on cited references. The minimum number of cited references is set at 15, and 68 of the 32856 mentioned

references match this requirement. One the 68 nodes is not related to the others, after excluding the not connected node, the co-citation map of 67 nodes is shown in the following Figure.

Figure 2.3

Co-citation map of cited references.



Source: Retrieved from VOSviewer

The co-citation map distributes the total articles into three clusters: cluster 1 (shown in red) has 30 articles, cluster 2 (green colour) has 22 articles, and cluster 3 (shown in blue) has 15 articles. The top ten articles in each cluster are chosen from this list based on citation score, as indicated in the table below.

Table 2.4

Most cited articles in three clusters

Cluster 1	Cluster 2	Cluster 3
(Allayannis & Weston, 2001a)	(Schrand, 1997)	(Tufano, 1996)
(Froot & Scharfstein, 1993)	(Hendrik, 2014)	(Allayannis & Weston, 2001a)
(Allayannis & Ofek, 2001c)	(FROOT et al., 1993)	(Jin & Jorion, 2006)
(Mian, 1996)	(Allayannis & Ofek, 2001b)	(Guay & Kothari, 2003a)

Cluster 1	Cluster 2	Cluster 3
(Smith & Stulz, 1985a)	(Allayannis & Weston, 2001a)	(Demarzo, 1995)
(Schrand, 1997)	(Mian, 1996)	(Mian, 1996)
(Tufano, 1996)	(Policy et al., 2012)	(FROOT et al., 1993)
(Hendrik, 2014)	(J. R. Graham & Rogers, 2002a)	(Nance et al., 2015)
(Hoyt & Liebenberg, 2011)	(Myers, 1976)	(Tufano, 1998)
(Nance et al., 2015)	(Nance et al., 2015)	(J. R. Graham & Rogers, 2002b)

Source: Author Compilation

While conducting a detailed study on three clusters, it was discovered that each cluster shares some characteristics, as the three clusters include articles about the use of foreign currency derivatives and their impact on firm value. When we look more closely at the research publications in these clusters, we can see some distinctions in their research emphasis. The following sections address research areas in these three clusters.

Cluster 1 deals with the areas of Enterprise Risk Management (ERM), derivative hedging, the use of Foreign Currency Derivatives (FCDs) and value creation, and Exchange rate risk. Cluster 2 includes articles from topics related to risk mitigation, hedging policies, and derivatives risk. Cluster 3 includes the articles deal with how much hedge, who manages risk and hedging, and who has access to sensitive information.

2.3.4 Bibliographical coupling.

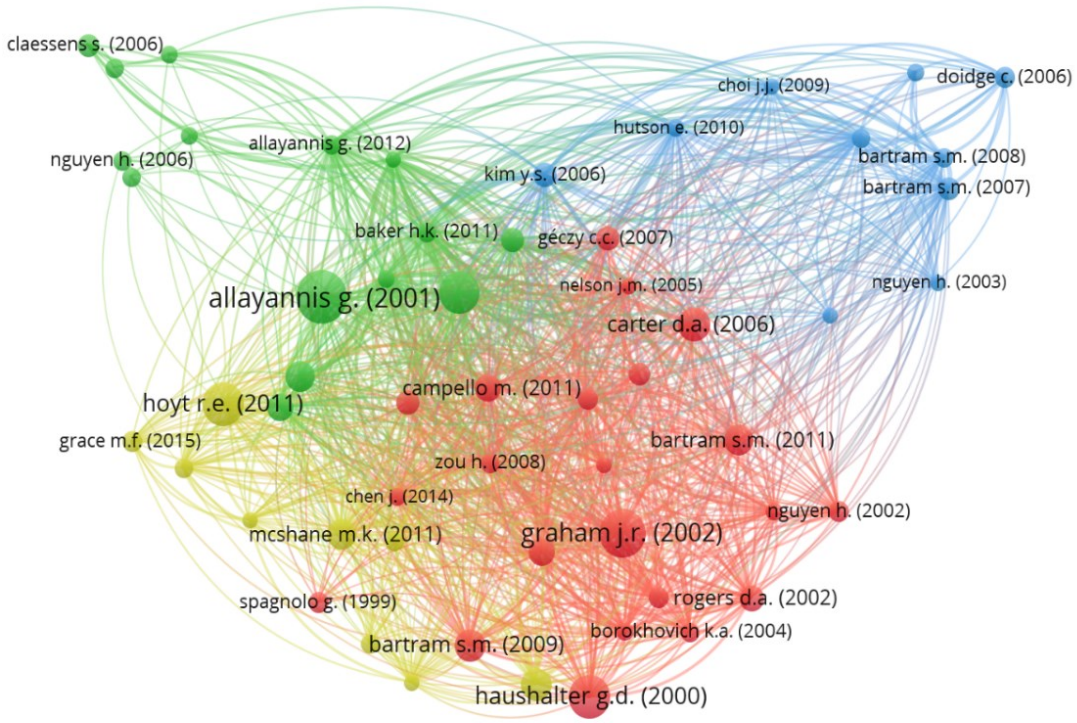
Whenever two works in their lists of sources allude to a similar third work, this is alluded to as bibliographical coupling. Bibliographical coupling, similar to co-citation, is a likeness metric that utilizes reference examination to lay out a connection between records. The coupling strength of two given records fills with respect to the quantity of normal references to different papers they share. Co-reference and reference investigation are utilized to plan the scholarly construction of a theme, but

because of systemic constraints, they neglect to integrate latest patterns (Boyack & Klavans, 2010; van Oorschot et al., 2018)Bibliographic coupling, on the other hand, overcomes this problem by incorporating the latest publications in the list, that facilitates in recognizing its most contemporary developments in a domain. (Chang et al., 2015). Researcher used VOSviewer to perform bibliographic coupling We found 74 top articles from four bunches that met the standard of having no less than 40 references. In the wake of eliminating 18 papers that were not straightforwardly connected with the subject, 56 papers were found and gathered into four clusters.

The figure below depicts the bibliographic coupling of 56 publications, which are divided into four clusters. Cluster 1 is represented by 22 red documents, Cluster 2 by 15 green documents, Cluster 3 by 10 blue documents, and Cluster 4 by 9 yellow documents.

Figure 2.4

Bibliographic coupling of documents.



Source: Retrieved from VOSviewer

Articles about hedging can be found in Cluster 1. The majority of the literature discuss the effects of hedging on firm value as well as other aspects of hedging. The following are the key papers in this cluster:

- 'Financing policy, basis risk, and corporate hedging: Evidence from oil and gas producers' by (Haushalter, 2000),
- 'Do firms hedge in response to tax incentives?' by (J. R. Graham & Rogers, 2002b),
- 'Does hedging affect firm value? Evidence from the US airline industry' by (Carter et al., 2006) and others.

Cluster 2 articles address corporate governance and its influence on assets. The large percentage of the papers in this group look at different aspects of corporate governance, such as board composition, board independence, agency cost, and whether these factors affect derivative usage and firm value. Some of the most popular articles in Cluster 2 are:

- 'The use of foreign currency derivatives, corporate governance, and firm value around the world' by (Allayannis et al., 2012),
- 'Corporate governance and development' of (Claessens, 2006),
- 'The impact of governance reform on performance and transparency' by (Price et al., 2011) and so on.

The focus of Cluster 3 is currency rate exposure. Every article in Cluster 3 is in some way related to exchange rate vulnerability. A few of the publications in Cluster 3 are as follows:

- 'What lies beneath: Foreign exchange rate exposure, hedging and cash flows' by (Bartram, 2008),
- 'Openness , hedging incentives and foreign exchange exposure : A firm-level multi-country study' by (Hutson & Stevenson, 2009),

- ‘Does multi nationality matter? Implications of operational hedging for the exchange risk exposure’ by (Jay Choi & Jiang, 2009) and others.

Enterprise Risk Management is the focus of the fourth cluster (ERM). This cluster focuses on the relationship between ERM and effectiveness, whether ERM did lead to firm performance, and the transition from traditional risk management to ERM. As some of the most popular articles in Cluster 4 are:

- ‘The valuation implications of enterprise risk management maturity’ by (Farrell & Gallagher, 2015),
- ‘Does Enterprise Risk Management Increase Firm Value?’ by (Enterprise et al., 2011),
- ‘The value of investing in enterprise risk management’ by (Grace et al., 2014) and other articles.

Research on the use of foreign currency derivatives always yields a contentious result. Some studies found that FCD had a positive effect, while others found that it had a negative effect. This leaves room for additional research on the subject, and studies in emerging markets are also limited. The existing literature has two major limitations: almost all studies used Tobin's Q to measure firm value and does not consider accounting means to measure firm value. The second issue with the independent variable, i.e., FCD, is that most studies only used the non-metric variable, with only a few studies using the true value of FCD. In this study, the researcher attempted to overcome these limitations.

2.4 Moderating role of corporate governance on currency derivatives and Firm value.

The findings of studies that examined the relationship between currency derivatives usage and firm value produced a mixed result, urging researchers to conduct additional research on which conditions FCD usage creates firm value and vice versa. In order to gain more insight on this topic, the researcher initially conducted some review of literature available in google scholar. Based on the review

it is identified that corporate governance is acting as a moderating variable between currency derivative usage and value creation. With this information, researcher created a search string or combination of keywords to collect maximum literature in concerned field from reputed data base like web of science. The combination of keywords used is as follows.

((“currency derivatives” or “foreign currency derivatives” or “currency hedging”) and (“corporate governance” or “financial regulations” or “internal corporate governance”))

Web of Science returned 17 documents when the above combination of keywords was used, one of which was in Spanish, so it was excluded. Following an examination of the title and abstract, seven articles are found to be unrelated to the topic and are removed from the list. With the available articles, the researcher conducted a forward and backward search of documents, resulting in the extraction of sixteen additional articles. Finally, nine articles from Web of Science and sixteen articles not on the list, for a total of 26 articles, were considered for the review of literature.

The researchers are also curious about the state of governance when it comes to derivatives. Many studies have integrated the two questions: first, does corporate governance enhance the use of derivatives, particularly currency derivatives? The second question is it leads to the creation of firm value.

A study on Korean firms was conducted by (Kim & Kim, 2015) identified that firms are encaged with more hedging activities as firms are less likely to exposed to currency risk and highly governed firms are involved with more hedging activities. Better monitoring system and clear outside ownership caused for this situation but such relationships are weaker during the crisis period. (Grima et al., 2016) conducted interviews with experts in derivative activities with the goal of identifying the sources of derivative misuse. According to the study, the sources of derivative misuse include an inadequate regulatory system, poor instrument design, badly designed internal controls, ineffective communication, and a poor firm culture. From the findings, the study recommended to have internal governance for reducing or to eliminate the

misuse of derivatives. Another cause for the difference in derivative product adoption by enterprises was revealed by(Beber & Fabbri, 2012). According to the study, CEO characteristics are a major determinant of derivative usage, with young CEOs with less experience and an MBA degree being more likely to use derivatives for speculation rather than hedging. This research pointed another explanation for differences in derivative usage. A more detailed and precise study conducted by (Adam et al., 2015) found that managers continue their speculative activities using derivatives when they gain but doesn't come to an end when appearing losses. The managers overconfidence influences different corporate decision as well as risk management decisions. (Tai et al., 2020) analyzed the role of board and audit committee in risk management and found a positive relation. The audit committee has a significant influence in hedging decisions; whether to hedge or how much to hedge is primarily determined by the audit committee. Supporting the earlier findings, a study from Taiwan conducted by (Chen et al., 2014) also proved that highly governed firms are largely using derivatives for hedging purpose. Firms with better internal governance are more focused on using the derivatives specifically for hedging and such firms are not utilize the derivatives for speculation. The result is a hope for investors to consider such highly governed firms for their investment.

The preceding discussion provided a picture of the relationship between corporate governance standards followed by corporations and their impact on derivative usage, particularly currency derivative usage. All the research mentioned above come to the same conclusion: highly governed enterprises are more conscious about derivative usage, and such firms lower their exposure through the right use of derivatives. The attitude of managers also has an impact on derivative usage. Most of the research described above are done in developed countries, which are well established in external corporate governance and corporations in such countries are significantly better at adhering to internal governance principles. There is a need to evaluate firms' governance practices and their relationship with derivative usage in emerging markets such as India.

The second question to be answered is whether corporate governance has any moderating effect on the use of currency derivatives and firm value. Many researchers were attempted to tackle this issue. (Fauver & Naranjo, 2010) identified that firms with less transparency and have week corporate governance is negatively related with derivative usage and firm value identified with Tobin's Q. Some other researchers also try to find answer for this issue. Another study, by considering broad sample of 39 countries having significant currency exposure. The study found that internal corporate governance and external corporate governance are positively correlated with value premium. The study also added that well corporate governed firms are use derivatives for hedging not for speculation or satisfy managers self-interest (Allayannis et al., 2012). In align with this finding, few other studies also reported the same result (Hege et al., 2021; Huang et al., 2018; Lel, 2012).Hedging enhances firm value if the motive is to increase shareholder value; on the other hand, hedging diminishes firm value if the rationale is to speculate or satisfy managers' self-interest (Sikarwar & Gupta, 2019).

According to (Lel, 2012), highly governed firms are using the currency derivatives for hedging not for speculation and such firms are benefited by overcome the costly external financing.(Bartram, 2017) also investigated the effect of derivatives on risk and exposure and the study also shown that derivatives helped to reduce risk and firms are used the derivatives for hedging purpose not for speculation and this usage is independent of country level corporate governance. The study also added that the risk reduction through derivatives is highly dependent on availability of derivatives, which gives a direction for policy makers to create an environment of readily available derivatives. (Huang et al., 2018) also found evidence that monitoring environment influences the usage of currency and interest rate derivatives, but the study revealed a shocking result that UK firms are reducing the derivative usage in the situations where derivative usage needs to be improved.

While analyzing the latest studies in the concerned theme, (Busru et al., 2019) identified a negative relation between good governance and risk taking except in case of compensation committee and risk management committee effectiveness. The study

collected data from annual reports of NSE listed Indian firms. The study is only focused on the relation between governance practices and risk taking, the firm performance or exposure level is it's out of scope. Another study in Indian context analyzed the relationship of governance mechanism (family ownership) and exchange rate exposure of firms. The study found a non-linear relationship between governance and exchange rate exposure. The exchange rate exposure is increasing at low and high level as a result of improper hedging when checking the relation with family ownership as means for representing corporate governance (Sikarwar & Gupta, 2019). The study checked the influence of changes in governance reforms on corporate risk management (Hege et al., 2021) identified that large changes in governance standards leads to increased usage of derivatives and which helped firms to reduce the foreign currency exposure. By supporting the earlier findings (Cheng & Waikong, 2021) also find a negative relationship between derivative usage and firm risk and managers ability has a positive moderating effect on this negative relationship but the positive moderating effect is more with less governed and low monitoring for firms in China.

Studies that tackle the moderating effect of corporate governance on the relationship between currency derivatives and firm value is paucity. The above discussion of different articles on the said theme is mainly focused on the effect of governance on derivative usage but not considered the influence on firm value, some studies came out of this limitation but most of such studies are analyzed the moderating effect of corporate governance on the relationship of derivatives on risk exposure not on the firm value. Many studies that find answer to the question: whether the corporate governed firms have made any changes on the derivative usage and risk exposure? Includes (Cheng & Waikong, 2021; Hege et al., 2021; Huang et al., 2018; Lel, 2012; Sikarwar & Gupta, 2019). The researcher could find only limited number of studies that analyzed the effect of corporate governance on the relation of currency derivatives and firm value, the studies which studies which considered this theme are (Allayannis et al., 2012; Fauver & Naranjo, 2010). The researcher couldn't find any studies that specifically analyzed the said theme in developed countries like India, apart from that, the above-mentioned studies doesn't full fill the sensitivity of result

by comparing different methods in analysis. Here the researcher tried to fill this gap identified from the literature.

2.5 Research Gaps

A thorough review of the existing literature on currency derivatives and firm value revealed the need for additional research on this topic. The existing literature does not provide a definitive answer as to whether the use of currency derivatives is incredibly helpful to the firm's value. A majority of existing studies used currency derivatives as a non-metric variable, which does not take into account the notional value of foreign currency derivatives. To overcome this limitation, the researcher used the notional value of foreign currency derivatives hand collected from annual reports of sample companies for analysis in this thesis. Another issue that has been identified in the existing literature on currency derivatives and firm value is that almost all studies used market-based measures such as Tobin's Q as a proxy for measuring firm value. Accounting-based measures for analyzing the firm performance were ignored in previous studies. The researcher attempts to fill this gap by incorporating accounting-based measures such as return on equity and return on asset for determining firm performance.

Some of the studies evaluated the influence of corporate governance on the use of derivatives, but the studies that specifically analyzed the impact of CG on FCD usage are very limited. Studies that analyzed the moderating effect of corporate governance on currency derivatives and firm value is paucity. There is a lot of research on corporate governance in relation to derivatives and managing exposure, but there isn't much research on how to improve value with currency derivatives. The studies that examined the effect of corporate governance on currency derivative usage and the moderating effect of corporate governance on the relationship between currency derivatives and value enhancement failed to present the sensitivity employing various methods. The researcher addresses this limitation by developing a corporate governance index and determining the relationship, as well as testing the relationship using multiple regression with variables from governance practices.

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CHAPTER 3
THEORETICAL FRAMEWORK OF THE STUDY

3.1 Introduction

The chapter discusses the study's theoretical foundation and the theoretical link between variables. The study's theories were collected from books, journal articles, and other secondary sources. The theoretical framework is subdivided into various subthemes, including:

Foreign exchange and types of exchange rate

Exchange rate determination

Foreign exchange exposure

Management of FE exposures

Corporate governance, derivative usage, and value premium

3.2 Foreign exchange and types of exchange rate

The international business environment necessitates trading and investing in assets denominated in different currencies. Exchange rates are the mechanisms by which world currencies are linked in the international market, offering the price of one currency in terms of the other; in other words, foreign exchange is the switching of one currency for the other. It is required to settle transactions between people or entities located in different economies. This transaction is required to complete international transactions.

Exchange rates are divided into two types: nominal exchange rates and real exchange rates. The number of units of one currency (home currency) expressed in terms of another currency is known as the nominal exchange rate (foreign currency).

The effect of purchasing power will not be considered in the nominal exchange rate. The real exchange rate considers the relative purchasing power of currencies in comparison to the nominal exchange rate. The relative exchange rate is calculated by multiplying the price index in the relevant country by the nominal exchange rate.

3.3. Exchange rate determination

Prior to 1992, India used a fixed exchange rate system with the rupee pegged to the pound sterling. The Breton-woods system failed in 1971, but the RBI maintained the link with the pound sterling until 1975. In July 1991, India experienced a severe Balance of Payments crisis. In response to the crisis, a new system known as the Liberalized Exchange Rate Management System (LERMS) was implemented in 1992. The rupee is convertible under LERMS at both the official and market rates. The official rate applies to 40% of the economy, as determined by the RBI, and the market rate applies to the remaining 60%, as determined by forces of demand and supply. However, this system did not last long, as it was phased out in March 1993, when a unified exchange rate system was introduced, with the value determined solely by market forces of demand and supply.

3.4 Major theories of exchange rate determination

3.4.1. Purchasing Power Parity (PPP) theory

Gustav Cassel, a Swedish economist, developed the purchasing power parity theory. According to the theory, the purchasing power of the home currency and the foreign currency determines the exchange rate. The theory is based on three assumptions: they are.

- Law of one price
- Free role of arbitrageurs
- Unrestricted movement of goods or financial assets.

A currency's purchasing power is the amount of goods or services that can be purchased with one unit of that currency. According to PPP theory, the exchange rate

between two currencies will be fixed at the rate where both currencies have the same purchasing power(Levi, 2012).

There are two versions of the theory: absolute and relative. According to the absolute version of theory, the exchange rate between two currencies is equal to the ratio of the price levels of two currencies as measured by respective consumer price indices. According to the relative version of the PPP theory, the exchange rate between two currencies is determined by the country's inflation rate. The difference in exchange rates between two countries is equal to the difference in inflation rates between the home and foreign countries.

3.4.2. The Fisher Effect (FE) theory

The theory explains the disparity in interest rates between countries. According to Fisher, if interest rates in two countries differ, the arbitrage process will kick in, resulting in a capital flow from a low-interest-rate charging country to a high-interest-rate providing country. Such a flow will increase the volume of capital in a high-interest-rate-paying country, lowering the interest rate. In a low-interest-rate country, the opposite function will be effective. The process will bring interest rates from different countries into line(S.Kevin, 2018). Fisher explains in this theory that the difference in interest rates between countries is due to differences in inflation rates between these countries.

3.4.3. International Fisher Effect (IFE) theory

The International Fisher Effect (IFE) theory states that the anticipated change in exchange rate between two currencies equals the inflation rate difference in concerned countries, which also equals the nominal interest rate difference between these two countries by considering the relative version of Purchasing power parity (PPP) and Fisher effect together.

3.4.4. Interest Rate Parity (IRP) theory

The Interest Rate Parity (IRP) theory explains how exchange rates in the forward market are determined. The forward rate may be higher or lower than the spot

rate. The theory attempts to explain why two currencies' forward rates differ from their spot rates. According to the theory, the forward rate difference between two currencies equals the interest rate difference between these two currencies. It is clear from the theory that the interest rate is the only factor influencing the difference between the spot and forward rates(Bekaert & Hodrick, 2012).

If the forward rate and the interest rate are not in sync, arbitrage opportunities will arise, resulting in a flow of funds from one country to another. This arbitrage will ensure that the forward rate and the interest rate are equal. Covered interest arbitrage is a type of arbitrage.

3.5 Foreign exchange exposure

The degree to which a company is impacted by exchange rate movements is referred to as foreign exchange exposure. Foreign exchange exposure is regarded as an important factor because it indicates the magnitude of any foreign exchange gain or loss associated with a specific exchange rate change. The following formula expresses this relationship.

$$\text{FX Gain (loss)}_{t,\,t+n} = [S_{t+n} - S_t]\,[\text{Exposure}_t]$$

Where FX Gain (loss) $_{t,\ t+n}$ is the foreign exchange gain or loss, it is denominated in home currency units. $[S_{t+n} - S_t]$ represents the change in the spot exchange rate over a given time. The exposure is valued in local currency, and the exchange rate is expressed in home currency units per local currency(Levi, 2012).

Foreign currency exposures are classified into three categories:

- Transaction exposure: It refers to the possibility of changes in the value of future cash flows (committed or anticipated) because of unpredicted currency fluctuations.
- Translation exposure, also known as accounting exposure, occurs when a company is reporting and needs to convert a foreign operation from local currency to home currency. Changes in exchange rates will have an impact on

income statement items as well as the book value of balance sheet assets and liabilities. The resulting gains and losses are not monetary, but only on paper, and are measured (translated) in retrospect of events and activities that occurred throughout the reporting year(STEPHENS, 2018).

- Economic exposure (or operational exposure) refers to the extent to which future revenues and earnings that have not been contracted are impacting the firm's earnings. When the exchange rate fluctuates, it may also be viewed as affecting the firms' competitive position on sales prices(Singh, 2010).

3.6 Management of FE exposures

Foreign exchange risk management is critical for the success of cross-border firms because changes in foreign exchange rates affect their revenue. Firms engaged in export or import activities are directly impacted by changes in foreign exchange rates; this can have a positive or negative impact on firm revenue(Levi, 2012). As a result, firms that engage in foreign currency transactions must manage their foreign exchange exposures.

To manage foreign exchange exposure, different tools are using. These tools are broadly classified into two categories: Internal hedging techniques and external hedging techniques(Jain et al., 2009). Internal hedging tools includes Matching, netting, leading, and lagging and home currency invoicing. External hedging techniques are Currency forwards, Futures, options, and swaps.

Currency forwards are contracts in which one party agrees with another party or a bank to buy or sell a fixed amount of foreign currency at an agreed-upon rate at a future date. Currency forwards are traded on the over-the-counter market. Currency exchange takes place on a future specific date at a predetermined rate, regardless of the market exchange rate. A currency future is a forward contract in which two parties agree to buy and sell foreign currency against home currency at a specific time and price in the future. Forward contracts are traded and negotiated between parties in the OTC market, whereas futures contracts are traded on an organized and regulated

exchange. The buyer in a contract is said to be in a long position, while the seller is in a short position. The contract is settled with the help of a clearing house. To avoid counter-party risk, both parties are required to use a margin system when trading. The contract is revalued daily based on market price, and parties must adjust margin accounts on a daily basis; this process is known as marking-to-market(Agarwal, 2017).

A currency option is a contract in which the buyer receives the right to buy or sell the agreed currency at a pre-agreed exchange rate, but no obligation to perform the transaction. The option that gives the holder the right to sell but not the obligation is known as a put option, and the option that gives the holder the right to buy but not the obligation is known as a call option. Currency options are traded on both the exchange and the over-the-counter markets. A currency swap agreement is a contract in which two parties exchange or agree to exchange two currencies for a set period with the intention of reversing the transaction later. The term ‘swap' refers to an exchange. A currency swaps agreement will include one transaction as well as a reverse transaction. The advantage of currency swaps over other currency derivatives is that swaps benefit both parties by lowering borrowing costs. Spot and forward swaps and forward and forward swaps are two types of swaps that are commonly used(Sercu, 2008).

3.7 Corporate governance, derivative usage, and value premium

A substantial amount of research has been conducted to theorize the effects of corporate hedging activities. Previously, the lack of required data on derivative usage limited researchers' ability to investigate further the economic consequences in corporations or firms. Accounting policy changes made it possible to access the derivative data, more research was held, and researchers came to different conclusions.

Hedging effects affect the firm's performance in different ways. As firms engage in hedging activities, which may leads to reduction in financial distress cost

by reducing the volatility and which leads to firm value (Smith & Stulz, 1985). Apart from reducing financial distress, reduction in volatility also helps the firms to mitigate the under-investment problem, which is faced by many organizations because of ineffective management of funds raised from public or from financial institutions (Myers, 1976). Some of the other researchers are also tried to find the real consequences of hedging on firm performance or firm value. According to (Froot & Scharfstein, 1993), Hedging reduces cash flow volatility, allowing the firm to access debt at a lower cost and make internal funds available for investment. Another study quote supports the use of derivatives from a tax standpoint. Because of the volatile taxable income, we could call it a convex tax schedule when the tax rises faster than the taxable income. Income volatility may result in an increase in taxable portion that exceeds income; firms can mitigate such consequences by effectively utilizing derivatives for hedging (Smith & Stulz, 1985). Hedging reduces the consequences of underinvestment problems apart from that, it created by the way of reducing the sensitivity to incremental investment. It is made possible by capturing a larger share of the incremental benefit from new investment. Hedging also enables the firm to credibly commit and meet the obligations in states where it would otherwise be unable to do so. These situations help the firms to improve the contract terms with different parties like mangers, customers, and creditors. Additionally, the firms could bargain for added benefit from parties like creditors(Bessembinder, 1991). These literatures were which examined the effect of derivative usage or hedging on creating the value for firms, but these studies are failed to incorporate the agency cost.

The cost incurred by a firm because of the problems associated with the conflicting interests of management and shareholders, as well as the information asymmetry that exists between the shareholders and the management is referred to as agency cost. When managers make decisions that are not in the shareholders' best interests, such decisions are unlikely to result in an increase in the firm's value, resulting in agency costs. The other group of theories suggest that agency cost is exist in the market and managers preference have an influential role in hedging decision

and effect of hedging on value creation. Managers may involve in hedging for different reasons, hedge for reducing expected exposure or to satisfy self-interest or may be for speculative purpose. (Ahmed et al., 2020) attempted to make a conclusive answer for 'Is corporate hedging always beneficial?', and detailed analysis of existing theories concludes that the different interpretation on hedging and value creation is due to economic factors and behavioral factors. The economic factors include difference in interest of managers, agency issues, quality and ability differences of managers and risk aversion of managers. Over confidence of mangers is the behavioral factor.

Information asymmetric theory states that one party has more information than the other party. In case of firms or large-scale corporations' managers are directly involved in the decision-making process and day to day activities and they hold more internal information than the owners or equity shareholders. Information asymmetry leads the mangers to follow or perform the non-value creating hedging activities or non-optimal risk avoidance activities. Mangers may try to satisfy their self-interest or use the derivatives for speculative activities, and which may lead to value reduction. In the non-optimal risk reducing strategies, managers only consider some portion of exposure but not consider the whole risk (Stulz, 1996). Firms involved in selective hedging are also not effective to manage exposure and create value. Selective hedging involves speculative elements and which leads to increase in cash flow volatility and can't ensure firm value creation(Brown et al., 2006). Corporate hedging and better governance practices reduces the information asymmetry and which helps the better monitoring of managers performance and leads to alleviate mangers self-interest(Xia et al., 2021). Managers ability is also playing an important role in effective utilization of hedging instruments. Mangers focus on satisfying their own interest are use hedging instruments to their personal advantage for rent seeking activities. The study found a negative relationship between hedging and firms risk and it is less pronounced for firms employing high ability managers (Cheng & Waikong, 2021).

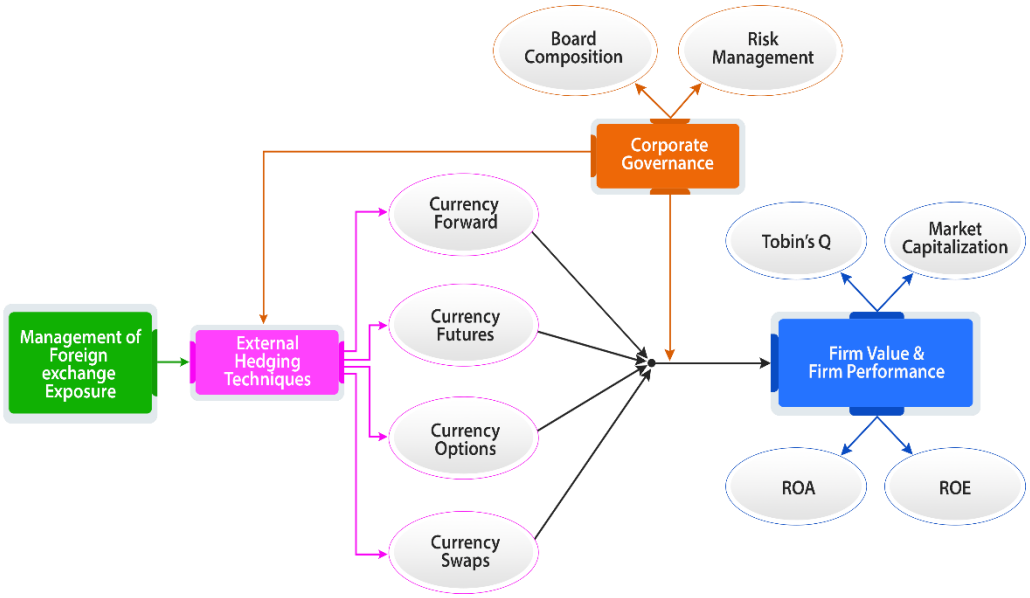
Various reasons were identified by existing theories or studies while delving into the claim that derivatives do not add value to firms. The emphasis of Manger is a major determinant of value creation. When managers engage in hedging transactions with the goal of satisfying the shareholders' interests, the firm's value may rise because of the hedging. On the other hand, if managers are only concerned with their own self-interest, hedging may not be able to add value to the firm (Hagelin et al., 2007). Derivatives are mainly used for three purposes, to hedge or to speculate or make arbitrage profit. When the considering the link between hedging and firm value, if the managers use derivatives for hedging, it could ensure the value adding to firm. If the managers use these hedging instruments for speculation, shareholders on an average may not be benefited out of this transactions (Géczy et al., 2007).

Existing theories and empirical studies provided a mixed results for the benefits of hedging on firm value. Further investigations are held to check the moderating effect of corporate governance on this this relationship (Adam et al., 2015; Allayannis et al., 2012; Chen et al., 2014; Grima et al., 2016; Hege et al., 2021; Kim & Kim, 2015; Lel, 2012; Sikarwar & Gupta, 2019; Tai et al., 2020). Information asymmetry, managers self-interest, speculative behavior of mangers, ability differences of mangers, over confidence behavior and others are the reasons which urges the effective mechanism for evaluating the working of managers. The monitoring is made possible through following better governance policies. Here the researcher intended to analyze the moderating effect of corporate governance on the relation between currency derivative usage and firm value.

Following figure depicts the theoretical relationship between derivatives on firm value when corporate governance acting as a moderating variable.

Figure 3.1

FCD on hedging premium and corporate governance's moderating role



Source: Author Compilation

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CHAPTER 4
RESEARCH METHODOLOGY

4.1 Introduction

This chapter explains the methodology adopted for achieving the objectives of the study. The chapter contains the research questions needed to answer during the study, followed by the objectives developed based on these research questions. Research design, description about the data is given in later sections; it contains sampling method, period of the data and the sources of data are explaining under this heading. The chapter also explains the variables for the study in detail, that is, dependent, independent, control variables and moderating variables. After describing the variables, hypothesis formulated were given later the econometric tools and moderation analysis tools used for the study are explained. Finally, the chapter concluded with limitations of the study.

4.2 Methods of research

The study seeks to analyze and describe the relationship between the identified variables based on data acquired from secondary sources. The study is therefore regarded to be descriptive in nature.

4.3 Research questions

Currency exposure is a significant risk that affects the performance and profitability of businesses, particularly those engaged in international transactions. Firms are investing heavily in currency derivatives to mitigate this risk. Previous studies reported mixed results on the effect of currency derivative usage on firm value and performance, drawing from these contradictory results, the research gaps are identified for the present study. To explore the research gap, the study attempts to answer the following questions.

- Whether the usage of foreign currency derivatives (FCD) has any effect on firm value and firm performance?
- Do the corporate governance practices followed by the firms have any influence on FCD usage?
- Does corporate governance moderate the relationship between FCD usage and firm value as well as firm performance?

4.4 Objectives of the study

The primary objective of this study is to analyze the effects of foreign currency derivatives on firm value or performance. The following specific objectives have been established to achieve this objective and evaluate related facts.

1. To analyze the effect of foreign currency derivative usage on firm value
2. To analyze the effect of foreign currency derivative usage on firm performance
3. To measure the influence of corporate governance practices on foreign currency derivative usage.
4. To assess the moderating role of corporate governance practices on the relation between foreign currency derivative usage and firm value and firm performance.

4.5 Data description

4.5.1 Data and Sample selection

Sample firms for the study is selected from the NSE listed companies. Initially, the NIFTY 100 index was considered among NSE listed firms because larger firms seem to have relatively high levels of exchange rate exposure than smaller firms (Praveen Bhagawan & Lukose, 2014) and size is a major determinant for currency derivative usage(Berkman et al., 1997; Berkman & Bradbury, 1996; Charumathi & Kota, 2012; Dolde, 1993; Jalilvand, 1999; Mian, 1996; A. Singh & Upneja, 2008) . Among the top 100 companies listed in NSE, 26 financial companies and two firms

were specified that they are not exposed to foreign currency risk as those firms are not involved in export or import transactions and removed from the sample as directed by (Allayannis & Weston, 2001). Seven firms were removed from the sample due to the unavailability of some annual reports over the last ten years. Following the application of all inclusion and exclusion criteria, 65 large non-financial firms from the NSE 100 list were considered for the study. List of sample firms and industries were given in Appendix I & II.

4.5.2 Period of the study

The data is collected for the study ranges from the financial year 2011-12 to 2020-21. In India, the US dollar is a key currency for export and import transactions, and the financial year 2011–12 reported a greater volatility, an average 3.8523 percentage fluctuations in the value of the Indian Rupee against US dollar. The financial years of 2012-13, 13-14, and 14-15... Furthermore, there were reports of increased volatility in the exchange rate between the INR and USD. The data collection period spans from the financial years of 2011-12 to 2020-21. The dataset comprises a panel of 10-year data for 65 large non-financial firms.

4.5.3 Sources of data

The sample companies include 65 large scale companies listed in NSE. Objectives of the study are achieved by analyzing the secondary data. Dependent, independent, control and moderating variables are included in the study. Variables of financial nature were collected from ProwessIQ databases and corporate governance variables are taken from Capitaline databases, these two are the leading databases provide financial performance data of both listed and unlisted Indian companies. Notional value of FCD is not available in Prowess IQ or capitaline databases, so such data is collected from annual reports of concerned companies. To find this value, initially the researcher downloaded annual reports of sample companies from NSE website and extracted the value from this annual report. Most of the companies are given the notional value of FCD in foreign currencies like US dollar or Euro etc. After extracting the value, researcher converted the value expressed in foreign currency to Indian rupee by considering the exchange rate on concerned date.

4.6 Description of the variables of the study

The study mainly concentrated on examining the effect of foreign currency derivatives on firm value and firm performance and the moderating role of corporate governance on this relationship. The study comprises of four objectives, the first objective analyses the effect of FCD on firm value, where firm value is measured using Tobin's Q as well as market capitalization, notional value of FCD is considered as independent variable and relevant control variables are also included. The second objective is to analyze the effect of FCD on firm performance. In order to achieve the second objective, firm performance is measured using return on equity and return on asset. Independent variables and control variables are same as in the first objective.

The third objective is to measure the influence of corporate governance on FCD usage. Here the researcher developed a corporate governance index by compiling eight points, were presents is indicated with score one and zero otherwise. Four characteristics of board composition and four characteristics related to risk management were included in governance index. In order to identify the individual influence of each characteristic of corporate governance, a multiple regression is used by including all these individual points. In this objective, notional value of FCD is taken as dependent variable and other relevant variables which influence the FCD usage is considered as control variable. The fourth objective is to assess the moderating effect of corporate governance on the relationship between FCD and firm value and performance. Here the notional value of FCD is considered as independent variable and firm value is dependent variable and corporate governance index as the moderating variable. Graphical representations of variables were given in Appendix III.

4.6.1 Firm value measurement

Firm value is measured by using two variables namely: Tobin's Q and market capitalization.

4.6.1.1 Tobin's Q

Tobin's Q is calculated by adding market value of equity, market value of preference shares and book value of debt and altogether divided by value of total assets. Tobin's is risk adjusted measure with less chance of changes by accounting practices and a forward looking value (Wernerfelt & Montgomery, 1988). This is a widely used method to measure the value of firm especially in case of analyzing the influence of derivatives on firm value (Bazih & Vanwalleghem, 2021a; S. Choi et al., 2020; Dai et al., 2020; Giraldo-Prieto et al., 2017; Pyeman et al., 2019; Seok et al., 2020; Setiawanta et al., 2021).

4.6.1.2 Market capitalization

Market capitalization represents the value of company's all shares of stock. It is computed by multiplying the number of outstanding shares with market value of share. Market value of share has an advantage over the book value of share because the market value represents the real value of share which is available for trading in market. Different existing studies like (Abdolmohammadi, 2005; Abdulrahman Anam et al., 2011; Edeling & Fischer, 2016; Panagiotidis, 2005) were used market capitalization for evaluating the value of firm. Different variables are considered for measuring the value of firm and market capitalization is an important among them, in this study the natural log of market capitalization is used to represents the market value of firm.

4.6.2 Firm performance measurement

The firm performance consists of accounting performance measured using Return on equity (ROE) and return on asset (ROA).

4.6.2.1 Return on equity (ROE)

Return on equity is a widely used measure for evaluating the performance of the firm. Many existing researchers (Athanasoglou et al., 2008; Beltratti & Paladino, 2015; Chen & Lin, 2015; Graves & Waddock, 1999; Oware et al., 2022; Oware & Mallikarjunappa, 2021, 2022) were used the ROE to evaluate the performance of firm.

ROE measures how much a firm generate profit using shareholders' fund. ROE is calculated as net income divided by total equity, where net income is the net profit generated by firm after deducing the tax and total equity is the shareholders fund available to equity holders.

4.6.2.2 Return on assets (ROA)

Return on asset is an accounting-based measure used to evaluate the performance of a firm. ROA represents the ability of firm to generate profit by utilizing their assets. The studies uses ROA to measure the performance of firm a includes (Athanasoglou et al., 2008; Chen & Lin, 2015; Graves & Waddock, 1999; Oware et al., 2022; WADDOCK & GRAVES, 1997). ROA is calculated as; ROA = Net income / Total assets. Net income is the net profit after tax and total assets is identified by adding firm fixed assets and current assets.

4.6.3 Foreign currency derivatives (FCD)

FCD represents the notional value of foreign currency derivatives reported by firms at the end of financial year. Notional value of foreign currency derivatives provides the productivity of derivative usage (Bazih & Vanwalleghem, 2021b). The FCD is reported by firms in different currencies. Some of the firms reported in home currency while others in foreign currency, for making unity all values are changed to Indian rupee in million.

4.6.4 Corporate governance index and Individual Components

Corporate governance index is created by using binary method where score is given as one for presence and zero otherwise. The researcher developed governance index by considering characteristics from board composition and risk management activities because companies are disclosed in the annual financial report that the companies are making decision on whether to hedge or not or how much should be hedge based on the risk management policy of firm and with approval from board of directors.

Corporate governance index is developed by considering the following points:

1. At least six members on the board
2. At least 5 meetings in a year
3. Disclosure of expertise/skills of directors
4. Risk management committee (details about RMC is provided)
5. Disclosure of risk management activities including hedging position
6. Appointed Chief Risk Officer (CRO)
7. Independent director as Chairman of RMC
8. Non-executive director as Chairman of RMC

Among the eight points considered for developing the corporate governance index, initial three points are related to board composition and remaining are related to the risk management. All the points except last three were selected from the recommendations of Uday Kotak committee report on corporate governance developed by SEBI with a view to improve the corporate governance practices of listed firms in India. Board composition is an effective way of measuring the governance of firm (Andres & Vallelado, 2008; Conheady et al., 2015; Jermias & Gani, 2014; John & Senbet, 1998; Naciti, 2019). Disclosure of risk management activities are also considered as an important measure of corporate governance(Aebi et al., 2012; Bhimani, 2009; Kleffner et al., 2003; Pirson & Turnbull, 2011; Tao & Hutchinson, 2013). Appointed chief risk officer (CRO), independent director as chairman of RMC and non-executive director as chairman of RMC are treated as highly important recommendations of RBI and Basel committee on banking supervisions (BCBS) and many non-financial companies are also following the same recommendations as part of their risk management policies.

Aside from the index, the researcher analyzed the corporate governance by using different components to identify the individual effect of each item in determining the value of FCD. The individual items comprise of 16 points, and all these are related to board composition or risk management but in different measurement units. The variables and measurement unit are given below.

Table 4.1

Governance variables and measurement unit

Variables	Measurement unit
1. Members on the board	Number
2. Board meetings in a year	Number
3. Attendance in board meeting	Percentage
4. Independent directors on board	Proportion
5. non-executive directors on board	Proportion
6. Salary of board members	Amount
7. Members on 'RMC	Number
8. RMC meeting in a year	Number
9. Independent directors on RMC	Number
10. non-executive directors on RMC	Number
11. Risk management committee	Binary (zero or one)
12. Independent director as Chairman of RMC	Binary (zero or one)
13. non-executive director as Chairman of RMC	Binary (zero or one)
14. Disclosure of expertise/skills of directors	Binary (zero or one)
15. Exposure is quantified and hedging details are disclosed	Binary (zero or one)
16. Appointed Chief Risk Officer	Binary (zero or one)

Source: Author's compilation

4.6.5 Control variables

Control variables helps to establish the true relationship between independent variable and dependent variable by keeping their values constant. Control variables related to all the objectives are described here. Meaning of the variable, why such variable is included in study and how to calculate the variable are discussed below.

4.6.5.1 Firm size

Logarithm value of total asset is treated as the firm size. Firm size influences the value and performance of firm (Chu, 2011; Ibhagui & Olokoyo, 2018; Kalkan et al., 2011; Orlitzky, 2001; X. Zhou, 2000). Large firms have more economies of scale and size has a positive influence on the value and performance of firm. Large firms

are more likely to use derivatives (Davies et al., 2006; Hu & Wang, 2005). By considering these reasons firm size is included in this study.

4.6.5.2 Dividend yield

Dividend yield is the dividend paid to share to shareholders as a percentage of market value of share. Dividend policy have a significant positive impact on firms performance (Farrukh et al., 2017) and firms using hedging instruments have a higher dividend pay-out ratio(Berkman & Bradbury, 1996). The dividend yield is calculated as: Dividend per share / market value of share**.**

4.6.5.3 Leverage

Leverage ratio is also known as the total debt ratio, and it is calculated as 'Total debt' divided by 'total asset'. Most of the previous studies reported a negative relationship between leverage and firm performance or value because firms use debt beyond their threshold limit and which results in increase of agency issues (Mishra & Dasgupta, 2019) while high leveraged firm are more tend to use derivatives (Bartram et al., 2009; Hentschel & Kothari, 2001).

4.6.5.4 Current ratio

Current ratio is the ratio between current assets and current liabilities. The ratio indicates a firm's ability to meet its short-term requirements. Existing literature analyzed the role of current ratio in determining the usage of derivatives and it is found that current ratio is positively associated with derivative usage especially in interest rate derivatives and could not establish a strong relation in case of currency derivatives (Goldberg et al., 1998; Nguyen & Faff, 2003b).

4.6.5.5 Liquidity

Liquidity is the measure of a firm's ability to meet its immediate cash requirements. The liquidity ratio can be calculated by adding liquid or quick assets like cash, marketable securities and account receivables and the value of all together divided by current liabilities. Higher the liquidity leads higher firm valuation (Fang et

al., 2009) and the liquidity is highly correlated with corporate governance and the CG leads to higher firm performance or value (Ali et al., 2017; Li et al., 2012).

4.6.5.6 Growth opportunities

Growth opportunities implies the firms focus on further investments to expand the business activities. It is the proportion of capital expenditure to the total sales. The growth opportunities are negatively associated with firm performance(Hutchinson & Gul, 2004).

4.6.5.7 Geographical diversification

Geographical diversification is the proxy for export ratio. The export ratio is the ratio of export sales to total sales. Many literature supports the views that firms encage more on export transactions leads to increase in firm productivity and subsequently the firm value and performance will be increased (Commander & Svejnar, 2011; Ganotakis & Love, 2012; Park et al., 2010; Silvente, 2005). The usage of derivatives also highly influenced by the export ratio, as the export is increases the firms exposed to more of exchange rate risk which tends firms to use more derivatives (He & Ng, 1998; Sahoo & Sahoo, 2020; Shu & Chen, 2003; Tuan & Ng, 1998).

4.6.5.8 Import ratio

Import ratio is the proportion of imports in total purchases of a firm. Exports and imports are the major determinants of currency derivative usage (Kuzmina & Kuznetsova, 2018)as such transaction forced the firms to use more derivatives to manage exposure to foreign currency risk(Allayannis & Ofek, 2001; Chang et al., 2013; Skinner, 2013; Zhang et al., 2013; V. Y. Zhou & Wang, 2013).

4.6.5.9 Capital gearing ratio

Capital gearing ratio represents the debt on capital structure and the ratio helps to assess the risk due to additional debt on capital. The ratio is calculated as: total debt / share holders' equity. Derivative users have high gearing ratio because such firms are in a position to use more debt capital for reducing the tax burden (Lau, 2016).

4.6.5.10 Research and development ratio

Research and development ratio is the ratio of firms R&D investment to its earning, mostly studies are considered the R&D ratio as proxy for growth potential of a firm (M. Singh & Faircloth, 2005). The existing studied reported a positive association between derivative usage and R&D ratio as it is considered as a proxy for growth opportunity of firm(Goldberg et al., 1998; Heaney & Winata, 2005).

4.6.5.11 Industry dummy

Industry dummy in the model is used to control the industry effect(Allayannis et al., 2012a; Bae et al., 2018). The panel data includes 13 types of industries, and random effect model explicit the industrial effect.

4.6.5.13 Year dummy

The panel data includes a period of 10 years and the year dummy is used to control the year effect (Allayannis et al., 2012b; Bae et al., 2018; Gómez-González et al., 2012; Lin & Lin, 2012). Here, the researcher divided the years into two groups based on changes in the value of the currency. In the beginning, the researcher calculated the average annual fluctuation of INR to USD. This fluctuation was then totalled and grand average were found, and the years were divided into those above and those below the grand average.

4.7 Hypotheses

A testable assertion pertaining an anticipated result of a research study is known as a research hypothesis(Dougherty et al., 2010), which is used to draw conclusions about the population from a sample(Kalaian & Kasim, 2008). The study aims to provide answers to questions about the benefits of FCD use for managing currency exposure for businesses. Initially the study indented to address whether the FCD usage has any significant effect on firm value and firm performance. Existing literature provided a mixed result on this relationship. Later the study tried to explore the influence of corporate governance on FCD usage. Finally, investigate the moderating role of corporate governance on the relationship between FCD and firm

value as well as FCD and firm performance. Based on the aforementioned research questions, variables and their relationship extracted from existing literature, the following hypotheses were developed.

4.7.1 Foreign currency derivatives (FCD) on firm value

The relationship between FCD and firm value is not unanimous in the existing literature. With a view to measure from different angles, here, the firm value is measured using Tobin's Q and market capitalization. After incorporating necessary control variables which are influencing the firm value, the following hypotheses were developed.

H0a: FCD usage has no significant effect on Tobin's Q value.

H0b: FCD usage has no significant effect on market capitalization value.

4.7.2 Foreign currency derivatives (FCD) on firm performance

The relation between FCD on firm performance is a less explored research area. ROE and ROA were used to measure the firm performance. The available existing literature reported a positive effect of FCD usage on firm performance. Based on the research question and objective, the following hypotheses were formulated for further analysis.

H0a: FCD usage has no significant effect on ROE.

H0b: FCD usage has no significant effect on ROA.

4.7.3 Corporate governance on foreign currency derivatives (FCD)

Determinants of derivatives are explored by different researchers. Researchers are identified different determinants and considering such variables as control variables, here study developed a model to analyze the influence of corporate governance on FCD usage. Two regression models were used in the study as described under the variables section. With considering the research question and objective, the following hypotheses were initiated to check the combined influence of CG score as well as the individual items in CG.

H0: Corporate governance has no significant influence on FCD usage.

H0a: Number of members on the board has no significant influence on FCD usage.

H0b: Number of board meeting has no significant influence on FCD usage.

H0c: Percentage of attendance in board meeting has no significant influence on FCD usage.

H0d: Proportion of independent directors on board has no significant influence on FCD usage.

H0e: Proportion of non-executive directors on board has no significant influence on FCD usage.

H0f: Salary of board members has no significant influence on FCD usage.

H0g: Number of members on 'RMC' has no significant influence on FCD usage.

H0h: Number of RMC meeting has no significant influence on FCD usage.

H0i: Number of independent directors on RMC has no significant influence on FCD usage.

H0j: Number of non-executive directors on RMC has no significant influence on FCD usage.

H0k: Risk management committee has no significant influence on FCD usage.

H0l: Independent director as Chairman of RMC has no significant influence on FCD usage.

H0m: non-executive director as Chairman of RMC has no significant influence on FCD usage.

H0n: Disclosure of expertise/skills of directors has no significant influence on FCD usage.

H0o: Exposure is quantified and hedging details are disclosed has no significant influence on FCD usage.

H0p: Chief Risk Officer has no significant influence on FCD usage.

4.7.4 Moderating role of corporate governance on the relation between FCD onfirm value and firm performance

Prior researchers focused on the unconditional effect of currency derivatives on firm value (Allayannis et al., 2012a)and reported a mixed results. The agency theory and information asymmetry hypotheses were intended the researcher to focus on the moderating role of corporate governance on the relationship between FCD on firm value and firm performance. In order to find answer for the final research question and objective developed based on the research question and the variables identified, the following hypotheses were formulated.

H0a: Corporate governance has no significant moderating role on the relationship between FCD and Tobin's Q

H0b: Corporate governance has no significant moderating role on the relationship between FCD and market capitalization.

H0c: Corporate governance has no significant moderating role on the relationship between FCD and ROE

H0d: Corporate governance has no significant moderating role on the relationship between FCD and ROA.

4.8 Econometric Methodology

4.8.1 Panel data analysis

Panel data is a combination of cross section and time series data. If we collect data of different entities during different time periods is said to be pooled data. A pooled data will become panel data only when collecting data of same cross section over a period, i.e., the same cross-sectional unit is sampled for different time intervals.

The panel data have both time (t) and space (i) dimension(N. Gujarati & C. Porter, 2016). Unbalanced panel and balanced panel are the two basic classifications for panel data. A balanced panel is that each subject has equal number of observations, whereas an unbalanced panel is one in which certain observations for one or more entities are absent or simply, observations of each subject may not be same or there is some missing information about the subject. The panel data used in this study is completely balanced panel.

The study collected data of 65 large non-financial firms over 10 years of period from 2011-12 to 2020-21. The panel data in this case is short and wide. If the number of time period is low but the cross sectional units are wide is known as short and wide panel (Kennedy, 2008).The panel data can be estimated by using pooled OLS regression, fixed effect model and random effect model.

4.8.1.1 Pooled Ordinary Least Squares

Pooled OLS is a method of regression where all the observations are pooled together and estimates a regression model. The model does not consider the cross-sectional difference and time series difference of observations. Pooled OLS assumes that regression coefficients are same for all the firms(N. Gujarati & C. Porter, 2016). Explanatory variables are not correlated with error term, i.e., regressors are nonstochastic, which can be expressed as, $Cov(v_{it}, X_{it}) = 0$. Error term are identically and independently distributed (iid) about the mean of zero and constant variance,it means that pooled OLS is reliable only under the condition of homoscedasticity.Pooled OLS modeland theabove-mentioned assumptions can be expressed as;

$$y_{it} = \beta_0 + \beta_1 x_{1it} + \beta_2 x_{2it} \ldots\ldots + \beta_n x_{nit} + v_{it}$$

$$u_{it} \sim iid(0, \sigma_u^2)$$

composite error term $v_{it} = \alpha_i + u_{it}$

$$Cov\ (v_{it}, x_{it}) = 0$$

The panel data includes different firms with different characteristics, means the heterogeneity exist. Heterogeneity refers to the unobserved firm specific characteristics like corporate culture, board diversity etc. These characteristics may vary across the firms but fixed over the time. When following the pooled OLS estimators and pooling all the firms together,the model does not consider fixed firm specific characteristics and are subsumed in the error term, $v_{it.}$ Such situation will leads to an endogeneity problem in which error term is correlated with one or more of regressor(s), it can be expressed as Cov (v_{it} ,x_{it}) ≠ 0. Endogeneity may cause to biased and inconsistent estimation of regression coefficient. In order to overcome this issue, fixed effect and random effect model can be use as both the models considers the unobserved heterogeneity.

4.8.1.2 Fixed effect

Different methods are available to include the unobservable heterogeneity into model if it is time invariant and Fixed effects model is an important one among them(Croissant et al., 2019). In the FEM, differences in the intercept and intercept are regarded as fixed parameters to account for cross sectional differences (Hill et al., 2018). The following procedure is involved in FEM to eliminate the fixed effect, a_i. For better understanding, consider the model with some independent variables: for each i,

$$y_{it} = \beta_1 x_{it} + \beta_2 x_{2it} + \ldots\ldots + \beta_n x_{nit} + a_i + u_{it}, \quad t = 1,2,\ldots..T.$$

now expressing the value of all variables for each item as a deviation from their respective mean values, these resulting values are called ‘demeaned’ values. It is expressed as;

$$\ddot{y}_{it} = \beta_1 \ddot{x}_{it} + \beta_2 \ddot{x}_{2it} + \ldots\ldots + \beta_n \ddot{x}_{nit} + \ddot{u}_{it}$$

where $\ddot{y}_{it} = y_{it} - \bar{y}_i$(time demeaned data) on y and so on for $\ddot{x}$ *and* $\ddot{u}$. The fixed effect estimator or within estimator is said to be the pooled estimator based on the time demeaned variable. The FEM ensures that the idiosyncratic error $u_{it}$is uncorrelated with explanatory variable under strict exogeneity assumption and fixed effect estimator is unbiased (Jeffrey M. Wooldridge, 2020).

4.8.1.3 Random effect

All of the FEM's assumptions are met by the random effects model (REM), and it also ensures that unobserved effect, a_i is independent of all explanatory variables over all time periods(Jeffrey M. Wooldridge, 2020). It can be expressed as:

$$\text{Cov}\ (x_{itj}, a_i) = 0,\ \ t= 1,2,\ldots\ldots,T;\ j= 1,2,\ldots\ldots,k.$$

REM captures all the cross sectional differences with different intercept, here the observations are randomly selected so the cross sectional differences will be considered as random (Hill et al., 2018). The intercept of REM includes two parts; one is the intercept which constant for both time and cross-sectional unit, i.e.,a_i. The secondis random variable which constant over time but varies cross-sectionally and it measures the intercept for each unit, i.e., ε_i..The intercept δ_{1i}includes both a_i andε_i.(Brooks, 2019). The model can be written as follows,

$$y_{it} = \beta_1 x_{it} + \beta_2\, x_{2it} + \ldots\ldots + \beta_n\, x_{nit} + \delta_{1i} + u_{it},\quad t = 1,2,\ldots..T.$$

$$\delta_{1i} = a_i + \varepsilon_i$$

when we substitute the second equation with first equation and define the composite error term as $v_{it} = a_i + u_i$, then the equation will be written as,

$$y_{it} = \alpha + \beta_1 x_{it} + \beta_2\, x_{2it} + \ldots\ldots + \beta_n\, x_{nit} + v_{it}$$

This model is also called as error component model because of the presence of two error components that v_{it} is a combination of random cross-sectional error and usual regression error. If incorporating time effect $\lambda_t$into the combined error, v_{it}, the model is called as two-way error component model. Time invariant unobserved value can be estimated in Two-way error components model(Baltagi, 2021).

4.8.2 Selection of Fixed effects or Random effects model

Researcher initially estimated Pooled OLS, FE model and RE model. After estimating all the three models for each data sets and compared the estimators obtained from all these models. Pooled OLS is not generally preferred because $a_i \neq 0$. To estimate ceteris paribus effect, FE model is considered as more convincing tool as

it offers the correlation between a_i and x_{it}but it does not allowin RE model. If the explanatory variables are constant over time RE model is the possibility to estimate the effect on y but it is not possible in FE model. RE could include time constant controls in explanatory variables, but is not necessary in case of FE models(Wooldridge, 2010).It is clear from the discussion that FE and RE cannot be possible to use for estimation in all situations. In order to decide whether to follow FE model or RE model is decided popularly based on two tests, namely; Hausman test and the Breusch-Pagan (BP) test.

In 1978, Hausman proposed a test to check whether the RE estimation assumption are satisfied or not. Researchers could follow the RE estimation unless the Hausman test rejects. In practical sense, a failure to reject means RE and FE estimates are close to each other and it will not make much distinction on using either of the same. If the Hausman test reject means that the key assumptions of RE are false and the FE estimates could use. Another issue is related to sampling, when the population is large and can't consider the sample as random. Then it is better to treat a_i as a different intercept to estimate each cross-sectional unit and in such situation FE estimates is followed(Wooldridge, 2010). The researcher checked Hausman test for each panel data model before selecting the FE or RE estimate.

Apart from Hausman test, Lagrange multiplier test is introduced in 1980 by Breusch and Pagan to test hypothesis that there is no random effect (N. Gujarati & C. Porter, 2016). This test handling the heteroscedasticity issue in the estimation where assumes $\sigma_u^2=0$. The BP test follow a chi square test with 1 degree of freedom. If the test fails to reject the null hypothesis which interpret that random effect model is not appropriate otherwise the RE model is appropriate. Researcher initially checked Hausman test then followed BP test to ensure which model is more appropriate.

4.8.3 Unit root test

Panel data with large N(number of items) and large T(Number of time series) is known as macro-panel, macroeconomic variables may contain the trend over the time(Stock & Watson, 2003), such panel emerges the need apply time series procedure to panel data by considering the issues of non-stationarity, cointegration and

producing of spurious results (Breitung & Pesaran, 2008; I. Choi, 2015). The micro panel, data with large N and small T does not deserve more attention on non-stationarity (Baltagi, 2021). In this study, N is 65 and T is ten years, as the econometric procedure for panel data discussed here, micro panel need not give more attention on non-stationarity issues, the researcher does not done the unit root tests normally applied in panel data which are actually extended form time-series literature like, Maddala and Wu (Maddala & Wu, 1999), LmPesaran and Shin (Im et al., 2003) and Choi (I. Choi, 2001). In order to address the panel unit root and panel co-integration, researcher followed the Augmented Dickey Fuller (ADF) test. ADF test is not preferable for checking the panel unit root, but other tests mentioned above are not running in R studio because of lack of time series. So, the researcher selected the ADF test and the result shows there is no unit root in any of the variables. ADF test the unit root for $e_{it}$with a null hypothesis that there is no cointegration. Results of ADF for each variable are given in concerned analysis chapter after explaining the descriptive statistics.

4.8.4 Test of Homoscedasticity and Autocorrelation

Testing of presents or absence of homoscedasticity in residual on panel data can be done with Breusch- Pagan test. Here the null hypothesis that there is homoscedasticity.Rejection of null hypothesis leads to the issue of heteroscedasticity, the situation of unequal scatter of residuals(Wooldridge, 2015).

As per (Baltagi, 2021), cross-sectional dependence (serial correlation) is a considerable issue in macro panel with long time series, while this is not a major issue is affecting the micro panel models. Here the panel models are micro panel, in order to better the panel data result, researcher test the serial correlation. Two major tests are available for testing the cross-sectional dependence are Pesaran CD test and Breusch- Pagan LM test for cross-sectional dependence. Here the H0 is there is no cross-sectional dependence.

Some models were found to have heteroscedasticity and cross-sectional dependence (serial correlation) and we use robust stand error to correct such issues and that will helps to reduce the bias in estimates(Wooldridge, 2015). ‘Arellano’ and

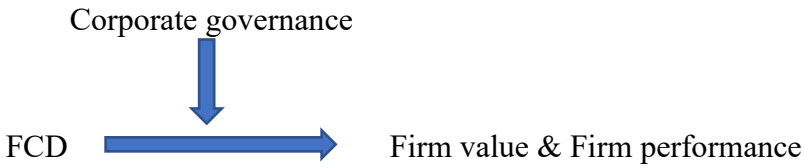
'White' methods are available in R- studio for make the robust of stand error for the data set have the heteroscedasticity and autocorrelation problems.

4.9 Moderation Analysis

Using a moderation analysis, determined the independent variable's impact on the dependent variable is consistent at various levels of another independent variable (moderator). It is used to determine whether the moderator will alter the magnitude of the relationship between the independent and dependent variables. We analyzed the moderating effect of corporate governance practices on the relation between FCD usage and firm value and firm performance.

Figure 4.1

Moderating role of CG on FCD and Firm value and performance.



The CG index is developed based on the eight variables related to board composition and risk management. Data were collected from Capitaline data base and annual reports and this index is considered as moderation for FCD on firm value and firm performance.

4.10 Limitations

There are few limitations encountered by the researcher during the research study. They are:

- Firm performance is measured using ROA and ROE, other available tools for measuring firm performance are not considered.
- The CG index is developed by considering the points from board composition and risk management, other aspects of CG are not included.

- The literature shows that the educational qualifications of managers, capital structure, etc. moderate the relationship between derivatives and firm value. But the study only analyzed the moderating role of corporate governance.
- Different external circumstances, such as currency demonetization, the COVID-19 pandemic, etc., may have an effect on FCD usage and premium, but the study does not analyze their effects.

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CHAPTER 5
FOREIGN CURRENCY DERIVATIVE USAGE ON FIRM VALUE AND FIRM PERFORMANCE

5.1 Introduction

Firms engaged in export-import transactions are exposed to foreign currency risk as the home currency is frequently fluctuate with foreign currency(R.H, 2018). Firms taking different measures to mitigate the foreign currency risk and foreign currency derivatives is one of the important measure among them(Jankensgård, 2015), but the existing literatures provides contradictory findings for the effect of foreign currency derivative usage on firm value or firm performance(Bachiller et al., 2021). Some studies reported a positive effect of FCD on firm value like(Ahmed et al., 2020; Allayannis et al., 2012; Allayannis & Weston, 2001; Bartram et al., 2011; Boubaker et al., 2020; Campbell et al., 2019; Clark & Judge, 2009; Clark & Mefteh, 2010; Fisch & Puhr, 2021; Giraldo-Prieto et al., 2017; Gómez-González et al., 2012; Graham & Rogers, 2000; Hadian & Adaoglu, 2020; Laing et al., 2020; Luo & Wang, 2018; Magee, 2013; Nova et al., 2015; Panaretou, 2014; Paulo, n.d.; Pramborg, 2004; Pyeman et al., 2019; Vivel Búa et al., 2015; Wang & Makar, 2019)while negative or negligible influence of hedging on firm value was shown by some literature(Ayturk et al., 2016; Belghitar et al., 2013; Buyukkara et al., 2019; Danisman & Demirel, 2019; dos Santos et al., 2017; Khediri & Folus, 2010; Li et al., 2014; Seok et al., 2020; Walker et al., 2014). The benefits from the use of financial derivatives are one of the major debated topic in corporate finance (Geyer-Klingeberg et al., 2019).

Large scale firms more prominent to use FCD because such firms are more exposed to foreign currency risk (Praveen Bhagawan & Lukose, 2014), so the study considered large non-financial firms listed in NSE 100 for the period 2011-12 to 2020-21. Tobin's Q and Market capitalization value are presented as a proxy for firm value and ROE and ROA is presented as a proxy for firm performance and all the variables

which have an impact on firm value and performance was included in control variables. After went through the panel model selection tests, appropriate models were chosen and applied for analysis, apart from that necessary diagnostics test were used and if required, control measures were taken. The regression result reported that FCD has no significant effect on firm value as well as firm performance. The study recommended to top level managers to revisit the investment made in FCD and takes necessary actions to ensure the positive impact of FCD on firm value and firm performance.

5.2 The effect of FCD on firm value

Empirical studies on the relationship between derivatives, particularly currency derivatives, and firm value have yielded conflicting results (Bachiller et al., 2021). A firm's decision to hedge foreign currency risk is influenced by a variety of internal as well as external or economic factors(Guay & Kothari, 2003; Haushalter, 2000; Jalilvand, 1999; Judge, 2007; Mian, 1996). Existing research have produced conflicting conclusions, and firms involved in export-import operations are exposed to foreign currency risk, making the problem more relevant. So, more research on this subject is required. Different approaches are available for determining firm value, with Tobin's being the most commonly used in previous studies, like (Bazih & Vanwalleghem, 2021; S. Choi et al., 2020; Dai et al., 2020; Giraldo-Prieto et al., 2017; Pyeman et al., 2019; Seok et al., 2020; Setiawanta et al., 2021; Wernerfelt & Montgomery, 1988). Aside from Tobin's Q, market capitalization is employed to measure firm value in this study. Most existing research use FCD as a binary variable, with one denoting the presence of FCD and zero otherwise. The researcher collected the notional value of FCD from the annual reports of sample firms for this study.

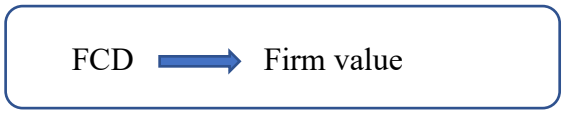
The sample firm consists of 65 large non-financial firms listed on the NSE. Initially, the NIFTY 100 index is considered for the sample. Financial companies, firms not exposed to foreign currency risk, and companies with non-availability of annual reports for all sample years are removed from the sample, and finally 65 companies are considered for data collection. The sample period consists of 10 years starting from 2011–12. The sample size covers 2011–12 to 2020–21, i.e., a ten-year

period with 650 firm-year observations. In the first objective, researcher try to find an answer to whether FCD usage has any effect on firm value. From the theoretical background explained in chapter 2, the conceptual model developed and depicted in figure 2.1 and the literature explained in chapter 3, section 3.1, the following hypotheses were developed (details of hypothesis development are given in section 4.6 of chapter 4: Research methodology).

H_0a: FCD usage has no significant effect on Tobin's Q value.

H_0b: FCD usage has no significant effect on market capitalization value.

In the first objective, the following model is analyzed based on the above-mentioned hypotheses.



5.2.1 List of variables

The first objective is to analyse the effect of FCD on firm value. In this analysis, the notional value of FCD is the independent variable, and firm value is the dependent variable. Firm value is measured using Tobin's Q value and the value of market capitalization. The study also controlled for different variables, which may influence the firm value, and the main aim of including such variables in the panel model is to avoid the omitted variable bias. Control variables included in this objective are firm size, dividend yield, leverage, liquidity, growth opportunity, geographical diversification, and research and development ratio. To measure if there is any difference in different industries, an Industry dummy is included, and to check if any difference exists in different years based on the fluctuation of INR against USD, a year dummy is also included in the control variables. The independent variable, dependent variables, and control variables, as well as how these variables are obtained or computed, are listed below.

Independent variable:

FCD= Notional value of FCD

Dependent variable:

a. Tobin's Q = (Market Value of equity +Market Value of preference share + Book Value of debt) / Total assets

b. Market capitalization (Mar Cap): Total value of all company's shares of stock

Control variables:

a. Firm size (Size): log of total assets

b. Dividend yield (Dy) = Dividend per share / Market Value of share

c. Leverage (Lev): Total debt ratio = Total debt / total assets

d. Liquidity (Liq): Quick ratio or acid-test ratio = (Cash + Marketable Securities+ Account receivables) / Current liabilities

e. Growth opportunities (Growth)= Capital expenditure / Total sales

f. Geographical Diversification (Geo Div): foreign sales / the total sales

g. R & D ratio (R and D) = R & D expenses / total assets

h. Year dummy: (based on yearly fluctuation of INR to USD)

i. Industry dummy

5.2.2 Descriptive statistics

Table 5.1 displays descriptive statistics for all variables, including independent variables, dependent variables, and control variables. The log value of the independent variable FCD and the dependent variables Tobin's Q and market capitalization are used. FCD has a mean of 2.771 and a standard deviation (SD) of 1.9735, resulting in a 71% deviation; this high deviation is due to the inclusion of hedgers and non-hedgers in the panel data set. Notably, the range of FCD values spans from 0.000 to 6.018.

Minimum value of 0.000, implying that certain firms aren't using FCD in their operations. Tobin's Q recorded 92 percentage deviations when comparing standard deviation to mean, however deviation in the case of market capitalization is just 7.87%. Size of the organization almost symmetrical in nature as the mean and median has no much differences and the SD is 11.5%. All the sample companies are large non-financial firms listed in NSE 100 and value is logarithm of total asset. Dividend is a significant determinant of firm value since investors evaluate a firm's performance by assessing the dividend declared, therefore firms are concerned about this matter and in this sample, firms are paying an average of thirty percent dividend, with a maximum of 88 percent. Geographical diversification is a measure of foreign sales to total sales and average foreign sales is thirteen percent, while the maximum value here is 97 percent and the minimum is zero, indicating that some firms are highly involved in export transactions. On the other hand, firm/s had some years with no foreign sales.

Table 5.1

Descriptive statistics

Variable name	Mean	Median	Std. Deviation	Min	Max
FCD	2.771	3.232	1.973	0.000	6.018
Tobin's Q	0.432	0.438	0.398	-0.474	1.399
Mar Cap	5.667	5.655	0.446	4.122	7.132
Size	5.314	5.246	0.612	3.677	6.988
D Y	32.360	30.090	18.011	2.140	88.180
Lev	0.161	0.113	0.139	0.005	0.650
Liq	0.219	0.059	0.382	0.002	2.505
Growth	0.0710	0.048	0.084	0.001	0.992
Geo Div	0.131	0.002	0.250	0.000	0.979
R and D	0.009	0.002	0.018	0.000	0.161

Source: Author Compilation

5.2.3 The effect of FCD usage on firm value (measured using Tobin's Q)

Different researchers are analyzed the effect of FCD on firm value and most of them considered the Tobin's Q as a variable for measuring the firm value as mentioned in section 5.2 of this chapter, the researcher employed the Tobin's Q for assessing the value because it is a commonly and extensively used variable for measuring the firm value. Log value of FCD and Tobin's Q are used for the purpose of analysis in order to transform a skewed variable to an approximately normal variable(Benoit, 2011).

5.2.3.1 Correlation coefficient, Unit root testing and VIF

Table 5.2 shows the correlation coefficients between the variables under the study. There is a correlation between FCD and Tobin's Q but the strength of this relation is weak and negatively significant. All the control variables are correlated with Tobin's Q, Size has a substantial negative correlation with Tobin's Q, while all other control variables are moderately correlated, with in this relationship, dividend yield, liquidity, and research and development being positively correlated but leverage and growth potential being negatively correlated. In the case of regional diversification and Tobin's Q, the correlation is insignificant. The largest correlation among independent variables is -0.660, it is between Tobin's Q and firm size and it is coming under the threshold limit of 0.80.

Table 5.2

Correlation coefficients between FCD, Tobin's Q and control variables

	FCD	Tobin's Q	Size	D Y	Lev	Liq	Growth	Geo Div	R and D
FCD	1								
Tobin's Q	-0.147***	1							
Size	0.280***	-0.660***	1						
D Y	-0.063	0.267***	-0.089*	1					
Lev	-0.157***	-0.382***	0.422***	-0.128**	1				
Liq	-0.062	0.189***	-0.094*	0.135***	-0.105**	1			
Growth	-0.190***	-0.142***	0.172***	-0.160***	0.388***	-0.070	1		
Geo Div	0.304***	-0.035	-0.014	-0.145***	-0.166***	0.062	-0.005	1	
R and D	0.161***	0.097*	-0.138***	-0.140***	-0.193***	-0.054	-0.020	0.273***	1

Source: Author Compilation

As per (Stock & Watson, 2003), a panel with large number of items and large time period tend to have trend over period, especially for macroeconomic variables. The micro panel, were number of items will be high but small time period does not deserve more attention on non-stationarity issues (Baltagi, 2021). Here the time period is only 10 years, so, it is unable to run the popular panel unit root tests like Maddala and Wu (Maddala & Wu, 1999), Lm Pesaran and Shin (Im et al., 2003) and Choi (I. Choi, 2001). Augmented Dickey Fuller (ADF) test is applied to test panel unit root. Here, null hypothesis is that there is unit root in variable or variable is non-stationary. Table 5.3 shows the unit root test of variables using ADF and corresponding p value and found that all the variables are stationary.

Table 5.3

Test of Stationarity

Variable name	Dickey-Fuller	p-value
FCD	-5.9026	0.01
Tobin's Q	-3.6098	0.03175
Size	-5.23	0.01
D Y	-6.3597	0.01
Lev	-4.0418	0.01
Liq	-5.711	0.01
Growth	-5.475	0.01
Geo Div	-3.6904	0.02448
R and D	-4.4285	0.01

Source: Author Compilation

The Variance Inflation Factor (VIF) was used to perform a multi-collinearity test. Table 5.4 lists the variables and the corresponding VIF. VIF measures the degree of correlation among variables in a regression model, since all variables are less than the threshold limit, i.e., 5, there is no evidence of multicollinearity.

Table 5.4

Test of Multicollinearity using VIF

Variable name	VIF
FCD	1.182486
Tobin's Q	
Size	2.231601
D Y	1.072174
Lev	1.28725
Liq	1.061868
Growth	1.082342
Geo Div	1.269116
R and D	1.224638

Source: Author Compilation

5.2.3.2 Panel model selection

F test is used to make selection between Pooled OLS and Fixed effect model and Hausman test is applied to make selection between Fixed effect and Random effect model. The F test shows, F (51,576) = 11.666 and it is significant at 1% (p value is 0.0000). Here the null hypothesis is that Pooled OLS is consistent, and alternative is Fixed effect model is consistent. As the p value is rejected the null hypothesis, it is concluded as Pooled OLS is not an apt model. In order to make selection between Fixed effect model and random effect model, Hausman test is applied, and chi-square is 24.478 with 9 degrees of freedom and p value is 0. 003606.Null hypothesis is that 'differences in coefficients are unsystematic'. Rejected the null hypothesis as the p value is insignificant at 5%, so, to analyse the effect of FCD on firm value using Tobin's Q, the fixed effect model is appropriate.

5.2.3.3 Panel regression result (FCD on Firm value measured using Tobin's Q)

Panel model selection tests identified the Fixed effect model is the most appropriate method for estimating the effect of FCD on firm value using Tobin's Q. The null hypothesis, H0a states that FCD usage has no significant effect on Tobin's Q value. The following FE model is used to estimate.

$$VALUE(TQ)_{it} = \beta 1FCD_{it} + \beta 2FSIZE_{it} + \beta 3D\,Y_{it} + \beta 4LEV_{it} + \beta 5LIQ_{it} + \beta 6GROWTH_{it} + \beta 7GDIV_{it} + \beta 8RANDD_{it} + \beta 9YEAR_{t} + vi,t$$

The results of FE model estimates of FCD on Tobin's Q are shown in Table 5.4. The F value is significant at 1% (p-value equal to 0.000), indicating that the regression model is fit, but the R^2 value is 0.058, inferring that the explanatory variable can only explain 5.8% of the variance in the dependent variable.

Table 5.5

Panel estimation of FCD on firm value (Tobin's Q)

Fixed Effect Model	
Variables	Estimate (Probability value)
FCD	-0.00686054 (0.50285)
Size	-0.00293858 (0.96809)
D Y	0.00010612 (0.88509)
Lev	-0.13129584 (0.35129)
Liq	0.05216127 (0.08665)
Growth	0.17542288 (0.24948)
Geo Div	0.06822739 (0.15141)
R and D	1.40509196 (0.08485)
Year (dummy)	-0.05848357 (2.466e-05 ***)

R-Squared: 0.058868
Adj. R-Squared: -0.060408
F-statistic: 4.0032 on 9 and 576 DF, p-value: 5.5882e-05

Source: Retrieved from R-studio

5.2.3.4 Diagnostic test

Following the panel regression test, various diagnostic tests were used to determine whether the model had any issues. The serial correlation in panel idiosyncratic error was tested. The p-value for the Breusch-Godfrey/Wooldridge serial correlation test was 0.000, and the p-value for the Durbin-Watson serial correlation test was also 0.000; here, the null hypothesis is that there is no serial correlation in idiosyncratic errors, and rejecting the null hypothesis reports serial correlation in error term. Finally, the heteroscedasticity was examined using the

Breusch-Pagan test. It is assumed that there is no heteroscedasticity when the p-value is higher than 0.05. The presence of heteroscedasticity reflects the residuals' unequal scatter. The test results show a p-value of 0.000, indicating the presence of heteroscedasticity.

5.2.3.5 Controlling of heteroscedasticity and autocorrelation.

In Section 5.2.3.4, Heteroscedasticity and serial correlation in fixed effects model is detected. Arellano, White1, and White2 are the different methods available to account for the identified issues using a robust covariance matrix. White 1 is useful when there is heteroscedasticity but no serial correlation and works best in a random effects model. When white 1 is restricted to a within-group common variance, white 2 is used, and the Arellano method is best used when there is heteroscedasticity and serial correlation in a fixed effects model.

Robust covariance matrix estimation using Arellano method is shown in Table 5.6. The result shows a negative relationship between FCD and Tobin's Q,the negative relationship is only 0.686 percentage points but it is insignificant (p-value is equal to 0.34600). The analysis fails to reject the null hypothesis of there is no significant effect of FCD on Tobin's Q value. The year dummy has a significant negative relationship with Tobin's Q, indicating that high fluctuations in INR to USD lower Tobin's Q value.

Table 5.6

Robust covariance matrix estimation (FCD on Tobin's Q)

	Arellano
Variables	Estimate (Probability value)
FCD	-0.00686054 (0.34600)
Size	-0.00293858 (0.94726)
D Y	0.00010612 (0.85018)
Lev	-0.13129584 (0.20342)
Liq	0.05216127 (0.06737.)
Growth	0.17542288 (0.06976 .)
Geo Div	0.06822739 (0.07095 .)
R and D	1.40509196 (0.04280 *)
Year (dummy)	-0.05848357 (2.879e-05 ***)

Source: Retrieved from R-studio

5.2.4 The effect of FCD usage on firm value (measured using Market capitalization)

Calculating a firm's value is a difficult task; various methods for determining market value are available. Market capitalization is a popular and simple method of calculating firm value because it is calculated by multiplying the number of outstanding shares by the closing price of the shares(Praveen Kumar & Manoj Kumara, 2021).Different existing studies like (Abdolmohammadi, 2005; Abdulrahman Anam et al., 2011; Edeling & Fischer, 2016; Panagiotidis, 2005) were used market capitalization for evaluating the value of firm. In this study the natural log of market capitalization is used to represents the value of firm.

5.2.4.1 Correlation coefficient, Unit root testing and VIF

Correlation coefficient between FCD, Market capitalization and control variables are given in Table 5.7. FCD and market capitalization have a moderately positive correlation (0.283), which is significant at 1%. Only size and dividend yield have a significant relationship with market capitalization; size is highly correlated, while dividend yield has a moderate correlation. All other control variables have a negligible correlation with market capitalization. The largest correlation reported among the explanatory variables is between size and market capitalization, which is 0.63, implying that all correlations are less than the threshold limit of 0.80.When the correlation between FCD and control variables is examined, it is observed that all control variables, with the exception of dividend yield and liquidity, show a significant correlation. Leverage and growth opportunities have a moderately negative correlation with FCD, indicating that leveraged firms or firms with growth opportunities are not highly involved in FCD hedging.

Table 5.7

Correlation coefficients between FCD, market capitalization and control variables

	FCD	Mkt.cap	Size	D Y	Lev	Liq	Growth	Geo Div	R and D
FCD	1								
Mkt.cap	0.283***	1							
Size	0.280***	0.630***	1						
D Y	-0.063	0.184***	-0.089*	1					
Lev	-0.157***	0.011	0.422***	-0.128**	1				
Liq	-0.062	0.083*	-0.094*	0.135***	-0.105**	1			
Growth	-0.190***	-0.027	0.172***	-0.160***	0.388***	-0.070	1		
Geo Div	0.304***	-0.008	-0.014	-0.145***	-0.166***	0.062	-0.005	1	
R and D	0.161***	-0.038	-0.138***	-0.140***	-0.193***	-0.054	-0.020	0.273***	1

Source: Author Compilation

Table 5.8

Test of Stationarity

Variable name	Augmented Dickey-Fuller	p-value
FCD	-5.9026	0.01
Market capitalization	-5.2467	0.01

Source: Author Compilation
(The unit root test of control variable are given in Table 5.3 and found that all the variables are stationary).

Table 5.8 shows the ADF and corresponding p value. ADF is used to test the unit root or non-stationarity of variables in the model. The result shows that all the variables are stationary or there is no unit root in the variables as the p-value is 0.01 and 0.024.

Multicollinearity test is done using VIF, it is shown in Table 5.9. The result exhibits that all the variables are below the threshold limit, so there is no issue of multicollinearity among the explanatory variables.

Table 5.9

Test of Multicollinearity using VIF

Variable name	VIF
FCD	1.184716
Market capitalization	
Size	2.237571
D Y	1.072736
Lev	1.290447
Liq	1.062351
Growth	1.083256
Geo Div	1.269021
R and D	1.227591

Source: Author Compilation

5.2.4.2 Panel model selection

F test is applied to make selection between pooled OLS and Fixed effect model. The test shows F (51,576) = 11.56 and the p value is 2.2e-16, means significant at 1%. Here the null hypothesis is that Pooled OLS is consistent, and alternative is Fixed effect model is consistent. Rejecting the null hypothesis is an indicates pooled OLS method could not consider. In order to make selection between Fixed effect model and random effect model, Hausman test is applied, and result shows chi-square is 3.4836 with 9 degrees of freedom and p value is 0.942, which is insignificant; hence, Random effect model is appropriate for analyzing the effect of FCD on firm value using market capitalization.

5.2.4.3 Panel regression result (FCD on Firm value measured using Market capitalization)

The following equation was used to analyze the effect of FCD on firm value when firm value was defined as the value of market capitalization. Explanatory variables include various variables that have a direct impact on firm value. The following panel regression model's results are shown in Table 5.9.

$$VALUE(MC)_{it} = \beta 0 + \beta 1 FCD_{it} + \beta 2 FSIZE_{it} + \beta 3 D\,Y_{it} + \beta 4 LEV_{it} + \beta 5 LIQ_{it} + \beta 6 GROWTH_{it} + \beta 7 GDIV_{it} + \beta 8 RANDD_{it} + \beta 9 YEAR_t + \sum_{j=1}^{j} \beta 10 + j + y\ INDy, i, t + vi, t$$

The panel regression results are shown in Table 5.9. The model is fit and significant as the chi-square value is 920.615 on 22 Degree of freedom and the p value is 0.000.

Table 5.10

Panel estimation of FCD on firm value (Market Capitalization)

Random Effect Model	
Variables	Estimate (Probability value)
(Intercept)	0.95552(0.0001014 ***)
FCD	-0.00216 (0.7802779)
Size	0.913504 (< 2.2e-16 ***)
D Y	0.00064209 (0.2634888)
Lev	-0.44754862 (7.870e-05 ***)
Liq	0.0747221 (0.0065092 **)
Growth	0.06548514 (0.3802881)
Geo Div	0.05104501 (0.1076005)
R and D	1.07823983 (0.0493531 *)
Year (dummy)	-0.07051 (2.652e-06 ***)
Industry 1	-0.13980129 (0.1438496)
Industry 2	0.322724(0.0549075 .)
Industry 3	-0.338173(0.0031738 **)
Industry 4	0.308038(0.0005430 ***)
Industry 5	0.403236(0.0269783 *)
Industry 6	-0.151060(0.3310872)
Industry 7	-0.083012(0.4651826)
Industry 8	0.04311005 (0.6486130)
Industry 9	-0.67418 (3.943e-07 ***)
Industry 10	-0.49604 (4.979e-06 ***)
Industry 11	-0.07328639 (0.4482078)
Industry 12	-0.546296(3.577e-05 ***)
Industry 13	-0.05222554 (0.7282596)
R-Squared: 0.59486	
Adj. R-Squared: 0.58064	
Chisq: 920.615 on 22 DF, p-value: < 2.22e-16	

Source: Retrieved from R-studio

5.2.4.4 Diagnostic test

Various diagnostic tests were used to address issues with the panel model, which was used to determine the effect of FCD on firm value, as measured by market capitalization.

The relationship between a variable's current value and its past value is measured by auto correlation or serial correlation. Serial correlationin the error term means that the error of one time period is correlated with the error of subsequent time periods. Various tests are used to determine whether or not serial correlation exists. In this case, the researcher used two major tests, both of which illustrated serial correlation in panel idiosyncratic error. The Breusch-Godfrey/Wooldridge test for serial correlation reported a chi-square value of 158.93 with a p-value of 0.000, while the Durbin-Watson test for serial correlation reported a DW of 1.33 with a p-value of 0.000, indicating that both tests rejected the null hypothesis and recognized serial correlation in error term.

The presence of heteroscedasticity reflects the uneven scatter of the residuals, the heteroscedasticity was analyzed using the Breusch-Pagan test. When the p-value exceeds 0.05, it is assumed that there is no heteroscedasticity. The test results show a p-value of 0.000, indicating the existence of heteroscedasticity.

5.2.4.5 Controlling of heteroscedasticity and autocorrelation

Diagnostic tests determine the serial correlation in the error term as well as heteroscedasticity. The white heteroscedasticity-consistent covariance estimator was used to control heteroscedasticity and autocorrelation or serial correlation, and the results are shown in table 5.11.The result shows that after controlling the heteroscedasticity and serial correlation, The R-square value shows that around 58 percent of variation in dependent variable is explained by the explanatory variables. The analyzing the effect of FCD on firm value reported that the FCD has no significant effect on firm value as the result shows a negative.21 percentage relation, but it is insignificant as the p value is.7745.The year dummy had a moderately negative effect on firm value (p value = 0.000), indicating that higher fluctuations in the INR-USD

exchange rate lead to a decrease in firm value by seven percentage.Except for industry 4 construction, which has a positive association with firm value, industries 3 chemicals, 9 IT, 10 Metals, and 12 pharmaceuticals have a negative association with firm value.

Table 5.11

Robust covariance matrix estimation (FCD on Market Capitalization)

White method	
Variables	Estimate (Probability value)
(Intercept)	0.95552964(2.713e-05 ***)
FCD	-0.00216514 (0.7745109)
Size	0.91350467 (< 2.2e-16 ***)
D Y	0.00064209 (0.2929351)
Lev	-0.44754862 (5.002e-05 ***)
Liq	0.07472215 (0.0137668 *)
Growth	0.06548514 (0.5522961)
Geo Div	0.05104501 (0.2129013)
R and D	1.07823983 (0.1536330)
Year (dummy)	-0.07051207 (5.083e-06 ***)
Industry 1	-0.13980129 (0.1993452)
Industry 2	0.32272411 (0.1021190)
Industry 3	-0.33817396 (0.0226781 *)
Industry 4	0.30803858(0.0004342 ***)
Industry 5	0.40323620 (0.0461600 *)
Industry 6	-0.15106007 (0.3094741)
Industry 7	-0.08301270 (0.6732753)
Industry 8	0.04311005 (0.7001533)
Industry 9	-0.67418660 (4.907e-11 ***)
Industry 10	-0.49604716 (1.652e-06 ***)
Industry 11	-0.07328639 (0.4399077)
Industry 12	-0.54629634 (0.0007793 ***)
Industry 13	-0.05222554 (0.7949977)

Source: Retrieved from R-studio

5.2.5 Discussions

Two hypotheses were developed and tested under the first objective. H0a states that FCD has no significant effect on Tobin's Q value. Using panel fixed effects model, the hypothesis was tested and fails to reject the null hypothesis. Table 5.6 shows that there is no significant effect of FCD on firm value. Table 5.6 also shows that year dummy has a significant negative effect on Tobin's Q value and it is inferred that when there is high fluctuation in rupee value against dollar that leads to lower firm value as firm value is represented by the Tobin's Q.

Different empirical studies conducted to analyze the effect of FCD or hedging on firm value and among them positive effect was identified by studies like(Ahmed et al., 2020; Allayannis et al., 2012; Allayannis & Weston, 2001; Bartram et al., 2011; Boubaker et al., 2020; Campbell et al., 2019; Clark & Judge, 2009; Clark & Mefteh, 2010; Fisch & Puhr, 2021; Giraldo-Prieto et al., 2017; Gómez-González et al., 2012; Graham & Rogers, 2000; Hadian & Adaoglu, 2020; Laing et al., 2020; Luo & Wang, 2018; Magee, 2013; Nova et al., 2015; Panaretou, 2014; Paulo, n.d.; Pramborg, 2004; Pyeman et al., 2019; Vivel Búa et al., 2015; Wang & Makar, 2019). This study is inconsistent with all the above-mentioned studies at the same time the study consistent with the below studies, which reported a negative or insignificant effect of hedging or more specifically FCD on firm value, like (Ayturk et al., 2016; Belghitar et al., 2013; Buyukkara et al., 2019; Danisman & Demirel, 2019; dos Santos et al., 2017; Khediri & Folus, 2010; Li et al., 2014; Seok et al., 2020; Walker et al., 2014).

The second hypothesis in this section states that FCD usage has no significant effect on market capitalization value. Table 5.11analyzed the effect of FCD on market capitalization and it is inferred that FCD has no significant effect. Most of the previous studied analyzed the effect of FCD on firm value has used the Tobin's Q to represents the market value. According to best of researcher's knowledge, this is the first study analyzed the effect of FCD on firm value where firm value is represented by the market capitalization value of firm.

Most of the firm involved in the export-import transactions are investing huge amount of money in the FCD to hedge the currency risk. The study analyzed the effect

of this FCD on firm value by considering the Tobin's Q and market capitalization to represents the firm value and in both the cases it is identified an insignificant effect of FCD on firm value. As far as the implications of the study is concerned, the study requests the firms to revisit the investment made in the FCD has it does not lead to increased firm value.

5.2.6 Conclusions

The study is undertaken to analyse the effect of FCD on firm value. Tobin's Q and Market capitalization, two variables are considered for representing the firm value. To analyse the effect of FCD on Tobin's Q, panel regression, fixed effect model is identified as apt model and used then to analyse the effect of FCD on Market capitalization random effect model is applied. The model is applied on 650 firm year observations for the period 2011-12 to 2020-21. The analysis shows that FCD has no significant effect on firm value, when firm value is represented by Tobin's Q as well as Market capitalization. The study also identified that, the year dummy; represents the fluctuation of Indian rupee against US dollar is found to have significant negative effect on firm value, it is indicated that if there is high fluctuation that leads to lower the firm value.

5.3 The effect of FCD on firm performance

The firm performance can be defined as the firm's ability to effectively utilize the available resources to achieve accomplishment based on the objectives(Taouab & Issor, 2019). Most of the existing studies analyzed the effect of FCD usage on firm value by representing the value with Tobin's Q (Bazih & Vanwalleghem, 2021; S. Choi et al., 2020; Dai et al., 2020; Giraldo-Prieto et al., 2017; Pyeman et al., 2019; Seok et al., 2020; Setiawanta et al., 2021; Wernerfelt & Montgomery, 1988).There is a paucity in analyzing the effect of FCD usage on firm performance, more studies are not involved in this analysis. (Bae et al., 2018) analyzed the effect of FCD on firm performance and reported that the more usage of FCD fails to ensure the improved firm performance by reducing the cost of underinvestment, financial distress and tax liability, as identified in existing literature for the benefits of FCD usage. In this study,

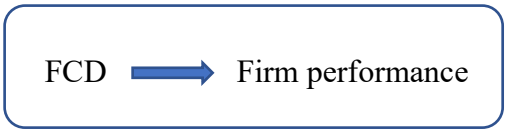
the researcher analyzed the effect of FCD on firm performance by representing the ROE (Return on equity) and ROA (Return on asset) as the firm performance indicators.

The researched identified the paucity in answering the question whether the FCD usage has any effect on firm performance. Based on the theoretical background explained in chapter 2, the conceptual model developed and depicted in figure 2.1 and the literature explained in chapter 3, section 3.1, the following hypotheses were developed (details of hypothesis development are given in section 4.6 of chapter 4: Research methodology).

H0a: FCD usage has no significant effect on ROE.

H0b: FCD usage has no significant effect on ROA

The following model is analyzed, which is created based on the second objective and hypothesis developed to analyze the objective.



5.3.1 List of Variables

Firms encaged in export-import transactions are widely using foreign currency derivatives to manage the foreign currency risk. The second objective is to analyze the effect of FCD on firm performance. The notional value of FCD is manually collected from the annual report of firm, some of the derivative values are gave in foreign currencies like USD, EUR, JPY etc., such values were converted into INR by considering the exchange rate on corresponding date. In order to measure the firm performance, two variables were considered: ROE (Return on equity) and ROA (Return on asset), which is used in existing literature to measure the firm performance(Bae et al., 2018). Different variables which have a direct impact on firm performance identified from existing literature were included in regression model as control variable to avoid the omitted variable bias. The control variables are same as

included in objective 1 and explained in section 5.2.1, so it is not repeated here. Yearly average fluctuation of INR against USD is calculated and total years segregated into highly fluctuated year and slightly fluctuated years and a year dummy is included in regression model. To check is there any difference exist in different industries in FCD to firm performance relationship, an industry dummy variable is also included in regression model. The brief explanation of dependent variable and independent variables are given below.

In order to measure if there is any difference in different industries, an Industry dummy is included, and to check if any difference exists in different years based on the fluctuation of INR against USD, a year dummy is also included in the control variables.

Independent variable:

FCD= Notional value of FCD

Dependent variable:

ROE = Net income / Total equity

ROA = Net income / Total assets

5.3.2 Descriptive Statistics

Table 5.12 shows the descriptive statistics of Dependent variables and independent variable. The control variables for objective 2 are the same as for objective 1 and are explained in section 5.2.2, so they are not explained again here. The panel data included both FCD hedgers and non-hedgers, so the independent variable, i.e., FCD has reported a high standard deviation and minimum value is zero while maximum value is 6.018. ROE and ROA are considered as dependent variables. ROE represents the proportion of net income to total equity and minimum is 2.425 percent while maximum is 440.62 percent, due to this high difference the standard deviation is also very high. The same situation is also in ROA. ROA represents the net income to total assets of the firm; the value is slightly skewed to right because the

mean is little bit higher than median. Standard deviation is .5979 in ROA as the minimum and maximum values are shows a high difference in their values.

Table 5.12

Descriptive statistics

Variable name	Mean	Median	Std. Deviation	Min	Max
FCD	2.771	3.232	1.973569	0.000	6.018
ROE	0.50228	0.26674	0.6272618	0.02425	4.40646
ROA	0.90553	0.75232	0.5979658	0.05568	3.51768

Source: Author Compilation

5.3.3 The effect of FCD on firm performance (ROE)

The effect of FCD on firm performance is less researched area as mentioned in section 5.3. Different variables are used to measure the firm performance and in this study ROE and ROA considered for representing the firm performance as used in (Bae et al., 2018). The panel data included both FCD users and which leaded to skewness in value of variable and in order to reduce the issue, Log value of FCD is used in analysis (Benoit, 2011). ROE is a widely used measure to evaluate the performance of firms, many existing studies used the same (Athanasoglou et al., 2008; Beltratti & Paladino, 2015; Chen & Lin, 2015; Graves & Waddock, 1999; Oware et al., 2022; Oware & Mallikarjunappa, 2021, 2022).

5.3.3.1 Correlation co-efficient, test of stationarity and VIF

Correlation co-efficient is used to measure the linear relationship between variables, the correlation between independent variable, i.e., value of FCD, dependent variable, i.e., ROE and control variables are given in Table 5.13. Size, leverage, liquidity, geographical diversification, R and D are showing a significant correlation with ROE and among them size and leverage has a positive correlation but all other variables have negative correlation and it is interpreted that large firm and firms having high leverage ratio are able to maintain high ROE while the FCD and ROE has a minor relation.

Table 5.13

Correlation coefficients between FCD, ROE and control variables

	FCD	ROE	Size	D Y	Lev	Liq	Growth	Geo Div	R and D
FCD	1								
ROE	0.057*	1							
Size	0.280***	0.453***	1						
D Y	0.007	-0.068	-0.013	1					
Lev	-0.157***	0.304***	0.422***	-0.094*	1				
Liq	0.033	-0.110**	-0.007	0.030	-0.116**	1			
Growth	-0.190***	-0.045	0.172***	-0.111**	0.388***	-0.050	1		
Geo Div	0.304***	-0.080*	-0.014	-0.132***	-0.166***	0.229***	-0.005	1	
R and D	0.161***	-0.160***	-0.138***	-0.075	-0.193***	-0.005	-0.020	0.273***	1

Source: Author Compilation

Different statistical tools are available to measure whether the variables following a trend over the period or the panel unit root test and here Augmented Dickey-Fuller test is applied. Table 5.14 shows the result of test of stationarity using ADF and corresponding p-value, the ADF test result shows that all the variables are stationary or there is no unit root in variables.

Table 5.14

Test of Stationarity

Variable name	Augmented Dickey-Fuller	p-value
FCD	-5.9026	0.01
ROE	-3.4328	0.04877

Source: Author Compilation
(The unit root test of control variable are given in Table 5.3 and found that all the variables are stationary).

VIF test is applied to check the multicollinearity, the degree of correlation among the variables, and the result shows there is no issue of multicollinearity in variables, as all the variables VIF values are below the threshold limit. The VIF result shows in Table 5.15.

Table 5.15

Test of Multicollinearity using VIF

Variable name	VIF
FCD	1.141144
ROE	
Size	2.150617
D Y	1.037428
Lev	1.232444
Liq	1.111275
Growth	1.058267
Geo Div	1.353224
R and D	1.178321

Source: Author Compilation

5.3.3.2 Panel model selection

Different models are available for panel data analysis, based on different tests, has to fix which the appropriate model is. In order to make the selection between pooled OLS or fixed effect model, F test for individual effect test is applied and the p value is 0.000, rejecting the null hypothesis is indicates that pooled OLS is not an appropriate method. In order to make selection between fixed effects and random effects model, Hausman test is applied, the result shows a chi-square value of 10.76 and the p value is 0.2925, based on that, we fail to reject the null hypothesis 'differences in coefficients are unsystematic'. So, it is interpreted that the random effect model is appropriate.

5.3.3.3 Panel regression result (FCD on ROE)

Panel model selection tests identified that the random effect model is the appropriate model for analyzing the effect of FCD usage on ROE. The following model is used to estimate and the null hypothesis is proposed to test is 'the FCD has no significant effect on ROE.

$$Performance(ROE)_{it} = \beta 0 + \beta 1 FCD_{it} + \beta 2 FSIZE_{it} + \beta 3D\ Y_{it} + \beta 4 LEV_{it} + \beta 5 LIQ_{it} + \beta 6 GROWTH_{it} + \beta 7 GDIV_{it} + \beta 8 RANDD_{it} + \beta 9 YEAR_t + \sum_{j=1}^{j} \beta 10 + j + y\ INDy, i, t + vi, t$$

5.3.3.4 Diagnostic test

Serial correlation in panel idiosyncratic error was tested using Wooldridge test and Durbin-Watson test. These tests states that if the p-value is higher than the 0.05 which indicates no autocorrelation or serial correlation in idiosyncratic error. Breusch-Godfrey/Wooldridge test for serial correlation in panel models and Durbin-Watson test for serial correlation reported a p value less than 0.05 and concluded there is serial correlation in error term. In order to check the issue of unequal scatter of the residuals

or heteroscedasticity, Breusch-Pagan test is applied and the result represents (p-value is less than 0.05) that the residuals is heteroscedastic.

5.3.3.5 Controlling of heteroscedasticity and autocorrelation

Diagnostic tests determine the serial correlation in the error term as well as heteroscedasticity. The white heteroscedasticity-consistent covariance estimator was used to control heteroscedasticity and autocorrelation or serial correlation, and the results are shown in table 5.16.The H0 states that FCD has no significant effect on ROE. The test result fails to reject the null hypothesis that FCD has no significant effect on ROE (p value 0.194) but the R square shows that all the independent variables together cause around 17 percent variation in ROE. The year dummy variable shows a significant negative relationship with ROE, it indicates that high fluctuations in INR against USD negatively impact the firm performance. Among 13 industries considered for study, only two industries, industry 9 IT and industry 10 metals reported a significant negative relationship with ROE while all other industries have an insignificant relationship.

Table 5.16

Robust covariance matrix estimation (FCD on ROE)

White method	
Variables	Estimate (Probability value)
(Intercept)	7.3272e-01 (0.072362)
FCD	1.6864e-02 (0.194774)
Size	-7.1362e-02 (0.328993)
D Y	1.2454e-05 (0.983464)
Lev	5.0881e-01 (0.007075 **)
Liq	-4.1478e-03 (0.848917)
Growth	-2.6614e-01 (0.150092)
Geo Div	-8.8853e-02 (0.216583)
R and D	-4.9379e-01 (0.701891)
Year (dummy)	-0.10057(0.000113 ***)

White method	
Variables	Estimate (Probability value)
Industry 1	-1.4898e-01 (0.482804)
Industry 2	-3.9967e-01 (0.301512)
Industry 3	-1.6910e-01 (0.560640)
Industry 4	-3.0191e-01 (0.075522)
Industry 5	-3.1267e-01 (0.428115)
Industry 6	-1.5051e-01 (0.604914)
Industry 7	-2.6137e-01 (0.497907)
Industry 8	-1.6237e-01 (0.454602)
Industry 9	-0.61537 (0.002012 **)
Industry 10	-0.99319 (7.717e-07 ***)
Industry 11	-2.1698e-01 (0.240675)
Industry 12	-3.7606e-02 (0.904091)
Industry 13	-4.9960e-01 (0.202096)

Source: Retrieved from R-studio

5.3.4 The effect of FCD on firm performance (ROA)

The effect of FCD on firm performance is analyzed in section 5.3.3, where firm performance is represented by ROE. In this section effect on firm performance is measured as Return on asset (ROA) is treated as the proxy for performance. ROA is well represented for firm performance as done by many existing studies like (Athanasoglou et al., 2008; Chen & Lin, 2015; Graves & Waddock, 1999; Oware et al., 2022; WADDOCK & GRAVES, 1997).Value of ROA is collected for selected firms from prowess data base.

5.3.4.1 Correlation co-efficient, test of stationarity and VIF

Table 5.17 shows the correlation coefficient between FCD, ROA and control variables. FCD is negatively correlated with ROA but the relation is slightly negative. All the control variables except liquidity have significant correlation with ROA and

among them dividend yield represents a positive correlation, it is interpreted that ROA is high for more dividend paying firms. All other control variables are moderate and negatively correlated with ROA. The correlation between the independent variables is less than the threshold limit, i.e., 0.80, it is expected not to have the multi-collinearity between the variables.

Table 5.17

Correlation coefficients between FCD, ROA and control variables

	FCD	ROA	Size	D Y	Lev	Liq	Growth	Geo Div	R and D
FCD	1								
ROA	-0.082*	1							
Size	0.280***	-0.298***	1						
D Y	0.007	0.160***	-0.013	1					
Lev	-0.157***	-0.286***	0.422***	-0.094*	1				
Liq	0.033	-0.010	-0.007	0.030	-0.116**	1			
Growth	-0.190***	-0.345***	0.172***	-0.111**	0.388***	-0.050	1		
Geo Div	0.304***	-0.140***	-0.014	-0.132***	-0.166***	0.229***	-0.005	1	
R and D	0.161***	-0.078*	-0.138***	-0.075	-0.193***	-0.005	-0.020	0.273***	1

Source: Author Compilation

Stationarity or the panel unit root is checked using the Augmented Dickey Fuller (ADF), and result shows that all the variables are stationary or there is no unit root in variables. The test result is shown in Table 5.18 and all the variables are significant at 1 percent level of significance while the geographical diversification is significant at 5 percent level of significance.

Table 5.18

Test of Stationarity

Variable name	Augmented Dickey-Fuller	p-value
FCD	-5.9026	0.01
ROA	-5.5129	0.01

Source: Author Compilation
(The unit root test of control variable are given in Table 5.3 and found that all the variables are stationary).

Table 5.19 shows the test of multicollinearity between the variables using VIF. The VIF test result shows all the variables are below the threshold limit of five and it is interpreted there is no issue of multicollinearity in variables.

Table 5.19

Test of Multicollinearity using VIF

Variable name	VIF
FCD	1.052108
ROA	
Size	1.862868
D Y	1.031446
Lev	1.106431
Liq	1.104023
Growth	1.026998
Geo Div	1.382387
R and D	1.065629

Source: Author Compilation

5.3.4.2 Panel model selection

Pooled OLS or Fixed effects or Random effects, which is the apt model for analyzing the effect of FCD on ROA? To find answer for the question, different statistical tests were applied. In order to make selection between pooled OLS or fixed effect model, the F test for individual effect is tested and the result shows the pooled OLS is not an apt method for apply in panel regression. Later, the Hausman test is used to make selection between fixed effects and random effects, and in this test null hypothesis sets those random effects is consistent. The test result shows a p value 0.005586 and it is interpreted that the fixed effect model is an apt method for analyzing the effect of FCD on ROA.

5.3.4.3 Panel regression result (FCD on ROA)

The null hypothesis (H0b) states that FCD usage has no significant effect on ROA. The following regression model is used to test the null hypothesis. The regression model is significant as the F-statistics p value is significant at 0.000 (at 1% level of significance). The r-square value shows an around 34 percent of variation in ROA is caused by all the independent variables.

$$Performance(ROA)_{it} = \beta 1 FCD_{it} + \beta 2 FSIZE_{it} + \beta 3 D\ Y_{it} + \beta 4 LEV_{it} + \beta 5 LIQ_{it} + \beta 6 GROWTH_{it} + \beta 7 GDIV_{it} + \beta 8 RANDD_{it} + \beta 9 YEAR_t + vi, t$$

5.3.4.4 Diagnostic test

Wooldridge test and Durbin-Watson test were applied to test the serial correlation in panel idiosyncratic error. As per (Wooldridge, 2010) if the p-value is higher than the 0.05 which indicates no autocorrelation or serial correlation in idiosyncratic error. The result shows there is no issue of serial correlation in panel regression model as the Breusch-Godfrey/Wooldridge test for serial correlation and Durbin-Watson test for serial correlation reported a p value greater than 0.05. Finally, the unequal scatter of the residuals or heteroscedasticity is checked using Breusch-

Pagan test and the result shows the p-value is greater than 0.05 and it is interpreted there is no issue of heteroscedasticity.

5.3.4.5 Controlling of heteroscedasticity and autocorrelation

After Controlling of heteroscedasticity and autocorrelation the regression result is given in Table 5.20. The regression result shows that FCD has no significant effect on firm performance proxied by ROA. Size, leverage, growth and geographical diversification have a significant effect on ROA, where leverage has a positive effect while other variables are negatively significant. The year dummy has no significant effect on FCD and ROA relationship, it is indicated that currency fluctuation has no significant impact on ROA.

Table 5.20

Robust covariance matrix estimation (FCD on ROA)

	Arellano method
Variables	Estimate (Probability value)
FCD	-4.2556e-03 (0.627834)
Size	-6.7259e-01 (2.2e-16 ***)
D Y	-8.8980e-06 (0.981441)
Lev	0.053948 (1.717e-05 ***)
Liq	-8.5962e-03 (0.543446)
Growth	-3.3968e-01 (0.003582 **)
Geo Div	-1.4338e-01 (0.002437 **)
R and D	-4.0788e-01 (0.626445)
Year (dummy)	2.2246e-02 (0.183107)

Source: Retrieved from R-studio

5.3.5 Discussion

In the second objective, the study analyzed the effect of FCD on firm performance. To represent the firm performance two variables were considered, i.e.; ROE and ROA and based on the variables, two hypotheses also generated to test. H0a states that FCD usage has no significant effect on ROE and H0b states that FCD usage

has no significant effect on ROA. Different studies from different countries were analyzed the effect of FCD on firm value, according to the best of knowledge of the researcher, there is paucity in literature which analyze the effect of FCD usage on firm performance especially emerging economies like India.

The first hypothesis in the second objective is tested using panel random effect model and the test result fails to reject the null hypothesis and it is inferred that the FCD has no significant effect on firm performance, the study results given Table 5.16. The study result not support the existing literature which identified a positive effect of FCD usage on firm performance (Bae et al., 2018). The study also found a significant impact of year dummy variable based on currency fluctuation on firm performance or ROE, which indicates the fluctuation of INR against the USD has a significant impact on ROE. The researcher could not find any existing studies analyzed the influence of currency fluctuation in the effect of FCD usage on firm performance.

The second hypothesis in the second objective states that FCD has no significant effect on ROA. The panel model selection test applied and identified that the fixed effects model is most apt model for analyzing the effect of FCD usage on ROA. The study found that FCD usage has no significant effect on ROA and the study finding not cope with the existing study finding, the literature found positive impact of FCD on ROA (Bae et al., 2018).

The study analyzed the impact of FCD on firm performance by considering ROE and ROA for representing the firm performance. The study fails to reject the null hypotheses. Based on the findings from the analysis, the study recommends the top-level managers to take necessary actions to ensure the effective utilization of amount invested in FCD as it is not ensured positive impact on firm performance.

5.3.6 Conclusion

The study collected the notional value of FCD collected from 65 large non-financial firm listed in NSE. Dependent variables, i.e., ROE, ROA and control variables are collected from prowess database for the concerned firms for the period

2011-12 to 2020-21. The data includes 650 firm year observation. Two hypotheses set for analysis and the panel regression test result shows that the FCD usage has no significant effect on firm performance. The result is same when firm performance is represented by ROE as well as ROA. The study also analyzed the influence of currency fluctuation, i.e., INR against USD, represented by the year dummy. The result shows the year dummy has a significant influence on FCD impact on ROE while there is no significant influence in case of ROA.

5.4 Chapter Summary and Conclusion

The chapter aimed to investigate the effect of FCD usage on firm value and firm performance. The firm value is measured using Tobin's Q value and Market capitalization value whereas the firm performance is measured using ROE and ROA.

The first objective aimed to analyze the effect of FCD usage on firm value. Initially firm value is represented with Tobin's Q value, panel fixed effect model is applied for analysis. Diagnostic tests found the issues of heteroscedasticity and autocorrelation and Arellano method is applied to control. The study result shows that FCD has no significant effect on Tobin's Q value. In the first objective, after analyzed the effect of FCD on Tobin's Q, later the effect of FCD usage on Market capitalization is analyzed. Panel model selection tests found that random effects model is appropriate for analysis. The diagnostics test found the issues of heteroscedasticity and autocorrelation and to control such effect, white method is applied. The test result found that FCD usage has no significant effect on market capitalization value. The study findings consistent with many existing studies at the same time the result also contradict with some existing literature. The year dummy variable included in the regression model to analyze the influence of currency fluctuation of INR against USD and result shows that high fluctuation has a significant negative effect on firm value in both the cases, i.e., Tobin's Q and Market capitalization.

The second objective of the study is to analyze the effect of FCD usage on firm performance and to represents the firm performance, ROE and ROA is used. Initially, the effect of FCD usage on ROE is analyzed using panel random effects

model. The test result shows that the FCD has no significant effect on ROE but the currency fluctuation has a significant negative effect. Secondly in the second objective, the study analyzed the effect of FCD usage on ROA. The fixed effects model is applied for analysis and the results shows that the FCD usage has no significant effect on ROA and currency fluctuation also has no significant effect on ROA. For the first and second objective, the study analysis model used 650 firm-year observations for the period 2011-12 to 2020-21.

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CHAPTER 6
CORPORATE GOVERNANCE ON FCD USAGE AND MODERATING ROLE IN FIRM VALUE AND FIRM PERFORMANCE

6.1 Introduction

The risk associated with foreign currencies is a significant element that can affect a company's performance. Companies that are vulnerable to foreign currency risk are implementing a variety of risk mitigation strategies, one of the most important of which is the use of foreign currency derivatives. Various factors influencing the derivative usage(Zamzamir@Zamzamin et al., 2021).The results of studies that examine the association between corporate governance and the use of derivatives or the use of foreign currency derivatives indicate mixed findings.Highly governed firms re involved in more hedging activities(Kim & Kim, 2015), the study also continued that firms are encaged with more hedging activities are less likely to exposed to currency risk. Supporting the earlier findings, a study from Taiwan conducted by (Chen et al., 2014) also proved that highly governed firms are largely using derivatives for hedging purpose.(Tai et al., 2020)reported that board and audit committee roles in risk management were evaluated and a positive correlation was discovered. The audit committee has a considerable impact on hedging decisions; the audit committee primarily determines whether to hedge and how much to hedge. On the other hand cause for the difference in derivative product adoption by enterprises was identified by (Beber & Fabbri, 2012). According to the study, CEO traits were found to be a significant predictor of derivative use, with younger CEOs and those without extensive experience or an MBA being more inclined to utilize derivatives for speculation than risk management.A more detailed study conducted by (Adam et al., 2015)found that managers keep on employing derivatives for speculation when they're making money, but stop when the losses start coming in.Corporate governance is one of a variety of factors identified by some research as impacting a firm's FCD usage, while other studies and literature seek to identify other determinants. Here the study

tries to find answer for the question: ‘Do the corporate governance practices followed by the firms have any influence on FCD usage?

Research on the relationship between the use of currency derivatives and the value of a firm has yielded conflicting results, prompting the need for more studies to determine under what circumstances FCD use increases firm value. businesses with less transparency and weak corporate governance have been found to have a negative correlation with derivative usage (Fauver & Naranjo, 2010). By considering a large sample of 39 nations with significant currency exposure, an another analysis was conducted by (Allayannis et al., 2012).The study found that Internal and external corporate governance are positively connected with value premium and highly governed firms have more hedging premium from the use of FCD. The study conducted by (Hege et al., 2021; Huang et al., 2018; Lel, 2012) also reported the same result. In addition to this findings, (Sikarwar & Gupta, 2019) shows that hedging enhances firm value if the motive is to increase shareholder value; on the other hand, hedging diminishes firm value if the rationale is to speculate or satisfy managers' self-interest. The majority of studies evaluated the moderating role of CG on derivative usage and firm value, whereas fewer studies analyzed the FCD usage effect alone. In all of these studies, firm value was represented solely by Tobin's Q, and no studies examined the moderating effect of the CG on the relationship between FCD and firm performance. In this context, the study attempts to determine if the CG moderates the relationship between FCD and firm value and firm performance.

6.2 Influence of Corporate Governance practices on FCD usage

Various factors influencing the derivative usage, especially for the foreign currency derivatives of the firms(Zamzamir@Zamzamin et al., 2021). Empirical studies analyzed the determinants of FCD usage has identified different variables and their relationship. (Seok et al., 2020) shows that derivatives usage is more common among large firms, those with less industry diversification, those with growth potential, and those with a wider regional presence. As contradictory to these findings, (Ekadjaja et al., 2020) reported that institutional variables and ownership are the determinants of the FCD usage while growth opportunities, leverage and liquidity has

no significant role on the determinants of FCD usage. On the had (Bartram et al., 2009; Hentschel & Kothari, 2001) studies reported that high leveraged firms are more tend to derivatives and liquidity is highly correlated with derivative usage (Ali et al., 2017; Li et al., 2012). Firms are more likely to employ derivatives when their export ratio is higher because increased exports expose them to more exchange rate risk(He & Ng, 1998; Sahoo & Sahoo, 2020; Shu & Chen, 2003; Tuan & Ng, 1998).Since exports and imports increase a company's exposure to foreign currency risk (Allayannis & Ofek, 2001; Chang et al., 2013; Skinner, 2013; Zhang et al., 2013; Zhou & Wang, 2013), they are important drivers of currency derivative usage (Kuzmina & Kuznetsova, 2018). Existing research has found a favorable correlation between derivative utilization and the R&D ratio, which may be interpreted as a measure of a firm's potential for future expansion(Goldberg et al., 1998; Heaney & Winata, 2005).

Despite mixed results in the literature, it seems fair to conclude that a company's export/import ratio, leverage/liquidity/growth opportunities/R&D ratio all have an influence in its FCD usage. When considering the influence of corporate governance on FCD usage, limited number of studies analyzed this relationship. (Chen et al., 2014)did an empirical investigation and found that firms with stronger governance have a greater need for derivatives to be used for hedging purposes rather than for speculation. With support this finding, (Marsden & Prevost, 2005) reported that the governance mechanism have a key role in the derivative policy. Ownership of the firm has also a significant influence on the derivative usage (Bokpin & Isshaq, 2009). The majority of the available literature empirically examined the impact or influence of governance on the use of derivatives, but there is a dearth of research focusing on the use of FCDs. No studies using data from developing countries like India were located during this investigation. This study was initiated by the researcher specifically to address these research gaps. In this case, two types of analysis were conducted to investigate the influence of corporate governance on the usage of FCDs. Initially the researcher developed a corporate governance index by including eight variables which is related to the board composition and risk management. This eight-point score for each firm in sample period is regressed with notional value of FCD after including necessary control variables to the panel regression model. In the

second analysis, influence of individual corporate governance variable is analyzed, for that purpose, sixteen variables were identified.

6.2.1 Influence of Corporate Governance on FCD usage (Measurement using CG Index)

The CG index for corporate governance practices is used to analyze the influence of CG practices on FCD utilization. When establishing the CG index, eight different variables are taken into consideration. The variables are connected to the composition of the board and the risk management. The initial analysis is performed using an 8-point corporate governance index, and the second part of this objective analyzes the individual contribution of each variable. The objective of this study is to determine the extent to which corporate governance practices have an influence on the usage of FCDs. For the purpose of evaluating this analysis, the following hypothesis has been constructed.

H0: Corporate governance has no significant influence on FCD usage.

6.2.1.1 List of variables

The third objective is to analyze the impact that the corporate governance practices of the company have on the utilization of FCDs. The corporate governance index is treated as the independent variable in this analysis. The notional value of FCD is treated as the dependent variable, and relevant variables that have an influence on the utilization of FCD are treated as control variables. These relevant variables include: export ratio, import ratio, firm size, current ratio, liquidity, leverage ratio, capital gearing ratio, dividend yield, growth opportunities, and research and development ratio.

The corporate governance index is derived from eight variables relating to the composition of the board of directors and various aspects of risk management. Presents of the variable are scored as 1 if present and 0 otherwise, and a total out of 8 is determined for each sample period. In many companies' annual reports, the board of directors and risk management committees are recognized as having a significant impact on the hedging decision. Because of this, these two factors were considered

during the development of the corporate governance index. The majority of the variables in the corporate governance index are derived from the amendments to SEBI listing regulations recommended by the Kotak committee. Kotak committee recommendations includes: at least six members on the board, at least five meeting in a year, disclosure of expertise or skills of directors, risk management committee (RMC) and disclosure of risk management activities including hedging position. Appointment of Chief risk officer, independent director as chairman of RMC, and non-executive director as chairman of RMC is included in SEBI clause 49 and RBI recommendation for banks and financial institutions, and if non-financial companies follow these practices, it is considered a desirable practice, so these variables are also included in the development of the corporate governance index. Below is a list of the independent variable, dependent variables, and control variables, as well as the means by which these variables are obtained or calculated.

Dependent Variable:

FCD= Notional value of FCD (From annual report)

Independent variable:

Corporate governance index (8 point)

1. At least six members on the board
2. At least 5 meetings in a year
3. Disclosure of expertise/skills of directors
4. Risk management committee (details about RMC is provided)
5. Disclosure of risk management activities including hedging position
6. Appointed Chief Risk Officer (CRO)
7. Independent director as Chairman of RMC
8. Non-executive director as Chairman of RMC

Control variables:

a. Export ratio: foreign sales / the total sales

b. Import ratio: foreign purchase / the total purchase

c. Firm size (size): log of total assets

d. Current ratio (CR): Current assets / Current liabilities

e. Liquidity (Liq): (Cash + Marketable Securities+ Account receivables) / Current liabilities

f. Leverage (Lev): Total debt ratio= Total debt / total assets

g. Gearing ratio (Cap G): Total debt / Shareholders equity.

h. Dividend rate (Dy): Dividend per share / Market Value of share

i. Growth opportunities (Growth): Capital expenditure / Total sales

j. R & D ratio (R and D): R & D expenses / total assets

As previously described, the corporate governance index is derived by considering eight desirable board composition and risk management practices. The score obtained by each firm from 2011-2012 to 2020-21 is displayed in table 6.1. The average CG score for all businesses over the past decade is 4.5861. Average CG index score for 2011-12 is 2.94, 2012-13 is 2.96, 2013-14 is 3.23, 2014-15 is 4.4, 2015-16 is 4.75, 2016-17 is 5.15, 2017-18 is 5.18, 2018-19 is 5.52, 2019-20 is 5.8 and 2020-21 is 5.9. The increase in the CG index score is undeniable evidence of companies' favorable stance toward the adoption of governance measures. Wipro ltd, Steel authority of India ltd, and Tata steel have accomplished an eight-point CG index in a number of years; in addition, ACC ltd, Ambuja cements ltd, Dabur ltd, Havells India, Tata consumer products Ltd, United spirits Ltd, and HCL technologies Ltd, among others, have achieved seven points in a number of years. These companies are regarded as the leaders in CG measures adoption. On the other hand, many pharmaceutical companies and a few companies from other industries, including

Eicher motors, Colgate Palmolive (India) ltd, Nestle India ltd, Adani enterprises ltd, and Procter and Gamble Hygiene and health care ltd, are less likely to adopt the CG measure and have kept a CG index of 4 or less for a number of years.

Table 6.1

Company's Corporate Governance Score

Sl. No	Company name	Financial Year									
		11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21
1	Bajaj Auto Ltd.	3	3	3	6	6	6	6	6	6	7
2	Bosch Ltd.	3	2	2	3	4	4	4	5	5	5
3	Eicher Motors Ltd.	1	1	2	3	3	1	2	3	3	3
4	Hero MotoCorp Ltd.	3	3	3	5	4	7	7	6	6	6
5	Mahindra & Mahindra Ltd.	3	3	3	4	4	4	5	5	6	6
6	Maruti Suzuki India Ltd.	3	3	3	5	5	6	6	6	6	6
7	Tata Motors Ltd.	4	4	4	6	6	6	5	5	6	6
8	A C C Ltd.	4	4	4	7	7	7	7	7	7	7
9	Ambuja Cements Ltd.	4	4	4	7	7	7	7	7	7	7
10	Grasim Industries Ltd.	3	2	3	6	6	6	5	6	6	6
11	Shree Cement Ltd.	3	3	3	5	6	6	6	6	6	6
12	UltraTech Cement Ltd.	2	3	3	5	5	6	5	5	5	5
13	Pidilite Industries Ltd.	3	3	3	3	5	5	5	5	6	6
14	D L F Ltd.	3	3	3	6	6	5	6	6	6	6
15	Larsen & Toubro Ltd.	3	3	3	4	4	4	4	4	5	5
16	Asian Paints Ltd.	3	3	3	5	5	5	5	5	6	6
17	Berger Paints India Ltd.	2	2	2	4	4	4	4	5	5	5
18	Britannia Industries Ltd.	2	2	2	2	5	5	4	4	5	5
19	Colgate-Palmolive (India) Ltd.	2	2	2	3	3	3	3	4	3	4

Sl. No	Company name	Financial Year									
		11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21
20	Dabur India Ltd.	2	2	3	4	5	5	5	7	7	7
21	Godrej Consumer Products Ltd.	3	3	3	2	4	4	4	4	5	5
22	Havells India Ltd.	2	3	5	5	6	5	6	7	7	7
23	Hindustan Unilever Ltd.	3	3	3	4	4	4	4	5	5	5
24	I T C Ltd.	4	4	4	4	4	5	6	6	6	6
25	Marico Ltd.	3	3	3	4	5	5	5	5	6	6
26	Nestle India Ltd.	3	3	3	4	4	4	4	4	4	5
27	Procter & Gamble Hygiene & Health Care Ltd.	2	2	3	4	3	4	4	4	4	4
28	Tata Consumer Products Ltd.	4	4	4	7	7	7	7	7	7	7
29	Titan Company Ltd.	3	3	4	7	7	6	6	6	6	6
30	United Spirits Ltd.	3	3	6	6	7	7	7	7	7	7
31	Jubilant Food works Ltd.	2	2	2	2	2	4	4	6	6	6
32	P I Industries Ltd.	3	2	2	3	4	4	3	5	5	6
33	U P L Ltd.	4	4	3	4	4	5	5	4	5	5
34	Siemens Ltd.	3	3	3	6	6	6	6	6	7	6
35	H C L Technologies Ltd.	7	7	7	7	6	7	7	7	7	7
36	Infosys Ltd.	4	4	4	6	6	6	6	6	7	7
37	Tata Consultancy Services Ltd.	5	5	5	5	5	5	5	6	7	7
38	Tech Mahindra Ltd.	3	3	3	4	5	4	6	6	6	7
39	Wipro Ltd.	3	3	3	3	4	7	7	7	7	8
40	Adani Enterprises Ltd.	2	2	3	3	5	4	4	4	4	4
41	Hindalco Industries Ltd.	3	3	3	5	5	5	5	6	6	7
42	J S W Steel Ltd.	3	3	3	3	6	6	5	7	6	7

Sl. No	Company name	Financial Year									
		11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21
43	Jindal Steel & Power Ltd.	3	3	3	6	6	7	7	7	7	7
44	Steel Authority of India Ltd.	2	2	2	6	6	7	7	8	8	8
45	Tata Steel Ltd.	3	3	3	3	6	6	7	7	8	6
46	Vedanta Ltd.	4	4	4	4	5	5	5	5	5	5
47	Bharat Petroleum Corpn. Ltd.	4	4	4	6	6	6	6	6	6	6
48	G A I L (India) Ltd.	3	3	3	3	3	4	5	6	6	6
49	Hindustan Petroleum Corpn. Ltd.	3	4	4	4	4	5	5	5	5	5
50	Indian Oil Corpn. Ltd.	3	3	3	3	4	4	4	4	5	5
51	Indraprastha Gas Ltd.	2	2	2	2	2	3	3	3	7	7
52	Oil & Natural Gas Corpn. Ltd.	3	3	3	3	5	6	6	6	6	6
53	Reliance Industries Ltd.	4	4	4	6	6	6	6	6	6	6
54	Aurobindo Pharma Ltd.	4	4	7	7	6	7	7	6	7	7
55	Biocon Ltd.	2	2	3	3	2	4	4	6	6	7
56	Cadila Healthcare Ltd.	3	2	3	3	4	4	4	4	4	5
57	Cipla Ltd.	3	3	3	4	4	4	5	5	5	5
58	Divi's Laboratories Ltd.	1	1	2	2	1	4	4	4	4	4
59	Dr. Reddy's Laboratories Ltd.	3	6	5	6	5	6	6	6	6	6
60	Lupin Ltd.	1	2	2	4	4	5	4	5	5	5
61	Sun Pharmaceutical Inds. Ltd.	2	1	2	3	5	5	5	5	5	4
62	Torrent Pharmaceuticals Ltd.	1	1	1	2	1	5	4	6	6	7
63	N T P C Ltd.	4	5	5	6	6	6	6	6	6	6

Sl. No	Company name	Financial Year									
		11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21
64	Power Grid Corpn. Of India Ltd.	3	3	3	5	4	5	5	6	6	6
65	Adani Ports & Special Economic Zone Ltd.	2	1	2	4	5	5	5	5	6	6

Source: Author Compilation

6.2.1.2 Descriptive statistics

The descriptive statistics of the variables that were used for analysis are included in Table 6.2. Mean, median, Standard deviation, minimum value and maximum value of independent variable, i.e., CG index, dependent variable, i.e., FCD and different control variables are presented. With an average CG index score of 4.586 and a median CG index score of 5, it can be seen that most businesses are paying attention to more than half of the CG indicators during the periods in inquiry. The minimum value of the CG index is 1, indicating that none of the companies are following any of the CG desirable practices, while the maximum value of 8 indicates that a few companies have adopted all of the CG variables.The average export of selected companies is only 13 percent, while the maximum is 98 percent, indicating that some companies earn the majority or all of their earnings from export sales; primarily, IT companies fall into this category. In comparison to exports, sample companies' imports are lower, with an average import of only 5% and a maximum import of 76%. The size of the organization is almost the same on both ends, as the mean and median don't differ by much. All of the sample companies are large non-financial companies listed in the NSE 100, and their value is the logarithm of their total assets. Current ratio shows that, on average, a company keeps 1.5 times as current asset as its current liabilities. The capital gearing ratio shows that, on an average the company's total debt is only 38% of its shareholders' equity, with a maximum of 274% of debt to equity.

Table 6.2

Descriptive statistics

Variable name	Mean	Median	Std. Deviation	Min	Max
FCD	2.771	3.232	1.973	0.000	6.018
CG Index	4.586	5.000	1.610	1.000	8.000
Export ratio	0.131	0.002	0.250	0.000	0.979
Import ratio	0.058	0.000	0.117	0.000	0.759
Size	5.314	5.246	0.612	3.677	6.988
CR	1.537	1.315	0.928	0.260	6.780
Liq	0.219	0.059	0.382	0.002	2.505
Lev	0.161	0.113	0.139	0.005	0.650
Cap G	0.386	0.140	0.527	0.010	2.740
D Y	32.360	30.090	18.011	2.140	88.180
Growth	0.0710	0.0482	0.084	0.001	0.992
R and D	0.0098	0.002	0.018	0.000	0.161

Source: Author Compilation

6.2.1.3 Correlation coefficient, Unit root testing and VIF

The correlation coefficients between the variables analyzed are displayed in Table 6.3. There is a significant positive correlation between the CG index and FCD. All control variables except liquidity and dividend yield are correlated with FCD. Export ratio, import ratio, firm size current ratio, and R&D ratio variables have a moderately positive correlation with FCD, whereas leverage ratio, capital gearing ratio, and growth opportunities have a negative correlation. The largest correlation among independent variables is 0.300, which exists between export ratio and import ratio. However, this value is below the 0.80 threshold limit, which was established to avoid multicollinearity issues.

Table 6.3

Correlation Co-efficient between variables

	CG Index	FCD	Export ratio	Import ratio	Size	Current ratio	Liq	Lev	Cap G	D Y	Growth	R and D
CG Index	1											
FCD	0.126**	1										
Export ratio	-0.155***	0.304***	1									
Import ratio	-0.219***	0.126**	0.300***	1								
Size	0.381***	0.280***	-0.014	0.109**	1							
Current ratio	0.039	0.165***	0.215***	-0.024	-0.166***	1						
Liq	0.000	0.033	0.229***	-0.071	-0.007	0.318***	1					
Lev	0.050	-0.157***	-0.166***	0.104**	0.422***	-0.394***	-0.116**	1				
Cap G	0.061	-0.088*	-0.099*	0.157***	0.400***	-0.423***	-0.133***	0.710***	1			
D Y	-0.005	0.007	-0.132***	-0.129**	-0.013	-0.010	0.030	-0.094*	-0.162***	1		
Growth	-0.101*	-0.186***	-0.007	0.046	0.172***	-0.122**	-0.052	0.389***	0.336***	-0.117**	1	
R and D	-0.042	0.161***	0.273***	-0.039	-0.138***	0.217***	-0.005	-0.193***	-0.120**	-0.075	-0.024	1

Source: Author Compilation

Table 6.4 displays the ADF and associated p value. ADF is utilized to examine the unit root or non-stationarity of model variables. As the p-values are 0.01 and 0.024, the result indicates that all variables are stationary or there is no unit root in the variables.

Table 6.4

Test of Stationarity

Variable name	Dickey-Fuller	p-value
FCD	-5.9026	0.01
CG Index	-4.731	0.01
Export ratio	-3.6904	0.02448
Import ratio	-5.9299	0.01
Size	-4.2565	0.01
Current ratio	-4.5111	0.01
Liq	-6.7698	0.01
Lev	-4.0418	0.01
Cap G	-5.037	0.01
D Y	-6.3597	0.01
Growth	-5.475	0.01
R and D	-4.4285	0.01

Source: Author Compilation

Using the Variance Inflation Factor (VIF), a multi-collinearity test was conducted. Table 6.5 enumerates the variables and their respective VIFs. VIF measures the degree of correlation between variables in a regression model. Since all variables are less than the threshold limit, i.e., 5, there is no indication of multicollinearity.

Table 6.5

Test of Multicollinearity using VIF

Variable Name	VIF
CG Index	1.839002
FCD	
Export ratio	1.487176
Import ratio	1.297259
Size	2.422201
Current ratio	1.259479
Liq	1.216406
Lev	1.318204
Cap G	1.302577
D Y	1.042371
Growth	1.055582
R and D	1.114267

Source: Author Compilation

6.2.1.4 Panel model selection

F test is used to make selection between Pooled OLS and Fixed effect model and Hausman test is applied to make selection between Fixed effect and Random effect model. F test for individual effects shows that pooled OLS is an apt model for measuring the influence of corporate governance on FCD usage as it is significant at 1% (p value is 0.0000). In order to make selection between Fixed effect model and random effect model, Hausman test is applied and chi-square is 5.613 with 11 degrees of freedom and p value is 0.8979, Null hypothesis is that 'differences in coefficients are unsystematic'. It is fails rejected the null hypothesis as the p value is significant at 5% level of significance, so, to analyse the influence of CG on FCD, the random effect model is appropriate.

6.2.1.5 Panel regression result

The Random effect model is the most appropriate method for estimating the influence of CG practices on FCD usage, as determined by panel model selection tests.

The null hypothesis, H0a, states that corporate governance has no significant influence on FCD usage. To estimate, the following RE model is used. The following equation was used to analyze, explanatory variables include various variables that have a direct influence on FCD usage, which is identified from the literature.

$$FCD_{it} = \beta 0 + \beta 1 CGI_{it} + \beta 2 EXP_{it} + \beta 3 IMP_{it} + \beta 4 SIZE_{it} + \beta 5 CR_{it} + \beta 6 LIQ_{it} + \beta 7 LEV_{it} + \beta 8 CAPG_{it} + \beta 9 DY_{it} + \beta 10 GROWTH_{it} + \beta 11 RANDD_{it} + \sum_{j=1}^{j} \beta 12 + j + y \; INDy, i, t + vi, t$$

The results of the panel regression are shown in Table 6.6. The model is appropriate and significant given that the chi-square value on 24 Degrees of freedom is 65.8754 and the p value is 0.000. The R-square value indicates that approximately 9.5% of FCD usage variation is explained by the explanatory variables. The random effect model analyzing the influence of the CG index on a company's FCD usage revealed that the CG index has a weakly negative relationship with FCD usage; the relationship is statistically significant at the 5-percent significance level, as indicated by the p value of 0.041423. Among the control variables, firm size and capital gearing ratio were found to have a significant positive relationship with FCD usage. This result is consistent with a large body of literature indicating that firm size is a major determinant of FCD usage and that large firms are more likely to utilize FCD. Three of the 13 industries have a statistically significant relationship with FCD usage. Industry 8, i.e., Industrial manufacturing, has a positive correlation with FCD usage, whereas industries 10, i.e., Metals, and 12, i.e., Pharmaceuticals, have negative correlations.

Table 6.6

Influence of Corporate Governance on FCD usage (Measurement using CG Index)

Random Effect Model	
Variables	Estimate (Probability value)
(Intercept)	-0.83271779 (0.547207)
CG Index	-0.07008461 (0.041423 *)

	Random Effect Model
Ex ratio	0.18598671 (0.409515)
Im ratio	-0.62583458 (0.136606)
Size	0.82341035 (0.001241 **)
CR	-0.01875484 (0.792924)
Liq	-0.09090604 (0.184962)
Lev	-0.61918148 (0.309722)
CG ratio	0.45567180 (0.003223 **)
DY	0.00024183 (0.892950)
Growth	-0.45967726 (0.404959)
R and D	4.54824150 (0.241506)
Industry 1	-1.16054146 (0.165788)
Industry 2	0.09911812 (0.948384)
Industry 3	-1.02304050 (0.373207)
Industry 4	-0.85736914 (0.198778)
Industry 5	-2.39888563 (0.121792)
Industry 6	0.73079858 (0.524951)
Industry 7	1.85230963 (0.224909)
Industry 8	1.79644131 (0.034944 *)
Industry 9	0.12755082 (0.870792)
Industry 10	-1.74085996 (0.026853 *)
Industry 11	-0.03760971 (0.958967)
Industry 12	-3.66148045 (0.002364 **)
Industry 13	-1.65684761 (0.282564)
R-Squared: 0.095351	
Adj. R-Squared: 0.060612	
Chisq: 65.8754 on 24 DF, p-value: 9.0484e-06	

Source: Retrieved from R-studio

6.2.1.6 Diagnostic test

Initially, the serial correlation in panel idiosyncratic error was examined utilizing the Breusch-Godfrey/Wooldridge serial correlation test and the Durbin-Watson serial correlation test. The null hypothesis in this case is that idiosyncratic

errors do not exhibit serial correlation. According to the test results, failed to reject the null hypothesis and it is concluded there is no serial correlation in the error term. Finally, the Breusch-Pagan test was used to examine the heteroscedasticity. When the p-value is greater than 0.05, it is assumed that heteroscedasticity is nonexistent. The presence of heteroscedasticity reflects the unequal scatter of the residuals. A p-value of 0.08542 indicates the absence of heteroscedasticity, as demonstrated by the test results.

6.2.2 Influence of Corporate Governance on FCD usage (Measurement of individual governance variables)

In the preceding section, the influence of CG practices on FCD usage is analyzed, and the section 6.2.1.5 test result demonstrates a significant influence. The previous section performed an analysis of the CG index on FCD after considering eight variables and assigning a score to each firm based on its fulfilment of CG variables, but the analysis does not permit interpretation of the contribution of individual variables to FCD usage. In order to overcome this limitation and conduct a comprehensive analysis of each variable's contribution to FCD usage, this analysis is conducted. The following hypotheses were formulated for testing purposes. The section 6.2.21 provides information regarding the CG variables considered for study.

H0a: Number of members on the board has no significant influence on FCD usage.

H0b: Number of board meeting has no significant influence on FCD usage.

H0c: Percentage of attendance in board meeting has no significant influence on FCD usage.

H0d: Proportion of independent directors on board has no significant influence on FCD usage

H0e: Proportion of non-executive directors on board has no significant influence on FCD usage.

H0f: Salary of board members has no significant influence on FCD usage.

H0g: Number of members on 'RMC' has no significant influence on FCD usage.

H0h: Number of RMC meeting has no significant influence on FCD usage.

H0i: Number of independent directors on RMC has no significant influence on FCD usage.

H0j: Number of non-executive directors on RMC has no significant influence on FCD usage.

H0k Risk management committee has no significant influence on FCD usage.

H0l: Independent director as Chairman of RMC has no significant influence on FCD usage.

H0m: non-executive director as Chairman of RMC has no significant influence on FCD usage.

H0n: Disclosure of expertise/skills of directors has no significant influence on FCD usage.

H0o: Exposure is quantified and hedging details are disclosed has no significant influence on FCD usage.

H0p: Chief Risk Officer has no significant influence on FCD usage.

6.2.2.1 List of variables

Existing studies analyzed the influence of various variables on FCD usage and determined that various variables have an effect on FCD usage. The preceding analysis identified the influence of CG practices on FCD usage but it has a limitation that precludes drawing conclusions about the contribution of individual CG variables to FCD usage. In this analysis, the effect of each variable is considered. The analysis included sixteen variables related to board composition and risk management. In addition to these sixteen variables, the variables identified in the existing literature as having an effect on derivative usage are treated as control variables. An industry dummy is also included in independent variables in order to measure differences

between industries. The dependent variable will obviously be the notional value of FCD. Details regarding the FCD and control variables have already been explained in section 6.2.1.1, so they are not repeated here. Table 6.7 provides the list of independent variables and their respective measurement units. The majority of the variables listed below are derived from amendments to SEBI listing regulations made in response to kodak committee recommendations. CG data are obtained from the CAPITALINE databases.

Table 6.7

List of Variables

Variables	Measurement unit
CG 1. Members on the board	Number
CG 2. Board meetings in a year	Number
CG 3. Attendance in board meeting	Percentage
CG 4. Independent directors on board	Proportion
CG 5. non-executive directors on board	Proportion
CG 6. Salary of board members	Amount
CG 7. Members on 'RMC	Number
CG 8. RMC meeting in a year	Number
CG 9. Independent directors on RMC	Number
CG 10. non-executive directors on RMC	Number
CG 11. Risk management committee	Binary (zero or one)
CG 12. Independent director as Chairman of RMC	Binary (zero or one)
CG 13. non-executive director as Chairman of RMC	Binary (zero or one)
CG 14. Disclosure of expertise/skills of directors	Binary (zero or one)
CG 15. Exposure is quantified and hedging details are disclosed	Binary (zero or one)
CG 16. Appointed Chief Risk Officer	Binary (zero or one)

Source: Author compilation

6.2.2.2 Panel model selection

There are a variety of models that can be utilized for panel data analysis; based on the results of various tests, one must determine which model is most suitable. The F test for individual effect test is applied in order to make the choice between the pooled OLS model and the fixed effect model. Since the p value is 0.000, which indicates that the null hypothesis should be rejected, this suggests that the pooled OLS model is not an appropriate method. The Hausman test is utilized so that a decision can be made between using a model with fixed effects or one with random effects. The test's outcome reveals a chi-square value of 36,345, and its p value is 0.0855; consequently, we are unable to reject the null hypothesis that "differences in coefficients are unsystematic." Therefore, it can be deduced that the random effect model is the one that should be utilized.

6.2.2.3 Panel regression result

To measure the corporate governance practices of a firm, sixteen variables related to board composition and risk management were identified, and the influence of each of these variables on FCD usage was analyzed using the following equation. The random effects model is determined to be the most suitable model for analyzing the impact of various CG practices on FCD utilization. The results of the subsequent panel regression model are displayed in table 6.8.

$$
\begin{aligned}
FCD_{it} = \ & \beta 0 + \beta 1\mathrm{CG1}_{it} + \beta 2\mathrm{CG2}_{it} + \beta 3\mathrm{CG3}_{it} + \beta 4\mathrm{CG4}_{it} + \beta 5\mathrm{CG5}_{it} + \beta 6\mathrm{CG6}_{it} \\
& + \beta 7\mathrm{CG7}_{it} + \beta 8\mathrm{CG8}_{it} + \beta 9\mathrm{CG9}_{it} + \beta 10\mathrm{CG10}_{it} + \beta 11\mathrm{CG11}_{it} \\
& + \beta 12\mathrm{CG12}_{it} + \beta 13\mathrm{CG13}_{it} + \beta 14\mathrm{CG14}_{it} + \beta 15\mathrm{CG15}_{it} + \beta 16\mathrm{CG16}_{it} \\
& + \beta 17EXP_{it} + \beta 18IMP_{it} + \beta 19SIZE_{it} + \beta 20CR_{it} + \beta 21LIQ_{it} \\
& + \beta 22LEV_{it} + \beta 23CAPG_{it} + \beta 24DY_{it} + \beta 25GROWTH_{it} \\
& + \beta 26RANDD_{it} + \sum_{j=1}^{j} \beta 27 + j + y\ INDy, i, t + vi, t
\end{aligned}
$$

As the test chi-square value is significant at the one percent level of significance, it is determined that the random effect model is appropriate to use (p value is 0.000). According to the value of R square, approximately 13 percentage

points of the variation in FCD value can be attributed to the explanatory variables. Three of the sixteen CG variables studied have a statistically significant effect on FCD usage. Salary of board members has a positive significant influence on FCD usage, while proportion of non-executive directors and disclosure of expertise or skills of directors have a negative significant influence on FCD usage, and all other variables have no significant effect on derivative usage. It is an indication that if there are more non-executive directors on the board, managers have more restrictions on the usage of derivatives, and businesses that are more transparent with their information to the public are also not extensively engaged in derivatives transactions. The results of the industry dummy variable revealed that the industrial manufacturing industry has a positive link on FCD usage, whereas the pharmaceutical industry has a negative association; however, none of the other industries had a significant association toward the FCD usage.

Table 6.8

Influence of CG on FCD usage (Analysis on individual variables of CG)

Random Effect Model	
Variables	Estimate (Probability value)
(Intercept)	-4.72750114 (0.021770 *)
CG 1	0.03439424 (0.147568)
CG 2	-0.01543735 (0.563711)
CG 3	0.00050618 (0.934533)
CG 4	0.94230051 (0.122481)
CG 5	-1.40734788 (0.038215 *)
CG 6	0.65945976 (0.001892 **)
CG 7	0.02860696 (0.490980)
CG 8	0.01678918 (0.664650)
CG 9	-0.01809920 (0.778710)
CG 10	-0.02975624 (0.625597)
CG 11	-0.20290458 (0.379285)
CG 12	0.07427058 (0.675144)
CG 13	0.00707301 (0.971522)

	Random Effect Model
CG 14	-0.33512184 (0.004780 **)
CG 15	-0.00876141 (0.960352)
CG 16	-0.22588353 (0.217093)
Ex ratio	0.13066469 (0.575764)
Im ratio	-0.51818862 (0.233745)
Size	0.56143606 (0.048588 *)
CR	-0.07312923 (0.320659)
Liq	-0.08732787 (0.225867)
Lev	-0.39667103 (0.529131)
CG ratio	0.39927060 (0.011602 *)
DY	0.00035306 (0.847083)
Growth	-0.47598811 (0.398863)
R and D	3.65414422 (0.354173)
Industry 1	-1.02460993 (0.217226)
Industry 2	-0.51580800 (0.733576)
Industry 3	-1.62614450 (0.155178)
Industry 4	-0.84285642 (0.201475)
Industry 5	-1.91780426 (0.211003)
Industry 6	0.78256181 (0.490204)
Industry 7	1.86122398 (0.216780)
Industry 8	1.83659245 (0.029695 *)
Industry 9	0.15043602 (0.847115)
Industry 10	-1.27858264 (0.114559)
Industry 11	-0.10097547 (0.888913)
Industry 12	-2.80378628 (0.023403 *)
Industry 13	-1.61428382 (0.289735)
R-Squared: 0.13038 Adj. R-Squared: 0.074784 Chisq: 91.4578 on 39 DF, p-value: 4.2305e-06	

Source: Retrieved from R-studio

6.2.3 Discussion

The third goal is to evaluate the influence of good corporate governance on the use of FCDs. Two sorts of analysis were performed to accomplish this objective. First, the CG index was created, and its impact on FCD adoption was studied. A statistically significant negative influence was found in the test. There were 16 factors found and evaluated to determine the relative importance of each CG variables in FCD usage. Three factors are identified as having a statistically significant influence on FCD usage.

There is paucity in studies which analyzed the influence of CG on FCD usage, most of the empirical studies are focused on derivative usage instead on specifically analyzing the influence on FCD. To accomplish the objective, analysis is divided in to two parts, in the first part the hypothesis set for analysis is that the corporate governance has no significant influence on FCD usage and the analysis rejected the null hypothesis. Our analysis found a statistically significant negative influence of CG on FCD usage, it contradict with existing studies as their results reported a positive influence of corporate governance practices on derivative usage for hedging purpose (Bokpin & Isshaq, 2009; Chen et al., 2014; Marsden & Prevost, 2005). The study reported the Size as major influencer of FCD usage and (Bae et al., 2018; Dang & Lindsay, 2022; Ekadjaja et al., 2020; Seok et al., 2020) are also reported the size as major determinant of derivative usage. (Lau, 2016) is a view that firms are more prominent to use derivative instrument for reducing the tax burden and this study also found a matching result. It has been shown by numerous researchers that the export/import ratio has a substantial impact on derivative usage (Allayannis & Ofek, 2001; Chang et al., 2013; Skinner, 2013; Zhang et al., 2013; Zhou & Wang, 2013)however, our analysis was unable to confirm these findings. This may be attributable to differences in the business practices of the corporates we analyzed, or to the passage of time; however, since our analysis period encompasses the Covid pandemic, it is also possible that these external factors had an effect on FCD usage.

The second part of the analysis is conducted to analyze the variable's individual influence on FCD usage; to accomplish these analysis 16 hypotheses were

developed and tested. Among them three hypotheses were rejected and remining failed to reject. The findings shows that proportion of non-executive directors on board have a negative influence on FCD usage and it is interpreted those non-executive directors may impose some restriction on risk management team on usage of FCD. In the same way the disclosure of expertise or skills of directors have a negative influence on FCD usage while salary of board members found to have a positive influence on FCD usage.

6.2.4 Conclusion

The objective of this study is to investigate the influence of corporate governance on FCD usage. Initially, the researcher constructed a corporate governance index by evaluating eight factors linked to board composition and risk management in order to achieve the goal. In their annual reports, the sample firms are informed that the board of directors and risk management committee are the two parties that influence FCD utilization. Consequently, these two characteristics were included when constructing the governance index. The research finds that CG has a negative and significant influence on FCD usage. The analysis performed to determine the influence of individual variables in CG on FCD usage revealed that the proportion of non-executive directors on the board and the disclosure of expertise or skills of directors have a significant negative influence on FCD usage, whereas board member compensation has a significant positive influence on FCD usage.

6.3 Moderating role of corporate governance on the relation between FCD on firm value and firm performance

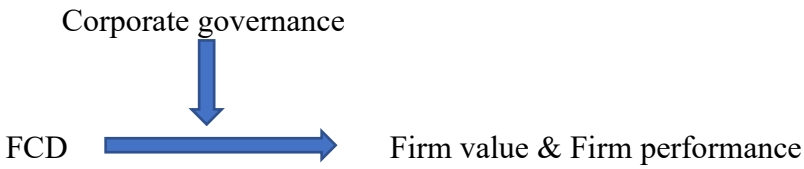
Agency theory states that a conflict of interest may arise between the shareholders and executives based on some decisions taken by executives (Eisenhardt, 1989)and information asymmetry hypothesis assumes that management knows more about the firm's value than investors. Investors rationalize the firm's behavior. These assumptions yield an equilibrium issue-invest choice model(Myers & Majluf, 1984). Many existing research solemnly focus on the relationship of FCD on firm value or performance (Bazih & Vanwalleghem, 2021; Choi et al., 2020; Dai et al., 2020;

Giraldo-Prieto et al., 2017; Pyeman et al., 2019; Seok et al., 2020; Setiawanta et al., 2021; Wernerfelt & Montgomery, 1988). The agency theory, information asymmetry hypotheses and lack of focus in literature were intended the researcher to focus on the moderating role of corporate governance on the relationship between FCD on firm value and firm performance.

Moderation analysis showed the independent variable's effect on the dependent variable is consistent at different levels of another independent variable (moderator). It determines if the moderator will change the degree of the independent-dependent relationship. The moderating influence of corporate governance procedures on the relationship between FCD usage and firm value and firm performance was one that we investigated as show in the following figure (figure 6.1), and fond that CG moderates the relation between FCD and firm value not the firm performance.

Figure 6.1

Moderation model of CG on FCD and Firm value and Performance.



The CG index is developed based on the eight variables related to board composition and risk management. Data were collected from Capitaline data base and annual reports and this index is considered as moderator for FCD on firm value and firm performance. To measure firm value, Tobin's and market capitalization values were used, and Return on Equity (ROE) and Return on Assets (ROA) served as proxy for firm performance. Literature-identified variables with a direct effect on company value or performance were included as covariates or control variables in the regression model. The information regarding the independent variables, control variables are provided in section 5.2.1 of chapter 5 and details about corporate governance (CG)index creation is provided in 6.2.1.1 of this chapter, thus they will not be repeated here.

6.3.1 Moderating role of corporate governance on the relation between FCD and Firm value

The review of literature on the relation between FCD usage and firm value reported a conflicting results in their relationship (Bachiller et al., 2020). The derivative usage may not be lead to firm value because of derivative misuse, the sources of misuse includes inadequate regulatory system, poor instrument design, badly designed internal controls, ineffective communication, and a poor firm culture (Grima et al., 2016). From the findings, the study recommended to have internal governance for reducing or to eliminate the misuse of derivatives. According to (Lel, 2012), firms with strong corporate governance use currency derivatives for hedging rather than speculation, and as a result, they are able to avoid expensive outside funding. With support to this view (Allayannis et al., 2012) reported that highly governed firms are use derivatives for hedging not for speculation or satisfy managers self-interest. Few other studies also reported the same result (Hege et al., 2021; Huang et al., 2018; Lel, 2012). In general, hedging is beneficial for a firm if its goal is to maximize returns for its shareholders, but it can have a negative impact if its drivers are speculation or the pursuit of personal gain on the part of its managers (Sikarwar & Gupta, 2019).

From the above discussion it is clear that corporate governance plays a major role in the relation between derivative usage and firm value. In order to measure the moderating role of corporate governance on the relation between FCD and firm value two proxies are considered to represent the firm value: Tobin's Q and market capitalization value. Based on the variable's relationship, the following hypotheses were developed to test.

H0a: Corporate governance has no significant moderating role on the relationship between FCD and Tobin's Q

H0b: Corporate governance has no significant moderating role on the relationship between FCD and market capitalization

6.3.1.1 Firm value represented by Tobin's Q

This study examines the statistical interaction or mediating role of corporate governance on the relationship between FCD usage and firm value. As previously stated, firm value is determined using Tobin's Q value and market capitalization value; nevertheless, the Tobin's Q value is employed as a proxy for firm value in this analysis. Here, Tobin's Q is the dependent variable, FCD is the independent variable, and corporate governance is the moderating variable. In addition, covariates or control variables with an impact on the firm's value found in the literature are included.

Moderation analysis is done with the Process code for R written Andrew F. Hayes, in the model, Y represented for dependent variable, X for independent variable and W for moderating variable and control variables are given under covariates (F. Hayes, 2022). In the statistical model, Y =Tobin'sQ, X = FCD, W = CGIndex and Covariates includes Firm size, dividend yield, leverage, liquidity, growth opportunities, geographical diversification and research and development ratio.

$$Value(Tobin's\ Q)_{it} = \beta 0 + \beta 1 FCD_{it} + \beta 2 CGI_{it} + \beta 3\ FCD_{it} * CGI_{it} + \beta 4 FSIZE_{it} + \beta 5 D\ Y_{it} + \beta 6 LEV_{it} + \beta 7 LIQ_{it} + \beta 8 GROWTH_{it} + \beta 9 GDIV_{it} + \beta 10 RANDD_{it} + vi, t$$

The statistical test result shows that the model employed for analysis is fit as the F value 65.0184 for the model is significant at 1 percentage level of significance (p value: 0.000). The R square value shows that the model is explained around 50.43 percentage of variation in dependent variable by the explanatory variables. The OLS regression result (Table 6.9) shows that FCD has a significant (p value: 0.0030) negative impact (Co efficient: -0.0523) on Tobin's Q but the CG index has no significant impact on Tobin's Q value. b3 i.e., co efficient of Int_1 = 0.0125, this co efficient quantifies the effect of FCD on firm value (Tobin's Q) changes as CG index changes by one unit.

Table 6.9

OLS Regression Output (FCD to Tobin's Q moderated by CG)

	Co efficient	Std Error	t value	P value
constant	2.6957	0.1145	23.6149	0.0000
FCD	-0.0523	0.0176	-2.9202	0.0036
CGIndex	-0.0046	0.0114	-0.3980	0.6907
Int_1	0.0125	0.0034	3.6175	0.0003
Size	-0.4372	0.0239	-18.2793	0.0000
D Y	0.0023	0.0005	5.0868	0.0000
Lev	-0.2417	0.1001	-2.4616	0.0141
Liq	0.0526	0.0140	3.7501	0.0002
Growth	0.2021	0.1480	1.3032	0.1930
Geo Div	-0.0868	0.0521	-1.7589	0.0791
R and D	0.4161	0.6284	0.6349	0.5257

Source: Retrieved from R-studio

The higher order unconditional interaction test result shows a p value of 0.0003, so it is interpreted that the interaction of FCD with CG index is statistically significant. While analyzing the conditional effects of the focal predictor (FCD) at the moderator (CG Index), 2.6493 is the lower and 5.2548 is the higher significance region defined by Johnson-Neyman significance region test. Conditional effect of focal predictor at different values of moderators are given in table 6.10. The test result shows that when the CG index is low the effect of FCD on firm value (represented by Tobin's Q) is negative. When the CG index is one, FCD has a statistically significant negative effect (-0.0398) on firm value and this negative effect is significant till the CG index is 2.6493. On the other hand, at the upper level, when the CG index is 5.2548 the conditional effect of focal predictor is statistically significant and the effect is positive. It is interpreted that when the CG index of the firm is higher and if such firms are using FCD for hedging the foreign currency risk, such practices have a positive effect on firm value.

Table 6.10

Conditional effect of focal predictor at values of the moderator (FCD to Tobin's Q moderated by CG)

CG Index	Effect	Std Error	t value	P value
1.0000	-0.0398	0.0144	-2.7552	0.0060
1.3684	-0.0352	0.0133	-2.6395	0.0085
1.7368	-0.0306	0.0122	-2.4966	0.0128
2.1053	-0.0259	0.0112	-2.3179	0.0208
2.4737	-0.0213	0.0102	-2.0921	0.0368
2.6493	-0.0191	0.0097	-1.9637	0.0500
2.8421	-0.0167	0.0093	-1.8044	0.0716
3.2105	-0.0121	0.0084	-1.4376	0.1510
3.5789	-0.0075	0.0077	-0.9746	0.3301
3.9474	-0.0029	0.0071	-0.4070	0.6842
4.3158	0.0017	0.0068	0.2515	0.8015
4.6842	0.0063	0.0066	0.9542	0.3403
5.0526	0.0109	0.0067	1.6296	0.1037
5.2548	0.0134	0.0068	1.9637	0.0500
5.4211	0.0155	0.0070	2.2121	0.0273
5.7895	0.0201	0.0075	2.6706	0.0078
6.1579	0.0247	0.0082	3.0088	0.0027
6.5263	0.0293	0.0090	3.2489	0.0012
6.8947	0.0340	0.0099	3.4163	0.0007
7.2632	0.0386	0.0109	3.5323	0.0004
7.6316	0.0432	0.0119	3.6128	0.0003
8.0000	0.0478	0.0130	3.6688	0.0003

Source: Retrieved from R-studio

6.3.1.2 Firm value represented by Market capitalization

The mediating role of CG on the relationship between FCD and firm value is evaluated using the value of market capitalization as a proxy in for firm value in this analysis. Many of the previously conducted research took the value of the firm to be

equivalent to its market capitalization (Abdolmohammadi, 2005; Abdulrahman Anam et al., 2011; Edeling & Fischer, 2016; Panagiotidis, 2005). The test result shows that the model is fit as the p value is 0.000 and the r square value demonstrate that around 53 percentage of the variation in the dependent variable is explained by the independent variables including the control variables, r square value is more informative in regression model (Chicco et al., 2021). The OLS regression result is given in table 6.11. The regression result shows that FCD has a significant negative effect on firm value while the CG index has an insignificant effect. The product of FCD and CG index shows a positively significant co-efficient, which means that firms with higher governance score have a positive impact on firm value while they are using FCD for hedging. Except for growth opportunities, geographical diversification and research and development, all other control variables are reported a significant co efficient on firm value.

$$Value(Market\ capitalization)_{it} = \beta 0 + \beta 1 FCD_{it} + \beta 2 CGI_{it} + \beta 3\ FCD_{it} * CGI_{it} + \beta 4 FSIZE_{it} + \beta 5 D\ Y_{it} + \beta 6 LEV_{it} + \beta 7 LIQ_{it} + \beta 8 GROWTH_{it} + \beta 9 GDIV_{it} + \beta 10 RANDD_{it} + vi, t$$

Table 6.11

OLS Regression Output (FCD to Market capitalization moderated by CG)

	Co efficient	Std Error	t value	P value
constant	2.9772	0.1247	23.8841	0.0000
FCD	-0.0473	0.0192	-2.4386	0.0150
CG Index	0.0005	0.0125	0.0414	0.9670
Int_1	0.0119	0.0037	3.1539	0.0016
Size	0.5050	0.0260	19.4536	0.0000
D Y	0.0029	0.0005	5.8083	0.0000
Lev	-0.7725	0.1090	-7.1171	0.0000
Liq	0.0554	0.0152	3.6325	0.0003
Growth	-0.0658	0.1611	-0.4465	0.6554
Geo Div	-0.0678	0.0567	-1.2514	0.2112
R and D	0.8710	0.6842	1.2566	0.2094

Source: Retrieved from R-studio

The outcome of the higher order unconditional interaction test reveals a p-value of 0.0016, indicating that the interaction between FCD and CG index is statistically significant. While analyzing the conditional effects of the focal predictor (FCD) on the moderator (CG Index), the Johnson-Neyman significance region test defines the lower significance region as 1.8386 and the upper significance region as 5.2226. Table 6.12 provides the conditional effect of the focal predictor at different moderator frequencies. When the CG index is low, the effect of FCD on firm value (as measured by market capitalization) is negative. FCD has a statistically significant negative influence (-0.0398) on firm value when the CG index is one, and this effect remains significant until the CG index reaches 1.8386. It implies that organizations with poor governance that utilize FCD have a lower firm value. Conversely, when the CG index is 5.2548 at the upper level, the conditional effect of the focused predictor is statistically significant and the effect is positive. When the firm's CG index is greater and it uses FCDs to hedge foreign currency risk, these activities are seen as having a positive impact on firm value.

Table 6.12

Conditional effect of focal predictor at values of the moderator (FCD to Market capitalization moderated by CG)

CG Index	Effect	Std Error	t value	P value
1.0000	-0.0355	0.0157	-2.2578	0.0243
1.3684	-0.0311	0.0145	-2.1452	0.0323
1.7368	-0.0267	0.0133	-2.0073	0.0451
1.8386	-0.0255	0.0130	-1.9637	0.0500
2.1053	-0.0224	0.0122	-1.8362	0.0668
2.4737	-0.0180	0.0111	-1.6218	0.1053
2.8421	-0.0136	0.0101	-1.3515	0.1770
3.2105	-0.0093	0.0092	-1.0102	0.3128
3.5789	-0.0049	0.0084	-0.5845	0.5591
3.9474	-0.0005	0.0078	-0.0693	0.9448
4.3158	0.0038	0.0074	0.5199	0.6033

CG Index	Effect	Std Error	t value	P value
4.6842	0.0082	0.0072	1.1386	0.2553
5.0526	0.0126	0.0073	1.7225	0.0855
5.2548	0.0146	0.0074	1.9637	0.0500
5.4211	0.0169	0.0076	2.2159	0.0270
5.7895	0.0213	0.0082	2.5951	0.0097
6.1579	0.0257	0.0090	2.8670	0.0043
6.5263	0.0300	0.0098	3.0539	0.0024
6.8947	0.0344	0.0108	3.1791	0.0015
7.2632	0.0388	0.0119	3.2617	0.0012
7.6316	0.0431	0.0130	3.3157	0.0010
8.0000	0.0475	0.0142	3.3504	0.0009

Source: Retrieved from R-studio

6.3.2 Moderating role of corporate governance on the relation between FCD and Firm performance

The relationship between FCD and hedging premiumis significantly impacted by the corporate governance practices that are in place, which has already been covered in section 6.3.1 of this chapter. The findings are supported by the majority of the previous studies that investigated the moderating role of CG. In align with this findings (Chen et al., 2014)reported that highly governed firms are largely using derivatives for hedging purpose. Firms with better internal governance are more focused on using the derivatives specifically for hedging and such firms are not utilize the derivatives for speculation.

The existing studies are analyzed the moderating role of CG in the relation between FCD and firm value, but the researcher could not find any study which examines the moderating role of CG in the relation between FCD and firm performance. To fill this gap researcher analyzed the moderating role of CG on relation between FCD and firm performance. ROE and ROA are considered as proxy for measuring the firm performance. Based on the literature and relationship between variables under study, the following hypotheses were developed.

H0c: Corporate governance has no significant moderating role on the relationship between FCD and ROE

H0d: Corporate governance has no significant moderating role on the relationship between FCD and ROA.

6.3.2.1 Firm performance represented by ROE

Moderating role of CG on the relation between FCD and firm value is analyzed and interpreted in section 6.3.1. Now, this study investigates the statistical interaction, also known as moderating, that CG has on the relationship between FCD usage and firm performance. Initially the ROE is considered as proxy for firm performance and analysis is carried. In this analysis, ROE serves as the dependent variable, while FCD serves as the independent variable, and corporate governance serves as the moderating variable. In addition, covariates or control factors that have an effect on firm performance and have been discovered from the relevant research are included in the model. The analytical model is deemed statistically significant since the p value for F is significant at the 1% level of significance (p value: 0.000) and the r square indicates that model explanatory variables accounted for approximately 15.74 percent of the variation in the dependent variable.

Table 6.13 shows the OLS regression output of statistical model. Regression co efficient for independent variable i.e., FCD, moderating variable, i.e., CG index and product of FCD and CG index is reported as statistically insignificant (p value > 0.05). It is interpreted that FCD, CG index and its product has no significant effect on firm performance. In the regression model, only two control variables are reported as statistically significant. Firm size has significant positive and growth opportunities have significant negative co efficient on firm performance.

$$Performance(ROE)_{it} = \beta 0 + \beta 1 FCD_{it} + \beta 2 CGI_{it} + \beta 3\, FCD_{it} * CGI_{it} + \beta 4 FSIZE_{it} + \beta 5 D\,Y_{it} + \beta 6 LEV_{it} + \beta 7 LIQ_{it} + \beta 8 GROWTH_{it} + \beta 9 GDIV_{it} + \beta 10 RANDD_{it} + vi, t$$

Table 6.13

OLS Regression Output (FCD to ROE moderated by CG)

	Co efficient	Std Error	t value	P value
constant	-3.8670	0.6571	-5.8845	0.0000
FCD	0.0827	0.1017	0.8136	0.4162
CG Index	-0.1201	0.0663	-1.8126	0.0704
Int_1	-0.0302	0.0199	-1.5168	0.1298
Size	1.0699	0.1378	7.7631	0.0000
D Y	-0.0034	0.0026	-1.3076	0.1915
Lev	0.9645	0.5770	1.6716	0.0951
Liq	-0.1254	0.0808	-1.5511	0.1214
Growth	-4.4262	0.8502	-5.2058	0.0000
Geo Div	-0.3664	0.2967	-1.2351	0.2173
R and D	-3.8083	3.6323	-1.0484	0.2948

Source: Retrieved from R-studio

The p-value for the higher order interaction test indicates that the interaction between FCD and CG index is not statistically significant. Therefore, it is concluded that corporate governance procedures implemented by enterprises have no significant conditional effect on the relationship between FCD and firm performance. In plain terms, there is no difference in the relationship between FCD usage and firm value for organizations that are in different levels of governance.

6.3.2.2 Firm performance represented by ROA

Section 6.3.2.1 examined the mediation role of CG on the relationship between FCD and firm performance, with ROE serving as a proxy for firm success, and determined that the moderating effect is insignificant. In this section, the identical analysis is performed, except ROA is used as a proxy for firm performance. The analytical model is considered statistically significant because the p value for F is significant at the 1% level of significance (p value: 0.000) and the r square indicates that model explanatory variables accounted for about 25.67% of the variation in the dependent variable.

Table 6.14 displays the output of the statistical model's OLS regression. It is noted that the regression coefficient for the independent variable, i.e., FCD, is statistically insignificant (p value > 0.05). The coefficient for the moderating variable, CG index is statistically significant and establishes a negative association, while the product of FCD and CG index is not (p value: 0.3103). It is believed that a higher CG index will result in a lower ROA. Except for liquidity, all control variables are indicated as statistically significant in the regression model.

$$Performance(ROA)_{it} = \beta 0 + \beta 1 FCD_{it} + \beta 2 CGI_{it} + \beta 3\, FCD_{it} * CGI_{it} + \beta 4 FSIZE_{it} + \beta 5 D\,Y_{it} + \beta 6 LEV_{it} + \beta 7 LIQ_{it} + \beta 8 GROWTH_{it} + \beta 9 GDIV_{it} + \beta 10 RANDD_{it} + vi, t$$

Table 6.14

OLS Regression Output (FCD to ROA moderated by CG)

	Co efficient	Std Error	t value	P value
constant	2.1518	0.2086	10.3149	0.0000
FCD	-0.0457	0.0323	-1.4157	0.1574
CG Index	-0.0830	0.0210	-3.9460	0.0001
Int_1	0.0064	0.0063	1.0154	0.3103
Size	-0.1075	0.0438	-2.4568	0.0143
D Y	0.0021	0.0008	2.4822	0.0133
Lev	-0.6724	0.1832	-3.6709	0.0003
Liq	-0.0083	0.0257	-0.3245	0.7456
Growth	-2.0116	0.2699	-7.4528	0.0000
Geo Div	-0.3399	0.0942	-3.6095	0.0003
R and D	-2.5466	1.1531	-2.2085	0.0276

Source: Retrieved from R-studio

The higher order interaction test result reported that the interaction between FCD and CG index is not statistically significant (p value: 0.3103). Therefore, the conclusion that can be drawn is that the corporate governance measures that are put into place by firms do not have a significant conditional role on the connection between FCD and firm performance. To put it another way, the relationship between

the utilization of FCDs and the firm performance which is measure as ROA is the same for all types of firms, regardless of the degree of governance they fall under.

6.3.3 Discussion

The study intended to test the moderating role of CG on the relation between FCD and hedging premium on other words firm value and firm performance. Tobin's Q and market capitalization are two variables taken as proxy for firm value. The H0a states that corporate governance has no significant moderating role on the relationship between FCD and Tobin's Q. The null hypothesis, H0b, states that corporate governance has no significant moderating role on the relationship between FCD and market capitalization in the second measure of firm value. The analysis result of the Conditional effect of focal predictor at values of the moderator given table 6.10 in case of Tobin's Q and table 6.12 in case of market capitalization reported that CG has significant moderating role on the relation between FCD and Tobin's Q and CG has significant moderating role on the relation between FCD and market capitalization. Here we rejected the null hypotheses.

When Tobin's Q is used as a proxy for firm value, the test results indicate that when the CG index is low, the effect of FCD on firm value is negative and substantial until the CG index reaches 2.6493. Conversely, when the CG index is 5.2548 at the upper level, the conditional effect of the focal predictor is statistically significant and the effect is positive. It is interpreted that firms with a lower CG index utilizing FCDs results in a decrease in firm value, whereas firms with a higher CG index using FCDs for hedging results in an enhancement in firm value.

The study reported a similar result in the role of CG on the relation between FCD on firm value when the firm value is proxy by Tobin's Q as well as market capitalization. In the instance of market capitalization, the regression results demonstrate that when the CG index is one, FCD has a statistically significant negative influence (-0.0398) on firm value, and this effect remains significant until the CG index reaches 1.8386. It means that firms that use FCD but have poor governance have a lower firm value. When the CG index is more than 5.2548, the conditional effect of the focal predictor is statistically significant and positive.

The study findings are consistent with the findings of existing studies. Highly governed firms are using derivatives for hedging instead of speculation and such firms are benefited from the costly external financing and resulted in increase in firm value (Lel, 2012). With consistent to this result, (Bartram, 2017) also shown that derivatives helps to reduce risk and highly governed firms are using derivatives for hedging purpose not for speculation. From this literature, it is clear that highly governed firms are using derivatives for hedging purpose and it resulted into increase in firm value. Derivatives will enhances firm value if the motive is to increase shareholder value; on the other hand, hedging diminishes firm value if the rationale is to speculate or satisfy managers' self-interest (Sikarwar & Gupta, 2019). The same findings is earlier put by (Allayannis et al., 2012), according to study, corporate governed firms are use derivatives for hedging not for speculation or satisfy managers self-interest. In align with this finding, few other studies also reported the same result (Hege et al., 2021; Huang et al., 2018; Lel, 2012).

The second part of this analysis is to evaluate the moderating role of CG on the relation between FCD and firm performance. ROE and ROA considered as proxy for firm performance. Based on the proposed relationship between variables, the study proposed hypotheses that, H0c: Corporate governance has no significant moderating role on the relationship between FCD and ROE and H0d: Corporate governance has no significant moderating role on the relationship between FCD and ROA. Since the regression analysis fails to reject the null hypotheses, it may be concluded that the corporate governance measures implemented by firms do not play a substantial conditional role in the relationship between FCD and firm performance. In other words, the relationship between the usage of FCDs and firm performance, as measured by ROE and ROA, is the same for all firm types, regardless of the degree of governance they are committed to.

6.3.4 Conclusion

This study examined the moderating effect of CG on the link between FCD and firm performance and firm value. Tobin's Q and Market capitalization are used as proxy for the firm's value, while ROE and ROA are used as proxy for the firm's performance. The moderating function was evaluated using R process code. In both situations, Tobin's Q and Market capitalization, the relationship between FCD and firm value is moderated by CG, according to the study. The relationship between FCD and firm value is seen to be positive in the case of highly governed firms, whereas it is negative in the case of poorly governed firms. It was observed that the moderating effect of CG on the relationship between FCD and firm performance was statistically insignificant.

6.4 Chapter summary and conclusion

The chapter aimed to measure the influence of corporate governance practices on the FCD usage and to assess the moderating role of CG practices on the relation between FCD usage and firm value and firm performance.

The third objective is to measure the influence of CG on FCD usage. To accomplish this objective two types of analysis were conducted. Initially the researched developed a CG index by considering eight variables which are related to board composition and risk management. The outcome of the panel regression indicates that corporate governance has a considerable negative effect on FCD utilization. It is assumed that highly governed companies utilize FCD only when necessary. The analysis performed to determine the influence of individual variables in CG on FCD usage revealed that the proportion of non-executive directors on the board and the disclosure of expertise or skills of directors have a significant negative effect on FCD usage, whereas board member compensation has a significant positive effect.

For the analysis, Tobin’s Q and Market capitalization are considered as proxy for firm value and ROE and ROA as proxy for firm performance. Eight-point CG index is used to represents the governance practices for sample firms for selected

study periods. The moderating role of CG on firm value is statistically significant in case of Tobin's Q and market capitalization. Conditional effect of focal predictor, i.e., FCD on firm value is found to be positive in case higher governance value and negative in case of lower governance value. It was found that the moderating influence of CG on the association between FCD and firm performance was not statistically significant.

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CHAPTER 7
FINDINGS, SUGGESTIONS AND CONCLUSION

7.1 Introduction

The chapter begins with a concise overview of the study's executive summary later points out the major findings from the analysis. The findings are segregated into different subtopics, including the effect of FCD on firm value, the effect of FCD on firm performance, the influence of corporate governance on FCD usage, the moderating role of corporate governance on the relationship between FCD and firm value, and the moderating role of corporate governance on the relationship between FCD and firm performance. Later, suggestions are proposed based on the findings, after which the study is concluded. At the end of the chapter, the limitations of the study are explained.

7.2 Summary

Firms are exposed to different kinds of risks, and foreign currency risk is an important one among them, especially for the firms engaged in export and import transactions. Firms use a variety of hedging measures to reduce their exposure to foreign currency risk, and FCD is an important method. FCD's impact on a company's value is always a hotly contested topic, with research yielding conflicting findings (Bachiller et al., 2020). With this background, the study has been done, which is entitled "Foreign currency derivatives for hedging: effect on firm value, firm performance and the moderating role of corporate governance."

Existing studies related to the topic were given in the review of the literature chapter, and research gaps were identified from this review. Major theories related to the topic were discussed in the theoretical framework chapter. Based on the variables identified in the literature and their relationships in the theories, a conceptual model

was developed. The study has been undertaken to answer the following research questions.

- Whether the usage of foreign currency derivatives (FCD) has any effect on firm value and firm performance?
- Do the corporate governance practices followed by the firms have any influence on FCD usage?
- Does corporate governance moderate the relationship between FCD usage and firm value as well as firm performance

The researcher established following objectives in order to find answers to the aforementioned research questions.

- To analyze the effect of FCD usage on firm value
- To analyze the effect of FCD usage on firm performance
- To measure the influence of corporate governance practices on FCD usage.
- To assess the moderating role of corporate governance practices on the relation between FCD usage and firm value and firm performance.

The study is descriptive in nature. The data is collected from secondary sources. Financial-related variables were collected from the Prowess database, and corporate governance variables were collected from the Capitaline data base. The sample size includes 65 large non-financial companies included in the NSE 100 list. The data is collected for the study ranges from the financial year 2011-12 to 2020-21. The total sample includes 650 firm year observations.

Different panel data regression tools, like the fixed effects model and the random effects model, were used for analysis. In order to check the hypotheses developed for the fourth objective, Hayes moderation analysis was applied. In the following session, major findings from the analysis are presented, along with suggestions based on the findings.

7.3 Findings of the study

The section shows the major findings of the study. The findings are arranged in the order of objectives set for the study was listed below.

7.3.1 Effect of FCD on firm value

a. The relationship between FCD and Tobin's Q is statistically insignificant (p value=0.346) as the study fails to reject the null hypothesis that, there is no significant effect of FCD on Tobin's Q value.

b. Tobin's Q is decreased when the INR to USD exchange rate is highly volatile.

c. As indicated by the p value of 0.7745, the FCD has no significant effect on the market capitalization value.

d. The year dummy had a moderately negative effect on market capitalization ($p< 0.001$), showing that greater volatility in the INR-USD exchange rate result in a seven percent decline in firm value.

f. Except for industry 4 construction, which has a positive association with firm value, industries 3 chemicals, 9 IT, 10 Metals, and 12 pharmaceuticals have a negative association with firm value

7.3.2 Effect of FCD on firm performance

a. The result of the analysis fails to reject the null hypothesis that FCD has no significant effect on firm performance ($p = 0.194$), with ROE serving as a proxy for performance.

b. The year dummy variable has a significant negative relation with ROE, indicating that large changes in INR versus USD have a detrimental effect on the performance of the firm.

c. Only two of the thirteen industries analyzed for the study, industries 9 IT and 10 metals, reported a significant negative relationship with ROE, while the remaining industries showed an insignificant relationship.

d. FCD has no statistically significant effect on firm performance, as measured by ROA (p = 0.627834).

e. ROA is significantly affected by size, leverage, growth, and geographical diversification, with leverage having a positive effect while other variables have negative effects.

f. The year dummy has no significant effect on FCD and ROA relationship (p value= 0.183107), it is indicated that currency fluctuation has no significant impact on ROA.

7.3.3 Influence of corporate governance on FCD usage

a. The average CG score for all businesses over the past decade is 4.5861. Average CG index score for 2011-12 is 2.94, 2012-13 is 2.96, 2013-14 is 3.23, 2014-15 is 4.4, 2015-16 is 4.75, 2016-17 is 5.15, 2017-18 is 5.18, 2018-19 is 5.52, 2019-20 is 5.8 and 2020-21 is 5.9. It shows an increasing trend in CG practices adoption.

b. Wipro ltd, Steel authority of India ltd, and Tata steel have attained an eight-point CG index over a number of years; additionally, ACC ltd, Ambuja cements ltd, Dabur ltd, Havells India, Tata consumer products Ltd, United spirits Ltd, and HCL technologies Ltd, among others, have attained seven points over a number of years and are regarded as the leaders in CG measures adoption.

c. Eicher motors, Colgate Palmolive (India) ltd, Nestle India ltd, Adani enterprises ltd, and Procter and Gamble Hygiene and health care ltd, among other pharmaceutical firms, are unlikely to adopt the CG measure and have maintained a CG index of 4 or below for a period of years.

d. The relationship between CG index and FCD usage is moderately negative which is statistically significant at the 5% level of significance.

e. There was a significant positive relationship between FCD utilization with firm size and capital gearing ratio.

f. There is a statistically significant association between three of the thirteen industries and FCD usage. Industrial manufacturing (industry 8) has a favorable relationship with FCD usage, but metals and pharmaceuticals (industries 10 and 12) have negative relations.

g. Salary of board members has a strong positive influence on FCD usage, whereas proportion of non-executive directors and disclosure of expertise or skills of directors have a significant negative influence on FCD usage, and other variables have no significant effect on derivative usage.

7.3.4 Moderating role of corporate governance on the relationship between FCD and firm value

a. Co efficient of the moderating variable is 0.0125, this co efficient quantifies the effect of FCD on firm value (Tobin's Q) changes as CG index changes by one unit.

b. Conditional effects of the focal predictor (FCD) at the moderator (CG Index), 2.6493 is the lower and 5.2548 is the higher significance region defined by Johnson-Neyman significance region test when Tobin's Q is the proxy for firm value.

c. When the CG index is low (i.e., CG index up to 2.6493) the effect of FCD on firm value (represented by Tobin's Q) is negative.

d. When the firm's CG index is greater and it uses FCDs to hedge foreign currency risk, these practices have a beneficial effect on the firm's value (Tobin's Q).

e. The product of the FCD index and the CG index has a substantial positive coefficient, indicating that firms with stronger governance scores have a positive effect on firm value (proxy by market capitalization) when employing FCD for hedging.

f. Conditional effects of the focal predictor (FCD) on the moderator (CG Index), the Johnson-Neyman significance region test defines the lower significance

region as 1.8386 and the upper significance region as 5.2226 when Market capitalization is the proxy for firm value.

g. When the CG index is low, the effect of FCD on firm value (as measured by market capitalization) is negative and this effect remains significant until the CG index reaches 1.8386.

h. When the CG index is 5.2548 at the upper level, the conditional effect of the focused predictor is statistically significant and the effect is positive.

7.3.5 Moderating role of corporate governance on the relationship between FCD and firm performance

a. FCD, CG index and its product has no significant effect on firm performance, when the performance is measured using ROE.

b. Firm size has significant positive and growth opportunities have significant negative co efficient on firm performance (ROE).

c. corporate governance procedures implemented by enterprises have no significant conditional effect on the relationship between FCD and firm performance (ROE).

d. The coefficient for the moderating variable, CG index, is statistically significant and establishes a negative association with ROA, while the product of FCD and CG index is not (p value: 0.3103).

e. The corporate governance measures that are put into place by firms do not have a significant conditional role on the connection between FCD and firm performance (ROA).

7.4 Suggestions

The examination of obtained data led to the study's key conclusions, which were covered in the preceding section of this chapter. Following are the suggestions derived from the findings for enhancing the current state of affairs.

a. The study concludes that foreign currency derivatives have no significant effect on the value of a firm; hence it suggests managers and top executives to reconsider their investments in foreign currency derivatives. The management should take the required efforts to ensure that FCD is utilized effectively.

b. According to studies, the adoption of CG practices is on the upswing, although the CG scores of certain businesses are relatively low. The board of directors has to take the necessary steps toward the adoption of desirable CG practices.

c. A significant proportion of non-executive board members have a negative impact on FCD utilization. Based on the findings of the analysis and the pertinent literature, it is likely that firms with a larger proportion of non-executive directors on their board will impose certain restrictions on the use of derivatives by their managers. In order to assure the appropriate utilization of derivatives for hedging rather than speculation, the study advises increasing the number of non-executive directors on the board.

d. Using FCDs for hedging by firms with a lower CG index results in a drop in firm value, whereas using FCDs for hedging by firms with a higher CG index results in an increase in firm value. The report encourages the board of directors and top management to strengthen the company's CG practices.

e. As the FCD is found to have positive effect on firm value of such firms that have strong CG practices. Potential investors could choose to invest in such firms since they have demonstrated their successful deployment of FCDs to mitigate currency risk.

7.5 Conclusion

Foreign exchange risk is a major risk to firms engaged in export and import. Foreign currency derivatives are an important strategy employed by firms to mitigate this risk. An essential question that arises is whether the use of FCDs has any effect on firm value and performance. Tobin’s Q and Market capitalization, two variables are considered for representing the firm value. It is found that FCD has no significant effect on firm value, when firm value is represented by Tobin’s Q as well as Market capitalization. The same kind of result is observed in case of firm performance

(measure using ROE and ROA) also. That is, FCD usage is not contributing to the firm performance. The study also identified that, the year dummy; represents the fluctuation of Indian rupee against US dollar is found to have significant negative effect on firm value, it is indicated that if there is high fluctuation that leads to lower the firm value. In case of firm performance, year dummy has a significant negative influence on ROE while there is no significant influence in case of ROA.

In the annual reports, the sample firms are informed that the board of directors and risk management committee are the two parties that influence FCD utilization. The researcher constructed a corporate governance index by evaluating eight factors linked to these areas and found that CG index has a significant negative influence on FCD usage. The influence of individual variables in CG on FCD usage revealed that the proportion of non-executive directors on the board and the disclosure of expertise or skills of directors have a significant negative influence on FCD usage.

The relationship between FCD and firm value is moderated by CG. The relationship between FCD and firm value is seen to be positive in the case of highly governed firms, whereas it is negative in the case of poorly governed firms. But it was observed that the moderating role of CG on the relationship between FCD and firm performance is insignificant.

7.6 Limitations of the study

- Firm performance is measured using ROA and ROE, other available tools for measuring firm performance are not considered.
- The CG index is developed by considering the points from board composition and risk management; other aspects of CG are not included.
- The literature shows that the educational qualifications of managers, capital structure, etc. moderate the relationship between derivatives and firm value. But the study only analyzed the moderating role of corporate governance.
- Different external circumstances, such as currency demonetization, the COVID-19 pandemic, etc., may have an effect on FCD usage and premium, but the study does not analyze their effects.

CHAPTER 8
IMPLICATIONS AND DIRECTION FOR FUTURE RESEARCH

8.1 Introduction

This chapter discusses the implications of the study derived from the findings for managers or top executives, policymakers or regulators, and investors. At the end of the chaptersuggests some future research areas in foreign exchange hedging practices, specifically foreign currency derivatives.

8.2 Implications

This section provides a succinct summary of the study's implications for the key stakeholders, including managers or top executives, policymakers or regulators, and investors.

8.2.1 Implication for Managers or top executives

The analysis found FCD to have an insignificant effect on firm value and performance. Managers could then take the required actions to ensure that currency derivatives are utilized effectively. If managers are prepared to implement desirable CG practices, the hedging premium may be assured.

8.2.2 Implications for policy makers and regulators

Regulatory authorities might ensure that all listed firms are complying to mandatory CG practices and require them to follow to desirable CG practices, which could result in a hedging premium. Regulators could attempt to guarantee that non-executive and independent directors actively participate in the risk management efforts of firms.

If the Reserve Bank of India (RBI) takes greater effort to stabilize the value of the Indian Rupee (INR) relative to foreign currencies, firms may be able to reduce foreign exchange exposure

8.2.3 Implications for investors

Investors may opt to invest in firms with strong corporate governance practices because they have proved the effective use of FCDs to manage currency risk and such firms may ensure value appreciation.

8.3 Direction for future research

Foreign exchange hedging practices, specifically in the foreign currency derivatives area, need to be explored more. The study has proposed the following areas for future researchers:

- In this study, the firm's performance is measured using ROA and ROE. The other available tools for measuring firm performance can be analyzed in the future.
- For the year dummy, currency fluctuations are taken into account. In further research, the effects of the COVID-19 pandemic, demonetization, etc., can be added.
- The CG index is made by only considering variables that have to do with board composition and risk management, though there is a list of variables that can be used to measure the CG.
- The moderating role of managers' education and capital structure are some of the emerging areas that future researchers could explore.

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APPENDIX

Appendix I - List of Companies

1	Bajaj Auto Ltd.
2	Bosch Ltd.
3	Eicher Motors Ltd.
4	Hero MotoCorp Ltd.
5	Mahindra & Mahindra Ltd.
6	Maruti Suzuki India Ltd.
7	Tata Motors Ltd.
8	A C C Ltd.
9	Ambuja Cements Ltd.
10	Grasim Industries Ltd.
11	Shree Cement Ltd.
12	UltraTech Cement Ltd.
13	Pidilite Industries Ltd.
14	D L F Ltd.
15	Larsen & Toubro Ltd.
16	Asian Paints Ltd.
17	Berger Paints India Ltd.
18	Britannia Industries Ltd.
19	Colgate-Palmolive (India) Ltd.
20	Dabur India Ltd.
21	Godrej Consumer Products Ltd.
22	Havells India Ltd.
23	Hindustan Unilever Ltd.
24	I T C Ltd.
25	Marico Ltd.
26	Nestle India Ltd.
27	Procter & Gamble Hygiene & Health Care Ltd.
28	Tata Consumer Products Ltd.
29	Titan Company Ltd.
30	United Spirits Ltd.
31	Jubilant Food works Ltd.
32	P I Industries Ltd.
33	U P L Ltd.

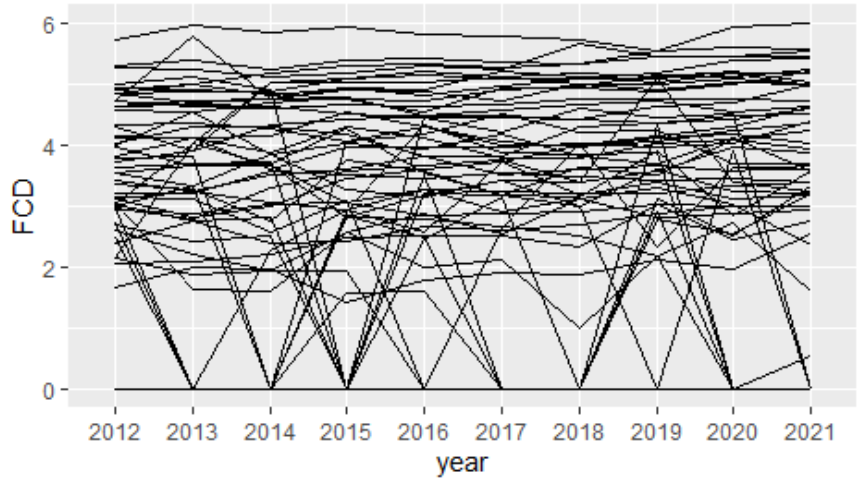
34 Siemens Ltd.
35 H C L Technologies Ltd.
36 Infosys Ltd.
37 Tata Consultancy Services Ltd.
38 Tech Mahindra Ltd.
39 Wipro Ltd.
40 Adani Enterprises Ltd.
41 Hindalco Industries Ltd.
42 J S W Steel Ltd.
43 Jindal Steel & Power Ltd.
44 Steel Authority of India Ltd.
45 Tata Steel Ltd.
46 Vedanta Ltd.
47 Bharat Petroleum Corpn. Ltd.
48 G A I L (India) Ltd.
49 Hindustan Petroleum Corpn. Ltd.
50 Indian Oil Corpn. Ltd.
51 Indraprastha Gas Ltd.
52 Oil & Natural Gas Corpn. Ltd.
53 Reliance Industries Ltd.
54 Aurobindo Pharma Ltd.
55 Biocon Ltd.
56 Cadila Healthcare Ltd.
57 Cipla Ltd.
58 Divi's Laboratories Ltd.
59 Dr. Reddy's Laboratories Ltd.
60 Lupin Ltd.
61 Sun Pharmaceutical Inds. Ltd.
62 Torrent Pharmaceuticals Ltd.
63 N T P C Ltd.
64 Power Grid Corpn. Of India Ltd.
65 Adani Ports & Special Economic Zone Ltd.

Appendix II - List of Industries

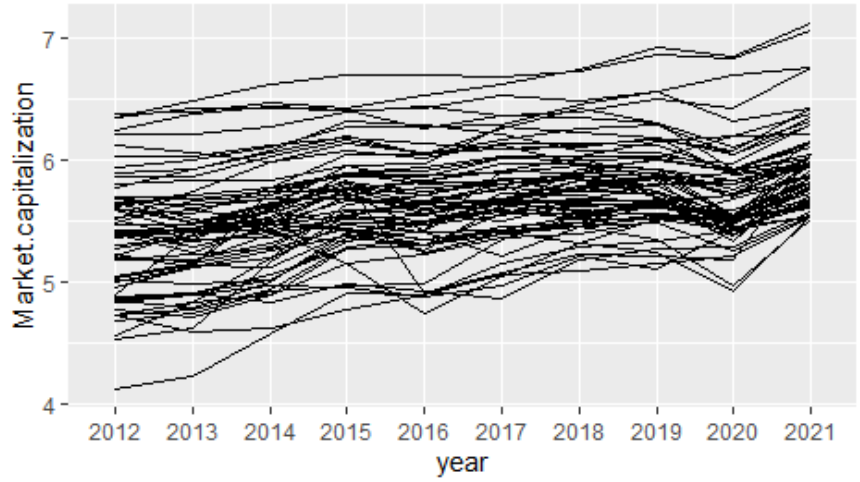
1. Automobile
2. Cements
3. Chemicals
4. Construction
5. Consumer Goods
6. Consumer Services
7. Fertilizers
8. Industrial manufacturing
9. Information Technology
10. Metals
11. Oil and Gas
12. Pharmaceuticals
13. Power

Appendix III - Graphical Representation of Variables

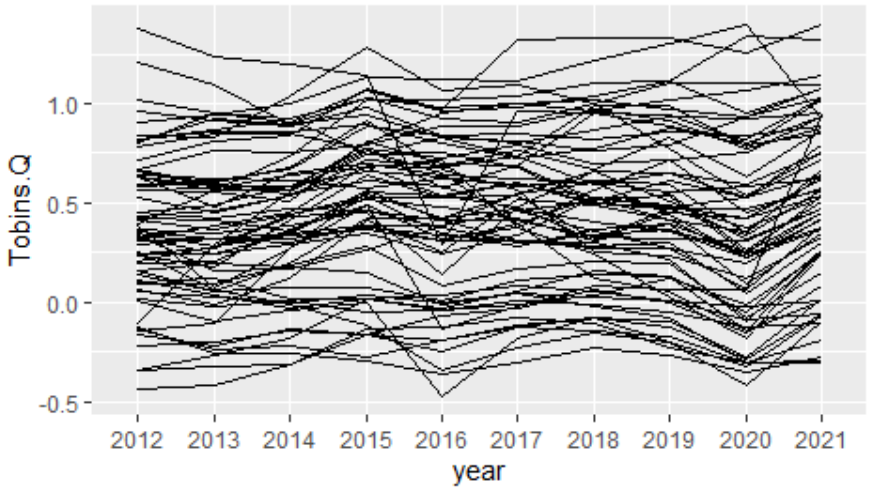
1. Foreign currency derivatives



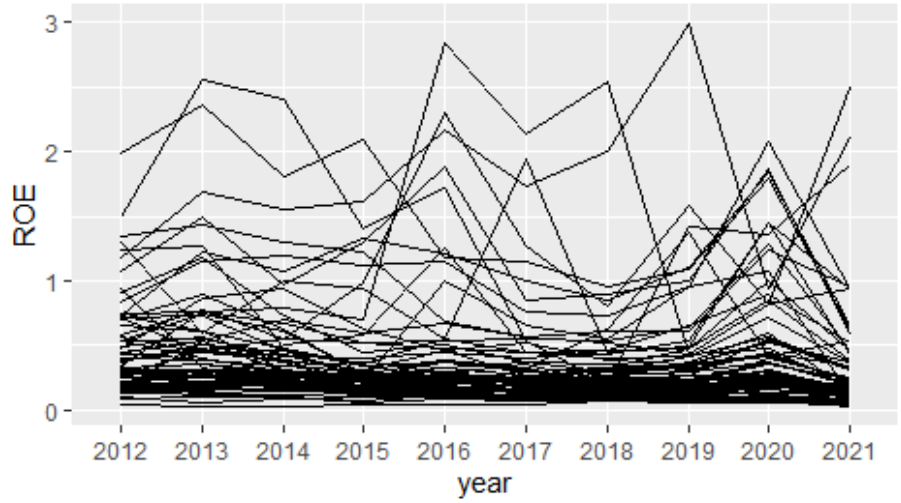
2. Market capitalization



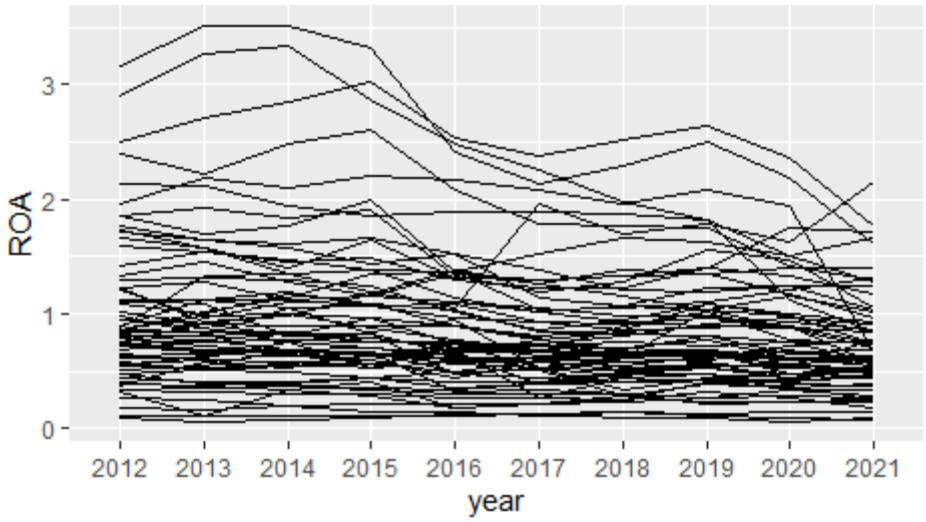
3. Tobin's Q



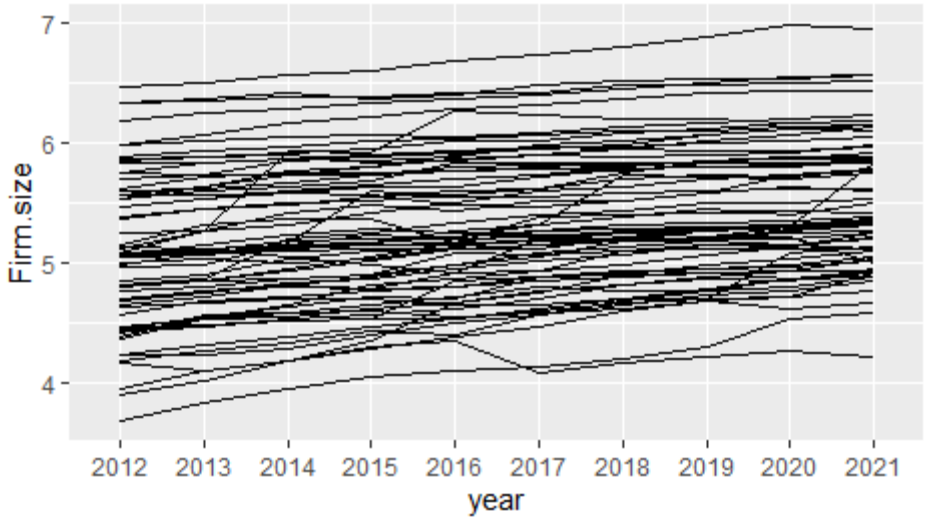
4. ROE



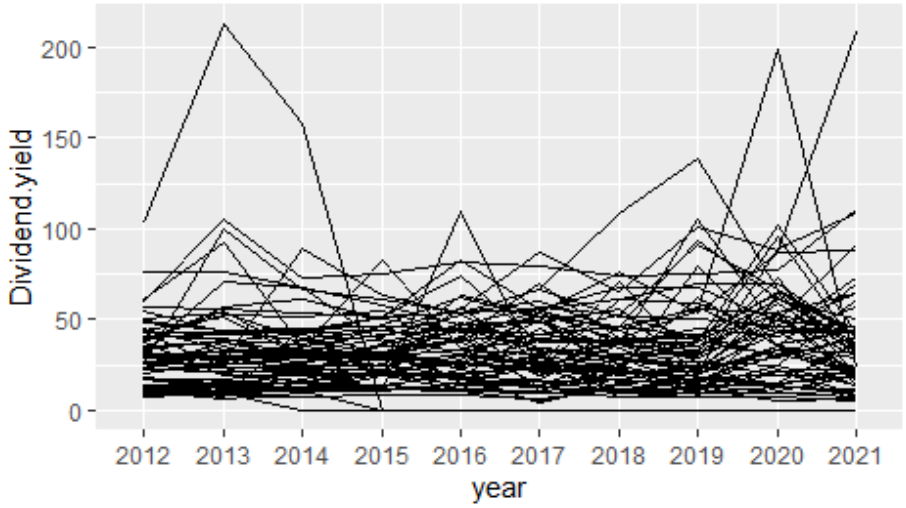
5. ROA



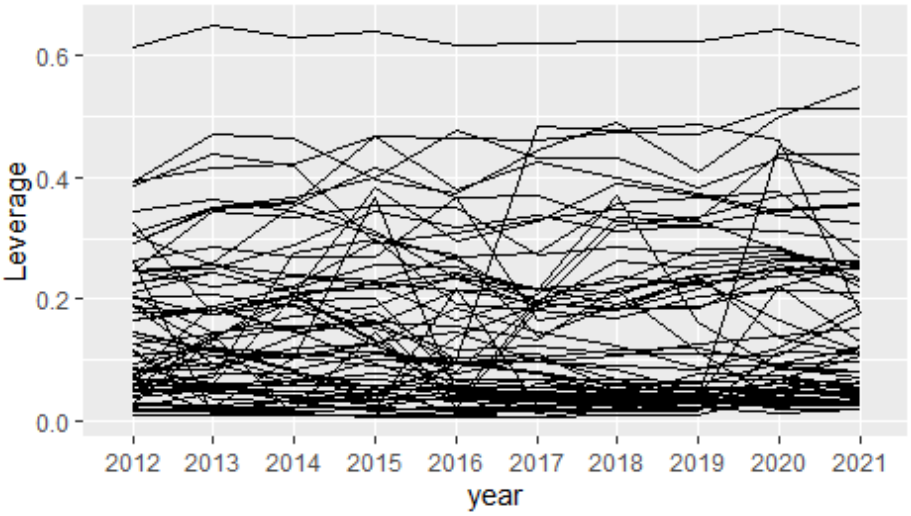
6. Firm Size



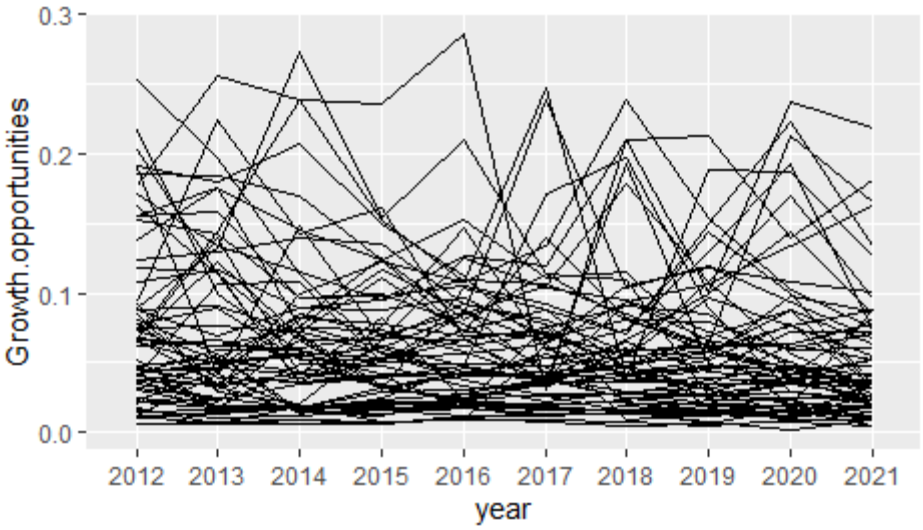
7. Dividend Yield



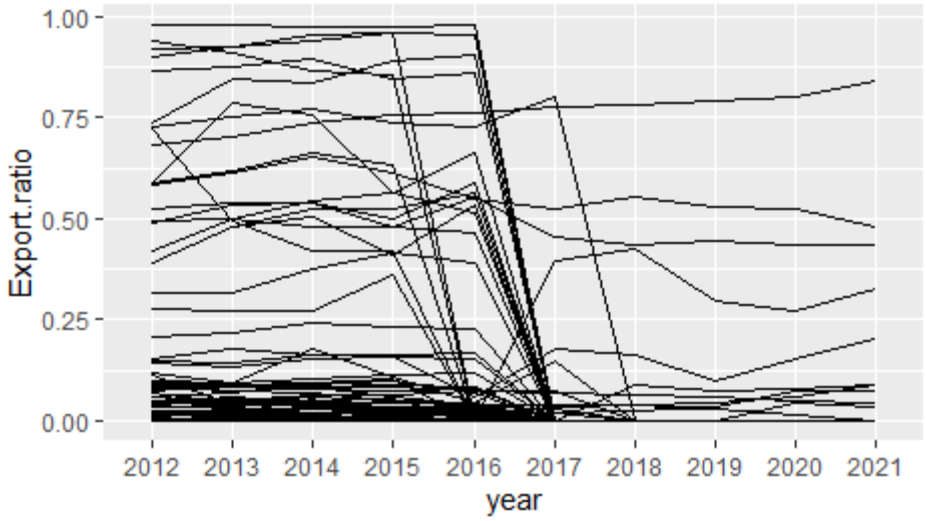
8. Leverage



9. Growth Opportunities



10. Export ratio



11. Import Ratio