



Ahtisham Imtiaz<sup>1</sup>, Aqueel Imtiaz Wahga<sup>2</sup>, Syed Fakher Abbas Zaidi<sup>3</sup>, Safyan Majid<sup>4</sup>

## Abstract

The purpose of the paper is to examine the impact of corporate hedging practices such as derivative usage on stock market behavior of the firms. The study employed the data of financial sector of Pakistan for firms that are listed in the Pakistan Stock Exchange. The economy of Pakistan faced several challenges and risk during the past five years such as Covid-19, climate change, political uncertainty, and economy policy uncertainty. Hence, it provided a solid ground to investigate the viability of derivative usage in the adverse economic environment. The sample consisted of 111 firms. The results indicated that hedging has significant impact on stock returns and stock returns volatility. The study concludes that firms that use derivative can yield positive stock returns and influence volatility in returns.

**Keywords:** Derivative, Stock Returns, Stock Volatility, Hedging

## 1. Introduction

Corporate hedging has become an essential aspect of corporate strategy in an ever-changing economic environment. The ability to deal with risk will allow the organization to be more confident in its future policies. Hedging is one of the most prevalent risk management tactics corporations use (Smith Jr & Watts, 1992). The term "hedging" refers to the practice of reducing business value volatility through the use of off-balance-sheet instruments such as option agreements, swaps, forward contracts, and futures contracts (Salisu & Adediran, 2019).

According to research from the BIS, the use of financial products like derivatives for hedging has expanded dramatically during the past ten years. According to surveys, derivative usage has risen from \$544 trillion to \$640 trillion during the past year. These consequences arise when the aim of firm hedging is determined, and an analysis is performed to compare the cost and profit for the firm which implements the hedging strategy. Several studies have been done in this area. Most of the studies indicated that derivative usage for hedging purposes is negatively connected to high liquidity ratios, firm growth, and volatility in company cash flows (Chen & King, 2014; Sulehri & Ali, 2020).

There are rational or added-value hedging techniques that can be implemented using the financial economics hypothesis (Siba, 2012). For example, Ahmad et al. (2015) stated that hedging firms use various derivatives to create scale economies and suitable hedging activities. They have a competitive edge over non-hedging firms. Value increases, external claims like bankruptcy expenses are reduced, and management benefits match capital suppliers when hedging is used (Worasinchai, 2013). When agency theory is used in business hedging, shareholders, stakeholders, and management all have fewer conflicts of interest because of the improved stock returns. Chen and King (2014) concluded that the shareholders' pressure to keep an eye on managers and the resulting impact on the company was worth alleging. When executives have the authority to hedge activities for speculative or self-interested reasons, they claim that hedging increases the value of the company's stock (Audi et al., 2023). To alleviate their financial woes and boost the usefulness of their manager, companies hedge (Dionne & Triki, 2013). Incorporated as a management tool by Frooman (1999), stakeholder theory has matured into a sound approach with an explanatory method that may be used to support this strategy. The stakeholder hypothesis emphasizes the importance of a company's strategy consistent with its customers' interests. Embedded claims have a high sensitivity to projected financial crisis and liquidation costs, which are reduced by corporate hedging measures and grow in value for the company (Siba, 2012).

According to a literature survey, most academic studies on hedging strategies and derivative instruments have been conducted in European countries; only a few studies have been undertaken on Asian non-financial enterprises. Compared to enterprises in established economies, corporations in developing economies confront significantly greater levels of uncertainty, foreign exchange exposure, economic and political volatility, and information asymmetry (Audi et al., 2022). To limit the risks associated with their company structure and country of operation, businesses must therefore be more prepared to participate in hedging practices, such as the use of derivatives, to protect themselves. Although Pakistan has experienced tumultuous economic and political conditions in recent years, no empirical research regarding the hedging policies and risk management practices of Pakistani companies listed on the PSX hundred index has been conducted in the country since last year. Nonetheless, this research seeks to fill this gap by investigating the factors influencing hedging policies.

Furthermore, firms in Pakistan are less aware of the need for corporate hedging through derivatives. Despite the high market instability and transaction costs, they are more unwilling to hedge. Consequently, the study focuses on the determinants and incentive factors that influence business hedging activities, notably foreign exchange hedging and the use of interest rate derivatives in risk management techniques, particularly in the financial sector.

## 2. Literature Review

In an efficient market, finance policy is irrelevant Modigliani and Miller (1958). The company's financial strategy includes the use of derivatives, generally referred to as "hedging." According to their views, hedging does not affect a company's value if there are no market defects. Expected cash flows discounted at authorized capital costs represent a company's value. As a result, management can boost cash flow and cut borrowing costs to raise the company's value. Due to the inherent flaws in the market, theories of hedge fund incentives focus on how to maximize the expected return on investment<sup>3</sup> via hedging.

<sup>1</sup> Relationship Manager, National Bank of Pakistan

<sup>2</sup> Assistant Professor, Department of Economics, Government College University, Lahore, Pakistan

<sup>3</sup> Business Consultant, STEDEC Technology, Pakistan

<sup>4</sup> Corresponding Author, Assistant Professor, Department of Commerce and Finance, Government College University, Lahore, Pakistan

According to Smith et al. (2001), the process of assessing and making adjustments to the numerous trade-offs between risk and reward required by corporations is known as risk management. For hedging, speculating, or arbitrage purposes, swaps can be examined. It is described as "the process of assessing and managing a corporation's exposure to multiple sources... by using financial derivatives, and other activities" in a study of risk management instruments conducted by Hillier and colleagues. Risk management, as defined by Bekaert and Hodrick (2017), is "the use of derivatives to take positions in the financial markets that counter the underlying causes of hazards that occur in the regular course of business. Because of this, the majority of extant literature uses the phrases "risk management," "hedging," and "derivative use" interchangeably.

What, therefore, is the meaning of the term "hedging"? Because there are so many distinct kinds of hedging. According to Smith and Stulz (1985), hedging means that the firm's value is not affected by environmental changes. Investing in certain futures, forwards, or option markets is described as a way for "a corporation to hedge". The worth of a corporation is no longer dependent on the state variable because of hedging. It's also possible to hedge through operating techniques, such as a merger with the same impact as using futures. Options, forwards, futures, and swaps are all forms of hedging, according to Smith et al. (2001). The term "hedging" encompasses all of these instruments.

Hedging is used by most of the firms to mitigate the foreign exchange rate risk and is also used by most of the firms to reduce their financial distress risk (Supanvanij & Strauss, 2010). The firms can either use accounting techniques or financial hedging to mitigate the exposure of their stock return to currency risk but investors and analysts should pay attention while evaluating the exposure of the stock return to currency risk using accounting techniques (Chang et al., 2013). Previously not much work has been done on the hedging behavior in the Asian countries thus the influence of hedging on exchange rate risk is the purpose of interest here. The firm size plays an important role to while evaluating a firm hedging behavior. (Mian, 1996) indicated that the firms with the larger size tends to hedge with more intensity as compared to smaller firms.

Derivatives are more likely to be used by companies in nations with higher political, economic, and financial risk (Bartram et al., 2009; Ali et al., 2023). However, corporations in less-risky countries have lower financial distress costs and less incentive to utilise derivatives as a risk-management tool. The firms are more exposed to exchange rate risk when they are in open economy and the firms' exchange rate risk has an inverse relation with the degree of creditor protection in the country (Hutson & Stevenson, 2009). The corruption level in home country inclines both the domestic firms and the domestic MNCs. The firm value of foreign MNC affiliates cut down with the help of using derivatives. Low corruption level in home country gives more advantage to domestic MNCs than domestic firms. The host country in which there is low corruption environment lifts the effect of derivatives use on foreign MNC affiliates' firm value. After the crisis the link between the hedging premiums of domestic MNCs and domestic firms and low corruption level of home countries is extremely strong (Kim et al., 2017).

For multinational corporations (MNCs), exchange rate risk is influenced by factors like the breadth and depth of their operational networks, which can be used to calculate operational hedges. MNCs with a broad reach are less vulnerable to currency risk, whereas companies with a narrow focus are more vulnerable. A group of MNCs, as well as those with both positive and negative disclosure, benefit from the ability of firms to construct operational hedges (Pantzalis et al., 2001).

The use of derivatives as a hedging tool mitigates the foreign exchange risk of the firms whether it is positive or negative. Hence the firms with more international activities tends to use more derivatives to hedge against foreign exchange risk (Zhou & Wang, 2013). The volatile income of the firms also has an impact on its hedging behavior. The firms with more volatile income are more exposed to risk hence they are more likely to hedge. Moreover, the financial distress, firms with imports and exports and the firms with more short-term debt, have a strong relationship with foreign currency hedging decision (Judge, 2006a). The firms that hedge with currency derivatives and interest rate derivatives have reduced cost of equity as compared to those that do not use derivatives. Furthermore, the firms that hedge with derivatives have lower systematic than the non-users (Lin et al., 2010).

Aretz and Bartram (2010) postulates that the shareholders can get benefits from the hedging, and it creates value for them. Hedging not only increase the value but also stabilize the taxable income and hence decrease the tax burden of the firm in the presence of different tax schedules. Those firms that are exposed to exchange rate risk have a positive relationship between the derivative usage as a hedging tool and the firm value. On the other hand, the firms that have no foreign operations but are exposed to exchange rate movement due to imports and exports have comparatively less hedging premium. Moreover, the firms that abandon hedging activities faces a decline in their value as compared to those firms that do not abandon hedging (Allayannis & Ofek, 2001).

### **3. Hypothesis Development**

#### **3.1. Corporate Hedging and Stock Returns**

A substantial body of literature examines the unconditional value consequences of derivatives use, with inconsistent results. Numerous studies demonstrate that derivatives use a prudent course of action in the primary stream of research. To begin, Allayannis et al. (2001) employed Tobin's Q to estimate the value of a corporation. They discovered that those who used derivatives had a higher Tobin's Q, implying that using derivatives increases a company's value. Similarly, Belghitar et al. (2016), among others, use Tobin's Q to determine a company's value. While the papers that examine Tobin's Q employ various methods to calculate it, most of them conclude that there is a strong and positive correlation between a company's value and the use of any type of derivatives.

Despite this, it is worth noting that while all of the research concluded that employing derivatives boosts a company's value, they all assess the hedging premium differently. According to Allayannis and Weston (2001), foreign currency derivatives increase the total value of non-financial enterprises in the United States by an average of 4.8 percent. Considering US firms, foreign currency hedges have a long-run effect on Tobin's Q of 1.939, suggesting that they increase a company's worth by 6.33 percent. Belghitar et al. (2008) estimate that hedging premiums for non-financial enterprises in the United Kingdom range from

11% to 34% for foreign currency hedgers. Tips for interest rate and commodity price hedging users range from 11% to 34%. If you examine studies conducted on US enterprises, you will notice that the hedging premiums are far higher than those discovered.

Additionally, they do not calculate the hedging premium, but they demonstrate that the average company in their sample earns around 4.7 percent of its revenue each year through Hedging. In 2000 and 2001, researchers examined many non-financial enterprises from 47 nations. They discovered that derivative use has a beneficial effect on a company's value, but it is more vulnerable to endogeneity and omitted variable issues.

There is some evidence that derivatives can detract from a company's value at times in the second stream. They examined 320 non-financial firms in France and discovered that those that employ derivatives had a lower market value than those that do not. According to Nguyen and Faff (2010), those who use swaps are the hardest harmed by a hedging discount. That means that the worth of 428 Australian enterprises has decreased by 24%. Supanvanij (2011) demonstrates that there is less evidence that interest rate derivatives can affect economic value added at the 10% level of significance.

Additionally, other research fails to establish a link between derivatives use and company value, or they produce inconsistent results. Belghitar and Khan (2013) conclude that while there is no evidence that foreign currency derivatives provide value, they assist French non-financial enterprises in reducing their overall foreign currency risk. Supanvanij (2011) also discovered that while those who employ foreign currency derivatives see no value effect, those who use interest rate derivatives devalue their firms. Another study conducted by Khediri and Folus (2010) does not appear to support the notion that adopting derivatives increases a company's value. Foreign currency hedging is based on the firm's historical value. Magee (2008) determined that this is critical. It would make no difference what happened to a firm's worth before using foreign currency derivatives, even if the company's value increased 6.33 percent in the long run due to foreign currency derivatives.

More intriguingly, some researchers are calling into doubt the relationship between derivatives use and company value, as well as the findings of previous studies on the subject. According to Guay and Kothari (2003), employing derivatives generates little profit for a business based on its size, operational and investing cash flows, and other factors. If this is accurate, it implies that other risk management actions (such as operational hedges) are responsible for the significant gains in the value of the corporations in prior research. Hence, we can hypothesize on the basis of value relevance propositions that firms with higher value are like to exhibit positive stock returns based on the derivative usage.

H1: Corporate hedging practices influence the stock return of PSX-listed firms.

### **3.2. Corporate Hedging and Stock Return Volatility**

Speculation and hedge funds are two of the most prevalent types of activity in the derivatives markets. Smith et al. (2001) describe speculating as an action that raises the probability of obtaining a reward while increasing the degree of uncertainty about obtaining that reward. According to the Commodity Futures Trading Commission (2006), speculation is defined as trading to make profits through successful price movement prediction.

Based on this broad idea, hedging and speculation can be seen as two sides of the same risk management coin. Regarding risk management, hedging and speculation are more like the ends of a continuum than the beginnings. For example, hedging is entering into a derivative position to eliminate all physical market exposure. Pure speculators, on the other hand, are on the other end of the spectrum. They consider taking a derivative that puts them at risk in the market that they wouldn't otherwise be at risk of (Kolb & Overdahl, 2010).

According to the researchers who conducted the study, there is compelling evidence that corporations employ derivatives for hedging rather than for speculation. There is evidence that corporations in many nations utilize a variety of derivatives to hedge their positions, according to studies by Bodnar and Gebhardt (1999) and Bartram (2008). Forwards, options, futures, and swaps are all examples of derivatives. Rather of conducting polls, Bartram et al. (2011) employ empirical analysis to establish that 90% of Fortune 500 businesses use derivatives for risk management rather than speculating. According to Allayannis et al. (2012), well-governed firms in 39 nations studied between 1990 and 1999 were more likely to hedge than speculate using derivatives, corroborating their findings.

According to Judge (2006b), it is far more practicable to quantify a firm's risk exposure and then evaluate the effect of derivatives usage on that exposure than it is to take a different strategy. According to Allayannis et al. (2012), well-governed firms in 39 nations studied between 1990 and 1999 were more likely to hedge than speculate using derivatives, corroborating their findings. Derivatives are used by companies to hedge their exposures rather than speculate in the market (Allayannis & Ofek, 2001; Bartram & Bodnar, 2007; Nguyen & Faff, 2003; Treanor et al., 2014). Hence, based on the existing literature, we can hypothesize that firms that undertake hedging practices influence stock returns volatility.

H2: Corporate hedging practices influence the volatility of PSX-listed firms.

## **4. Methodology**

### **4.1. Sample Construction**

This research targets the Pakistan stock exchange listed companies. This study used secondary data collected for analysis purposes. We choose the financial sector for this study, such as Public & Private Sector Banks, Leasing Companies, Investment Banks, Mutual Funds Companies, Modarba Companies, Insurance Companies, and Takaful Companies. The study includes 111 listed financial institutions working in Pakistan covering 05 years period (2018-2022) are listed on Pakistan Stock Exchange. Data of annual financial reports are also available on the company's websites to analyze the organizations' financial profitability and performance.

### **4.2. Variable Description**

The table presents the label and definition of the variables employed in this study.

**Table 1: Description of Variables**

Label	Variable	Definition	Data Source
SR	Stock Return	The sum of daily stock returns computed annually using the daily stock prices	PSX
VOL	Volatility	The standard deviation of daily stock returns	PSX
HEDGE	Hedging	Dummy Variable 1 for Derivative user and 0 otherwise	Annual Report
SIZE	FIRM SIZE	normal logarithm of total assets	Annual Report
ROA	Return on Assets	Net Income / Total Assets	Annual Report
DIV	Dividend Paying	Dummy Variable 1 for dividend paying firm and 0 otherwise	Annual Report
LEV	Leverage	Total Liabilities / Total Assets	Annual Report
CAPEX	Capital Expenditure	Capital Invested in a year	Annual Report
LIQ	Liquidity	Current Assets/ Current Liabilities	Annual Report

The variables mentioned above highlight the below mentioned empirical models for research:

$$\text{Model 1: } SR_{it} = \alpha_0 + \alpha_1(Hedge)_{it} + \phi(K)_{it} + \varepsilon_{it}$$

$$\text{Model 2: } VOL_{it} = \alpha_0 + \alpha_1(Hedge)_{it} + \phi(K)_{it} + \varepsilon_{it}$$

Where:

$SR_{it}$  Stock Return

$V$  Volatility

$DHedge_{it}$  Hedging activity of the firm

$\phi K_{it}$  Control variables set including (SIZE, LEV, CAPEX, ROA, LIQ and DIV)

$\varepsilon_{it}$  Error term

$\alpha_0$  Intercept

$\alpha K$ , Coefficients

## 5. Results and Analysis

The result in table 2 presents that the 36 percents of the changes in the dependent variables are due to the changes in the explanatory variables in the study. It also means that 63 percent of the changes are due to other factors which are outside the scope of the study.

**Table 2: Model Summary**

R Square	Adjusted R Square	Root MSE
0.3564	0.3455	1.49

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### 5.1. Diagnostic Tests

*Durbin-Wu-Hausman Tests for Endogeneity* have been performed to check problem endogeneity in the data set. Table 3 shows the results of the endogeneity test:

**Table 3: Endogeneity Test**

Durbin-Wu-Hausman Test			
Null Hypothesis (Ho): Exogenous Regressor			
F- stat	42.4629	F(1,510)	P-value = 0.00000
chi-sq test:	41.0470	Chi-sq(1)	P-value = 0.00000

The endogeneity test result is provided in table 3. The Wu-Hausman F test is highly comparable to the Durbin-Wu-Hausman chi-sq example, according to the findings. As a result, we can assume that the variables have an endogeneity problem. When the variables are endogenous, estimate methods like OLS, the Random Effect, and the Fixed Effect produce skewed results. 2SLS / IV regression produces more accurate results than the other estimators. When heterogeneity is present in the

model, however, 2SLS / IV frequently indicates skewed effects. As a result, before computing the final results, the data will be subjected to a heteroskedasticity test. Table 4 shows the results of the heteroskedasticity test:

**Table 4: Heteroskedasticity in Instrumental Variables (IVs)**

IV heteroskedasticity test(s)			
Null Hypothesis (Ho): Homoskedastic residuals (Pagan Hall)			
test statistic:	54.52	Chi-sq(1)	P-value = 0.0000

Heteroscedasticity has appeared in the model, according to the test findings for hetro. As a result, in the presence of endogeneity and hetro in model 2SLS/IV, biased estimations can be generated; thus, the system generalised methods of moments (GMM) estimator are appropriate. For the System GMM estimation, the model's results are produced using the auto lagged selection and robustness options.

Table 5 presents the GMM results. The coefficient of firm Hedging, Firm Size, ROA, CAPEX, dividend payout ratio, and liquidity ratio is positively related to return. Furthermore, firm leverage represented by is negatively associated with stock returns. The results show that all financial variables in this study are highly significant. For all variables, the p-value is 0.000, which is considered highly effective. The coefficient value of hedging is (hedge = 0.0048,  $p < 0.1$ ). That shows that the leverage ratio with the company's hedging activity is significantly and positively related. It implies that the stock returns will rise by 0.48% percent if the ratio rises by 1 percent. Most previous studies have confirmed this finding (Yong et al., 2006). The empirical values of ROA ( $\beta = 0.024$ ,  $p < 0.1$ ) show a positive and significant relationship with hedging instruments. It postulates that high profitability tends to increase the need for hedging due to tax incentives or reduce the expected tax liability. From this point of view, some previous studies have achieved similar results, such as Carter et al. (2003, 2006). The coefficient of CAPEX is ( $\beta = .01975$ ,  $p < 0.1$ ) this postulates the positive and significant relationship between shareholding by family directors and hedging. It also means that when the family shareholding increases by 1%, stock returns by 2%. The firm size has a positive and significant ( $fs = .0078$ ,  $p < 0.01$ ) impact on the stock returns. It shows that larger firms are more likely to produce more stock returns than small ones. The reason may be that they want to exploit the advantage of economies of scale to reduce fixed costs. The dividend has a positive and significant ( $\beta = 0.063$ ,  $p < 0.01$ ) impact on derivative usage as firms involved in the export of goods or services make greater use of derivatives for hedging purposes due to mitigation of foreign exchange risk.

**Table 5: Dynamic panel-data estimation, one-step system GMM**

	Dependent: Stock Return (SR)		Dependent: Volatility (VOL)	
	Coefficient	Robust Standard Error	Coefficient	Robust Standard Error
HEDGE	.0048***	.0005047	.0148***	.0004122
SIZE	.0078*	.0050307	.0674**	.0064316
ROA	.0204***	.0032274	.0123***	.0042577
CAPEX	.01975***	.0060768	.01475***	.0050748
LEV	-.2121***	.0032716	-.3121***	.0002716
DIV	0.063***	.00796	.1677***	.0308231
LIQ	.1677***	.0308231	0.053***	.00796

Source: Authors calculations using Stata 12.0 (SE) Command xtabond2.

Some more tests are applied to test the autocorrelation problem for the error term in mode and to check the viability of instruments selection. These are the Arellano-Bond test for AR (1) in first differences, Arellano-Bond test for AR (2) in first differences, and Sargan test of override restrictions. These tests have been provided in Table 6 and Table 7.

**Table 6: Arellano-Bond test for AR (1) and (2)**

Arellano-Bond test for AR (1) in first differences:	$z = -2.67$	$Pr > z = 0.007$
Arellano-Bond test for AR (2) in first differences:	$z = -0.51$	$Pr > z = 0.522$

Source: Authors calculations using Stata 12.0 (SE)

Arellano-Bond autocorrelation test results show that the error term in the first-difference equation has negative. First-order autocorrelation and 0 second-order autocorrelation; therefore, model has no error term autocorrelation problem.

To test the problem of over-identification and under-identification of instruments. Sargan test of override restrictions has been estimated, and test results are given in Table 8.

**Table 7: Over identification restrictions test**

Sargan test of over identification restrictions:	chi2 (28) = 503.45	Prob> chi2 = 0.000
Source: Authors calculations using Stata 12.0 (SE)		

The P-value for the Sargan test is more significant than 0.05, i.e. (Sargan p-value = 472.54 > 0.05 shows that over-identified instruments are exogenous, and there is the correct specification of System GMM. So instead of the above results, we can say that GMM estimation is correctly specified.

To check the hypothesis, the financial variable determines firm hedging, we have used the GMM estimator due to endogeneity and heteroskedasticity in the panel data. Tests of endogeneity and heteroskedasticity show the presence of both endogeneity and heteroskedasticity in the data. After that model has been run, the results show that all the firm variables are highly significant in determining the hedging. To check the robustness of the model, two more tests have been applied, which were the Arellano-Bond test for AR (1) and (2) and over-identification restrictions test.

## 6. Conclusion

The purpose of this research thesis is to examine the elements and reasons that influence hedging policies in the context of Pakistan. From 2018 to 2022, the 111 companies listed on the Pakistan Stock Exchange were the subject of this research project. The specific characteristics of the company, such as growth potential, hedging, volatility in cash flow, and size, tend to have a greater impact on the stock return of the company. It is anticipated that this study thesis will have substantial implications for businesses and financial regulatory authorities. Most of the firms listed on the Pakistan Stock Exchange are non-hedgers, meaning that they did not take use of derivatives to increase their profits. This research has offered a framework for employing derivatives for risk mitigation to minimize hazards, with the size of the organization and the potential for expansion being the most important considerations. The purpose of this study is to assist managers and investors in evaluating the risk of their organization before taking a position in derivatives and in obtaining the size of economies through the implementation of hedging measures. The findings of this study imply that future research should consider variables other than company size, development potential, and cash flow unpredictability, as this study addresses these essential issues.

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