



USE OF DERIVATIVES AND ITS IMPACT ON FIRM PERFORMANCE AND FIRM VALUE WITH MODERATING ROLE OF MANAGERIAL RISK APPETITE

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Abstract

This study explores the influence of derivative application on firm performance and firm value in non-financial listed firms on the Pakistan Stock Exchange from 2013-2023. Given an illiquid and underdeveloped derivatives market in Pakistan, we investigate whether the use of financial derivatives has clear positive benefits on commonly reported firm performances and value: Return on Assets (ROA), Return on Equity (ROE) and Tobin's Q. The study also uses panel EGLS regression with random effects to evaluate the moderating role of managerial risk appetite on these outcomes. The study finds that derivative application does not lead to an improvement in performance or value and in many cases reported negatively. Specifically, where high leverage conditions exist in firm use of derivatives, it is generally reported negative effects on financial performance. The results suggest that in emerging markets like Pakistan, the positive implications for using derivative instruments is heavily dependent on the firm's inherent risk governance and market conditions. Finally, the study provides key policies and managerial implications to improve the strategic effectiveness of financial derivatives.

Key Words: Derivatives, RoA , RoE, Tobin's Q, Risk Appetite

1. Introduction

In today's dynamic global integrated financial markets, risk management has become a primary focus for corporate entities looking for sustainable growth and value-enhancing results. One of the main ways companies manage financial risk is by using derivative instruments. Derivative instruments are financial contracts including forward contracts, options, and swaps that allow companies to hedge against market uncertainty in areas such as foreign-exchange risk, interest-rate risk, and commodity price risk. In developed markets, derivatives are common with established deep and liquid markets and relatively sophisticated corporate managers. In comparison, Goldsmith (2007) shows that derivatives markets are all but absent in emerging economies such as Pakistan, and which begs the question: is there a valid case to be made for use of derivatives and are they beneficial in these economies?

As per the Risk Management Theory, the managers use instruments like Derivatives to hedge against a variety of Risks faced by the firms like, commodity price risk, interest rate risks, exchange rate risk etc. With the help of these instruments, the firms reduce the volatility in revenues and stabilize the cash flows so as to lower the overall financial distress.

Within the last twenty years, the Pakistani financial market has undertaken extensive reforms that have improved its capital markets, banking, and regulation. However, derivatives remain lagging behind, primarily due to low liquidity, limited products, enforceability of regulation, and a lack of overall financial literacy in corporate managers. This provides an interesting case to assess derivatives' contribution to firm performance and firm value because derivative usage



in developed countries and Pakistan are considerably different. Nasir et. al (2024) found that firm in PSX which use derivatives, are likely to show better firm value. In the developed world, derivatives are often a part of the financial portfolio of the firm, whereas firms in Pakistan will encounter restrictions that may complicate the normal benefits associated with derivative use. A study by Bari et. al (2023) showed that hedging through derivatives cast positive effect on investor sentiment and hence a positive effect on the stock prices.

In addition, the choice to use derivatives is not only a financial strategy, it also reveals the managerial attitude towards risk (often referred to as the risk appetite of the financial decision-makers in the firm). The risk appetite of senior executives can on one hand impact the capacity to use derivatives, and on the other, could change the way in which derivatives might be used. Asghar et. al (2019) exhibits that Ownership concentration is directly related to hedging. That is, the firms with better ownership are more likely to hedge with derivatives. These different attitudes towards risk can lead to unfavorable risk taking in the context of low market liquidity and understanding of the product, negating the intended value of hedging, and compromising firm performance.

By examining the effect of derivative usage on firm performance and firm value for non-financial firms on the Pakistan Stock Exchange (PSX) over an eleven-year period (2013-2023), this study adds to the existing body of literature by empirically exploring the interaction of individual firm features, including managerial risk appetite, slipped into the study as financial leverage acting as a proxy for risk, as a moderating variable. This allows us to explore the potential of derivative usage on not only firm performance and value but how internal firm factors are implicated in these effects.

Using panel data regression models that included random effects and interaction terms, we investigate the impact of derivative use on two of the main measures of firm performance- Return on Assets (ROA) and Return on Equity (ROE) and Tobin's Q, one proxy of firm value. The findings indicate that the relationship between derivative use and firm outcomes is complicated and varies depending on managerial behavior towards risk, given the imperfections in the market structure.

In sum, this paper seeks to address three core questions 1st, can derivatives improve firm performance and firm value in an emerging market context like Pakistan. 2nd how does the risk appetite of financial managers interact with the use of derivatives to determine these outcomes and lastly what does this mean for the corporate financial strategy and public policy implications when we are in an illiquid derivatives market?

The results achieved through this study shows that there exists a significant relationship between the use of derivatives and form performance in case of performance being measured by RoA. However, no significant relationship was found when firm performance being measured by RoE. Also, we found a slightly significant relationship between the use of derivatives and Firm Value being measured by Tobin's Q. The Risk Appetite of the managers, measured by Leverage, seems to moderate the relationship between use of derivatives and firm performance, when measured through RoA and RoE but no such moderating effect is observed for the relationship between use of derivatives and form value.

This study is 1st of its kind where the use of derivatives and their impact on Firm Value and Firm Performance is being examined in a less liquid market i.e. Pakistan where there is not much room available for the managers to hedge against numerous risks as mentioned above. The study is focused on the non-financial sector being the users of finance and not the generator.

2. Literature Review

The body of literature on derivatives, as well as their effects on firm performance and value, is substantial, yet the findings are mixed, particularly when segregated by developed or emerging markets. The use of derivatives is generally seen as positive within well-developed markets for hedging and offsetting risk. Allayannis and Weston (2001), in their landmark paper, found firms that use foreign currency derivatives tend to have higher market valuations than firms that do not use derivatives. They attribute this to the cash flows being informationally more predictable, reducing the risk of financial distress, and being viewed favorably by the investor community.

Interestingly, Geczy, Minton and Schrand (1997) observe that firms with more exposure to financial risks are more likely to use derivatives. They studied derivative use in the U.S. and concluded by stating that use of derivatives is positively associated with size, leverage and foreign business. In an international sample set, Bartram, Brown and Fehle (2009) confirmed that the use of derivatives suffices in increasing risk-adjusted firm value and diminishing cash flow volatility.

Not every study supports this optimistic view of derivatives. Guay and Kothari (2003), for example, suggested that derivatives have limited economic importance, as they tend to represent only a small portion of firm value and do not seem to affect financial outcomes that much. They concluded that only if firms use derivatives more extensively will the benefits from the use of derivatives occur without merit; otherwise, they do not occur in a statistically or economically significant way.

Unlike developed markets, the emerging market literature identifies two institutional and contextual barriers that limit the proper use of derivatives. Nguyen and Faff (2002) found when examining Australian firms, which were less liquid markets that had a lack of financial expertise and under developed regulations, that firms used derivatives in a limited ineffective manner. Bartram, Brown and Conrad (2011) pointed out that in emerging economies without deep markets and infrastructure, derivatives, if properly priced, have little or no impact than it would in a developed economy and can contribute even more to inefficiencies, if not properly priced.

Literature is limited in the South Asian context, specifically Pakistan. Afza and Alam (2011) provide evidence from a study into derivative usage among Pakistani firms: leverage, size and exposure to foreign exchange are significant determinants. However, they argue that many firms have no internal capacity to successfully implement derivative strategies. Khalid and Rehman (2018) also found similar study results, emphasizing low derivative usage in Pakistan primarily due to lack of market liquidity and weak enforcement mechanisms, regardless of regulatory support.

A further area in the literature is the effect of managerial behavior, specifically risk appetite, on the influence of derivatives. Froot, Scharfstein, and Stein (1993), argued that hedging decisions are influenced by the risk aversion of the firm's management and the need to stabilize the firm's internal cash flows rather than a desire to optimize the financial performance. Recently, Jin and Jorion (2006), reported that for oil and gas firms, the use of derivatives did not affect the firm value positively, suggesting that the role of managerial discretion and firm outer markets are relevant inputs into decision making.

Bugeja and da Silva Rosa (2006), incorporating managerial risk appetite as a moderating factor, showed higher leverage - usually considered a proxy for risk tolerance - could both increase or

decrease the effect of derivative usage depending on the firms overall frames of reference regarding governance and strategic intentions. Their findings are particularly relevant for Pakistan, as corporate governance standards and financial literacy levels can greatly differ between firms.

In conclusion, the literature identifies context, managerial behavior, and institutional structure as being important in examining derivatives and firm outcomes. This study adds to the growing literature on emerging markets in incorporating context, managerial behaviors, and institutional structure into an empirical model for the non-financial sector in Pakistan.

Based on the above literature, this study poses the following hypothesis:

H-1: Use of derivatives increases the Firm Performance.

Return on Assets = f(Derivative Use, Risk Appetite of Manager, Firm Size, Operating Profit Margin, Assets Turnover, year)

$$Per_{it}(RoA) = \alpha + \beta_1 D_{it} + \beta_2 RA_{it} + \beta_3 Size_{it} + \beta_4 OPM_{it} + \beta_5 AT_{it} + f_i + v_t + \epsilon_{it}$$

H-2: The Risk Appetite of the Firm's Manager Moderates the Relationship between the Use of Derivatives and the Firm Performance

$$Per_{it}(RoA) = \alpha + \beta_1 D_{it} + \beta_2 RA_{it} \times D_{it} + \beta_3 Size_{it} + \beta_4 NPM_{it} + f_i + v_t + \epsilon_{it}$$

H-3: Firm performance (Return on Equity) is increased by Use of Derivatives

Return on Equity = f(Derivative Use, Risk Appetite of Manager Net Profit Margin, Firm Size, Leverage, Year)

$$Per_{it}(RoE) = \alpha + \beta_1 D_{it} + \beta_2 RA_{it} + \beta_3 Size_{it} + \beta_4 NPM_{it} + f_i + v_t + \epsilon_{it}$$

H-4: Risk Appetite of the Firm's Manager Moderates the Relationship between Firm Performance and use of Derivatives

$$Per_{it}(RoE) = \alpha + \beta_1 D_{it} + \beta_2 RA_{it} \times D_{it} + \beta_3 Size_{it} + \beta_4 NPM_{it} + f_i + v_t + \epsilon_{it}$$

Impact on Firm Value (Tobin's Q)

H-5: There exists a Positive relationship between the use of Derivatives and the Firm Value

Tobin'Q = f(Derivative Use, Risk Appetite(leverage), Return on Asset, Firm Size, Net Profit Margin)

$$V_{it} = \alpha + \beta_1 D_{it} + \beta_2 RA_{it} + \beta_3 ROA_{it} + \beta_4 Size_{it} + \beta_4 NPM_{it} + f_i + v_t + \epsilon_{it}$$

H6: The Risk Appetite of the Financial Managers Interacts with the relationship between the use of Derivatives and Firm Value.

$$V_{it} = \alpha + \beta_1 D_{it} + \beta_2 RA_{it} \times D_{it} + \beta_3 ROA_{it} + \beta_4 Size_{it} + \beta_4 NPM_{it} + f_i + v_t + \epsilon_{it}$$

3. Methodology

The research has a quantitative research design, using panel data regression models to analyze the relationship between derivative usage and firm performance and value. The dataset is composed of annual observations from 35 non-financial firms on the Pakistan Stock Exchange (PSX) from 2013 to 2023, resulting in an unbalanced panel of 376 firm-year observations. The 35 companies selected are those which have used Derivatives during the time period selected for this research. Moreover, these companies are amongst the Non-Financial firms listed in Pakistan Stock Exchange. All non-financial firms listed on PSX were checked for the use of

derivatives through their annual reports and finally these 35 firms were found to be using derivatives in this time period. The rationale for using the non-financial firms is that it gives a realistic view of how and why derivatives are used in real world to mitigate the risks faced by the firms like the commodity price risk, exchange rate risk and interest rate change risk etc. rather than their use for speculation Bartram et. al (2011), Yesildağ, E. (2019)

Data were gathered from the audited annual reports, PSX database and the State Bank of Pakistan. The dependent variables of interest include communications on Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q. The independent variable of interest is derivative use (DU_DNS) and it is captured as a dummy variable, which takes on the value of 1 if a given firm used any derivative instrument in a given year, and the value of 0 otherwise.

Control variables include:

- **Firm Size (SIZE):** Measured as the natural logarithm of total assets.
- **Operating Profit Margin (OIM) / Net Profit Margin (NIM):** Represents profitability.
- **Asset Turnover (ASST_TOV):** Indicates operational efficiency.
- **Leverage (LEV):** Used as a proxy for managerial risk appetite.
- **Year Dummies (YEARS):** To capture time-specific effects.

We estimate the following panel regression models with random effects:

1. $ROA_{it} = \alpha + \beta_1 DU_{it} + \beta_2 LEV_{it} + \beta_3 SIZE_{it} + \beta_4 OIM_{it} + \beta_5 ASST_TOV_{it} + f_i + v_t + \epsilon_{it}$
2. $ROE_{it} = \alpha + \beta_1 DU_{it} + \beta_2 LEV_{it} + \beta_3 SIZE_{it} + \beta_4 NIM_{it} + f_i + v_t + \epsilon_{it}$
3. $Tobin's\ Q_{it} = \alpha + \beta_1 DU_{it} + \beta_2 LEV_{it} + \beta_3 ROA_{it} + \beta_4 SIZE_{it} + \beta_5 NIM_{it} + f_i + v_t + \epsilon_{it}$

Interaction terms ($DU \times LEV$) are included to test moderation effects.

The regression is performed using Panel EGLS (Estimated Generalized Least Squares) with random effects. We used a random effects model based on the results of the Hausman test. Due to heteroscedasticity and autocorrelation, White period standard errors are used. The data is initially tested for stationary through **Augmented Dickey-Fuller (ADF)** and the results are satisfactory shown as annexure A.

4. Results and Analysis

Impact on Firm Performance (ROA and ROE)

Panel Data Regression Analysis:

Table:1

Effect of the Use of Derivatives of Firm Performance (RoA)

Variable	Coefficient	Standard Error	Z-Statistics	Probability
C	-89.16575	63.45783	-1.40511	0.1608
DU_DNU	-0.416333	0.216820	-1.92017	0.0556*
RA	0.082693	0.015079	5.48390	0.0000***
SIZE	-0.006308	0.036114	-0.17466	0.8614
OPM	0.031016	0.031430	0.98681	0.3244
ASST_TOV	0.311295	0.247504	1.25773	0.2093
YEARS	0.044274	0.031352	1.41212	0.1588

Dep. Variable is Use of Derivatives (Dummy 1/0), RA is Risk Appetite, Size is Firm Size, OPM is Operating Profit Margin. *** means significant at 99% CI, ** means significant at 95% CI and * means significant at 90% CI.



Test	Result	Test	Result
R-squared	0.080363	Prob(LR statistic)	0.00000
Avg. log likelihood	-0.625685		

The result of the estimated relationship between the performance measurement such as ROA, ROE and derivative use. Model 1 which is based on the estimation equation that derivative use was significantly related to the performance of firm as measure as ROA. The results shows that coefficient (B) = -0.4163, $p = 0.0556$ Marginally significant at the 10% level in support of hypothesis (H1-A), the relationship between derivatives use and firm performance (ROA) is positive and significant. On average, the use of derivatives reduces ROA by approximately 42 basis points (0.42%), all else equal.

Table:2
Moderation Analysis

Variable	Coefficient	Standard Error	Z-Statistics	Probability
C	-88.87044	68.54405	-1.296545	0.1956
DU_DNS	-0.286039	0.258825	-1.105147	0.2698
INT__U_N_X_LEV	-0.085656	0.012627	-6.783766	0.0000***
SIZE	-0.023571	0.046505	-0.506853	0.6126
OPM	0.041483	0.042678	0.972006	0.3317
ASST_TOV	0.279303	0.228541	1.222110	0.2224
YEARS	0.044318	0.033885	1.307867	0.1917

*Dep. Variable is Use of Derivatives (Dummy 1/0), RA is Risk Appetite (Lev), Size is Firm Size, OPM is Operating Profit Margin. *** means significant at 99% CI, ** means significant at 95% CI and * means significant at 90 CI.*

Test	Result	Test	Result
R-squared	0.080363	Prob(LR statistic)	0.00000
Avg. log likelihood	-0.625685		

This model tests whether Risk Appetite moderates the relationship between derivatives use and firm performance measured by Return on Assets (ROA). The interaction term (Du X Ra) is negative (-0.0857) and highly significant ($p = 0.0000$). This indicates that Risk Appetite significantly moderates the relationship between derivative use and ROA, but in a negative

direction. In other words, as financial managers' risk appetite increases, the negative impact of derivative use on firm performance (ROA) becomes stronger. Main Effect of Derivatives Use (DU_DNS) alone is not statistically significant ($p = 0.2698$). This suggests that derivative use by itself does not predict ROA in this model, but its combination with managerial risk appetite does. Control Variables (Size, OPM, ASST_TOV, Years), none of the control variables were statistically significant. The effect is driven predominantly by the interaction term.

Overall Model Fit the low R^2 suggests that other factors not included in the model may explain firm performance better. However, the significant interaction provides strong evidence supporting the role of managerial characteristics in influencing how derivatives impact firm outcomes. The results provide support for the moderating hypothesis. Specifically, financial managers' risk appetite strengthens the negative association between derivative use and firm performance (ROA).

Overconfidence or aggressive risk-taking by financial managers may lead to speculative, poorly judged derivative positions, harming performance. Weak regulatory frameworks or lack of derivative market sophistication in the Pakistani financial environment. Prior studies in emerging economies sometimes report negative impacts of derivatives due to lack of expertise or weak governance controls (Guay & Kothari, 2003).

Table:3

Effect of Derivative use of Firm Performance (RoE)

Variable	Coefficient	Standard Error	Z-Statistics	Probability
C	2636.030	6785.882	0.388458	0.6979
DU_DNS	-8.149727	26.84233	-0.303615	0.7616
RA	-6.480913	3.514910	-1.843835	0.0660*
SIZE	14.09787	6.011339	2.345213	0.0195**
NIM	-0.218279	3.414570	-0.063926	0.9491
YEARS	-1.472130	3.369706	-0.436872	0.6625
C	2636.030	6785.882	0.388458	0.6979

*Dep. Variable is Use of Derivatives (Dummy 1/0), RA is the Leverage, Size is Firm Size, NIM is Net Income Margin. *** means significant at 99% CI, ** means significant at 95% CI and * means significant at 90% CI.*

Test	Result	Test	Result
R-squared	0.0293	Prob(LR statistic)	0.00000

Hypothesis H3 is not supported by the results. Across both models (ROA and ROE), derivatives use does not have a positive and statistically significant relationship with firm performance. In fact, the coefficients for derivative use are negative in both cases, with marginal or no statistical significance. The findings suggest that firms using derivatives in this

sample did not achieve superior financial performance, and in some cases, their performance may even have been marginally lower, possibly due to inefficient hedging strategies, market volatility, or higher derivative-related costs. Positive drivers of firm performance were leverage (ROA model) and firm size (ROE model), highlighting the importance of capital structure and firm scale rather than derivative use per sector.

Table:4
Moderation analysis

Variable	Coefficient	Standard Error	Z-Statistics	Probability
C	273.8118	262.5342	1.042956	0.2976
DU_DNS	-1.804033	0.799662	-2.255995	0.0247**
INT__U_N_X_LEV	-0.202891	0.173029	-1.172588	0.2417
SIZE	2.499383	0.378884	6.596705	0.0000***
NPM	0.379934	0.191842	1.980452	0.0484**
YEARS	-0.165330	0.131336	-1.258833	0.2089
C	273.8118	262.5342	1.042956	0.2976

*Dep. Variable is Use of Derivatives (Dummy 1/0), Lev is the Leverage, Size is Firm Size, NIM is Net Income Margin. *** means significant at 99% CI, ** means significant at 95% CI and * means significant at 90% CI.*

Test	Result	Test	Result
R-squared	0.0293	Prob(LR statistic)	0.00000

For ROE, the standalone derivative variable is not significant in the base model. However, with interaction terms included, derivative use becomes significantly negative ($\beta = -1.804$, $p = 0.025$), and the interaction with leverage is also negative, indicating the combined risk does not translate into better equity returns. Firms that use derivatives have significantly lower ROE than non-users ($\beta = -1.80$, $p = 0.025$). Findings of the research supports the risk-mismanagement hypothesis suggesting that derivative use, without effective risk governance, may increase complexity or risk, hurting performance. Previous studies confirm that in some emerging markets, derivatives usage was associated with reduced firm performance due to poor risk management practices and lack of hedging expertise (Ahmed, Afza & Nazir, 2020). Belghitar, Clark, & Mefteh (2013) also confirmed that the benefits of derivatives are conditional on governance, financial sophistication, and transparency, which may not always be present.

Interaction Term (Derivatives $\times$ Leverage) between derivatives use and leverage is not significant ($\beta = -0.203$, $p = 0.242$). The insignificant interaction in model may mean that risk appetite (proxied by leverage) does not reliably moderate the performance benefit of derivatives use possibly due to poor targeting of hedging strategies, hedging for speculative



rather than protective purposes and Non-linearity or threshold effects not captured in the linear model. Purnanandam (2007) showed that highly levered firms gain more from hedging (due to higher expected distress costs). According to Nance, Smith, & Smithson (1993), theoretically argued that firms with higher risk exposure (e.g., leverage) have stronger incentives to hedge, which should enhance performance. Clark & Judge (2009) also found mixed evidence for interaction effects, emphasizing industry and country differences.

Other variables like Firm Size (SIZE) positive and highly significant (coefficient= 2.499383, P-value= 0.000). Consistent with Demsetz & Villalonga (2001) and Berger & Patti (2006) larger firms enjoy economies of scale, better access to capital, and better governance, which improves performance. Further Net profit Margin (NPM) is Positive and significant (coefficient= 0.379934, P-value= 0.04). Aligns with previous literature (e.g., Miller & Modigliani (1961)) higher margins imply more internal funding and efficiency. Similarly results of Years is not significant it means no trend over time, which may be expected if structural conditions in the industry haven't changed. Derivative use does not inherently improve firm performance and may harm it without sound risk governance. Leverage as a proxy for risk appetite may not effectively capture the nuanced risk behaviors that influence derivative performance effects. Study supports the contingency perspective benefits of derivatives depend on internal capabilities, governance, and context.

Table: 5

Effect of Derivative use of Firm Value:

Variable	Coefficient	Standard Error	Z-Statistics	Probability
C	-17.63317	3.764718	-4.683794	0.0000
DU_DNS	-0.074506	0.031495	-2.365618	0.0185**
LEV	0.000612	0.002781	0.220095	0.8259
ROA	0.002829	0.006368	0.444270	0.6571
SIZE	-0.006721	0.013675	-0.491483	0.6234
NPM	-0.001191	0.002220	-0.536753	0.5918
YEARS	0.009058	0.001981	4.572711	0.0000***

*Dep. Variable is Use of Derivatives (Dummy 1/0), Lev is the Leverage, Size is Firm Size, NPM is Net Income Margin. *** means significant at 99% CI, ** means significant at 95% CI and * means significant at 90 CI.*

Test	Result	Test	Result
R-squared	0.0293	Prob(LR statistic)	0.00000

This hypothesis was tested using panel data regression through the EGLS method (Cross-section random effects, Wallace and Hussain estimator). Tobin's Q was used as a proxy for



firm value, regressed on derivative use, risk appetite, ROA, firm size, net profit margin, and years.

Derivative Use (DU_DNS) has a negative coefficient (-0.075), which is statistically significant at the 95% confidence level ($p = 0.0185$). Contrary to the proposed hypothesis (H4), the results indicate that derivative use is negatively associated with firm value (Tobin's Q). This suggests that firms using derivatives tend to have slightly lower firm value during the study period.

Time trend (Years) shows a positive and significant relationship ($p = 0.0000$), indicating that firm value generally increased over the period 2013–2023, independent of derivative use. Other explanatory variables (Leverage, ROA, Size, Net Profit Margin) were not significant predictors of Tobin's Q in this model. The low R^2 value (2.5%) suggests that the explanatory power of this model is weak, implying that other variables or external factors may better explain variations in firm value beyond those included here. H4 is not supported by the empirical evidence. The data demonstrate that derivative use has a significant but negative impact on firm value, directly contradicting the hypothesized positive relationship. Poor derivative management or speculation instead of hedging, High costs associated with derivative contracts, Market perception of derivative use as risky for firms in the studied environment (likely Pakistan's listed firms). Finding to prior studies like Allayannis & Weston (2001) found positive links between hedging and firm value in certain developed economies.

Table:6
Moderation analysis

Variable	Coefficient	Standard Error	Z-Statistics	Probability
C	-17.38408	7.739321	-2.246202	0.0253
DU_DNS	-0.071975	0.034117	-2.109673	0.0356**
INT__U_N_X_LEV	-0.000344	0.004755	-0.072441	0.9423
ROA	0.002960	0.005124	0.577714	0.5638
SIZE	-0.005867	0.008203	-0.715156	0.4750
NIM	-0.001267	0.003948	-0.320978	0.7484
YEARS	0.008925	0.003847	2.320016	0.0209**

*Dep. Variable is Use of Derivatives (Dummy 1/0), Lev is the Leverage, Size is Firm Size, NPM is Net Income Margin. *** means significant at 99% CI, ** means significant at 95% CI and * means significant at 90% CI.*

Test	Result	Test	Result
R-squared	0.0243	Prob(LR statistic)	0.00000

This model investigates whether Risk Appetite (RA) moderates the relationship between derivatives use (D) and firm value (V), measured by Tobin's Q. The analysis employed a Panel EGLS (Random Effects Model), estimated using the Swamy and Arora method. Interaction

Effect ($RA \times D$) Coefficient = -0.000344, $p = 0.9423$ (Not Significant). The interaction between Risk Appetite and Derivatives Use has no significant moderating effect on firm value (Tobin's Q). Managerial risk appetite does not significantly alter the impact of derivatives use on firm value in this model. Main Effect of Derivatives Use (DU_DNS) shows negative and significant ($\beta = -0.0720$, $p = 0.0356$). Use of derivatives alone is negatively associated with firm value. This result suggests that, independently, derivatives use may be detrimental to firm value for the sample firms, possibly due to poor hedging practices or speculative misuse.

Furthermore, other variables such as Firm Size, ROA, NPM are not significant. Years are significant and positive ($\beta = 0.0089$, $p = 0.0209$), implying that firm value increased slightly over time, regardless of derivatives use or risk appetite. Results of model Fit (Low R^2) shows the low R^2 (2.4%), which indicates that most of the variation in Tobin's Q remains unexplained, suggesting the need for further explanatory variables like market conditions, corporate governance, financial literacy (as noted in your model context), or macroeconomic factors. H6 is not supported by the data. While derivatives use negatively affects firm value, the risk appetite of financial managers does not significantly moderate this relationship. This result indicates that firms using derivatives may be experiencing reduced firm value regardless of managerial risk preferences. Possible Reasons for Non-significance is derivatives misuse or poor financial management in the sample firms, potential lack of sophistication in Pakistan's derivative markets and measurement issues related to capturing Risk Appetite accurately. Aligns with some emerging market studies where derivatives negatively affect firm value due to speculative usage rather than hedging.

Model Fit and Robustness

All the models showed relatively low R-squared values (< 0.13), a characteristic in corporate finance research. The significance of key variables and the significance of the interaction terms support greater importance of internal risk governance mechanisms instead of a more mechanical hedging behavior in emerging markets.

5. Discussion

This study's findings suggest that there exists mostly a negative or statistically non-significant relationship between the use of derivatives and firm performance (ROA and ROE) and firm value (Tobin's Q) in the non-financial sector in Pakistan. Furthermore, our results are consistent with recent literature from emerging markets that indicates that the use of derivatives often fails to provide value, in part due to market and institutional constraints. For example, Khan and Ahmad, (2021) in examining South Asian firms argue that "ineffective use of financial derivatives by companies tends to be associated with weak internal controls and risk management infrastructure." These observations resonate with the findings of this study that demonstrated derivative use did not improve performance outcomes, with the addition of moderate leverage (proxy for risk appetite) even having the opposite (negative) effect on the effectiveness of derivative use.

In the same vein, Rehman and Malik (2022) noted that most firms using derivatives in Pakistan, lacked strategic alignment with respect to risk management practices. Their examination highlighted that many of the derivatives contracts being used were mean to be reactive (post risk exposure) as opposed to proactive. As a result, the ability to improve performance outcomes through derivatives was unduly constrained.

The negative interaction effects present in our study further supported the results provided by Habib et al. (2020), who concluded that managerial overconfidence—often tied to increased

leverage—can induce misuse, or overuse, of financial instruments resulting in reduced hedging effectiveness.

From a valuation perspective, the negative implications to Tobin's Q indicates that market participants may interpreted the use of derivatives in illiquid markets as an indication of financial distress, or speculative activity, rather than risk management. Iqbal and Sheikh (2023) raised similar concerns in their study where they found disclosure quality of derivatives was a significant factor influencing investors perceptions in Pakistan.

In Tobin's Q regression, derivative usage is again negatively significant ($\beta = -0.074$, $p = 0.0185$), and may speak to market skepticism as to the usefulness of risk management practices in countries with less developed derivative markets. The interaction term with leverage is insignificant, suggesting that the investor perception of value is primarily affected by the existence of derivatives and not by managerial risk preferences.

Overall, these findings reinforce that derivative use cannot provide potential benefits without the quality of implementation, financial transparency, and managerial prudence and factors in which many Pakistani firms are likely to struggle.

6. Conclusion

This study looked at the relationship between derivatives use and firm performance and values of the 35 non-financial firms on the Pakistan Stock Exchange from 2013 -2023. In short, despite the evidence indicating that derivatives do not have a significant impact on performance measures such as ROA and ROE, in fact, it appears that derivatives can adversely affect firm value as measured by Tobin's Q. Furthermore, a financial manager(s) risk appetite, as proxied by leverage, significantly moderates the relationships that exist between derivatives use and ROA, ROE, and Tobin's Q - which seems to exacerbate any negative impact derived from the derivative use. Thus, highlighting the importance of managerial behavior, the market environment, and the characteristics of the relevant institutional context around the effectiveness of risk management tools.

In illiquid and less mature derivative markets like Pakistan, using financial instruments will not necessarily improve financial performance or risk outcomes. Instead, the presence of good governance, financial literacy, and alignment of risk management processes and practices with strategic objectives is needed.

Recommendations

Based on the findings, the following recommendations are proposed:

Capacity Building and Training - Firms should spend time training financial managers on next-level risk management practices, especially how to incorporate derivative instruments into a broader universe of strategic risks.

Strengthening Regulatory Frameworks - Regulators such as SECP should take the necessary steps to better regulate the use of derivatives and encourage standard reporting frameworks that will help promote transparency and provide investor confidence.

Development of Derivative Markets - There is an opportunity to build and diversify Pakistan's derivatives markets through product development and innovation, market maker involvement, and investor education.

Integration of Risk Governance - Firms should integrate derivative use within their enterprise-wide risk governance frameworks to ensure consistency with the firm's risk appetite and long-term strategy.



Encouraging Research and Disclosure - Academic institutions and think tanks should continually conduct research on financial innovation, and provide the findings to relevant corporate stakeholders. Corporates should be encouraged to disclose their derivative strategies and risk objectives in detail to enhance market confidence.

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