

*Original Article*

# Corporate Hedging Practices in Indonesian Non-Financial Firms in Response to the 2025 US Tariffs

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**Abstract:** This study examines the effect of corporate hedging on corporate performance amid a surge in US tariffs in 2025, using quasi-natural experiments on 38 Indonesian non-financial companies during 2015–2024. Four types of hedging, such as forex, commodities, interest rates, and operations, were evaluated against six performance indicators: return on assets, return on equity, free cash flow, leverage, current ratio, and EBITDA margin. The results show that forex hedging is associated with lower return on assets and higher leverage. Commodity hedging increases return on assets and EBITDA margin, especially in the mining and agriculture sectors, while interest rate and operational hedging do not show consistent performance effects. The heterogeneity analysis confirms the different effects between sectors, where exporters experience profitability compression due to foreign exchange hedging, while commodity firms obtain margin stabilization from commodity hedging. These findings emphasize that the benefits of hedging depend on instrument selection, exposure channels, and suitability to capital structures, and the implications for managers are the need for hedging designs that are aligned with cash flows, tenors, and operating cycles. Study limitations include potential selection bias, limitations of disclosed hedging information, and the use of interim accounting measures, which encourage further research to measure the intensity, cost, and effects of hedging more directly.

**Keywords:** Corporate Hedging, Trade Shock, Tariffs, Exposure Channels, Profitability, Capital Structure.

## I. INTRODUCTION

Global trade tensions have hardened into a structural cost shock for cross-border value chains. In 2025, the United States adopted a reciprocal tariff regime by executive order, subsequently modified in July, under which Indonesia's negotiated reciprocal rate is 19% on goods flows with the US (The White House, 2025a; The White House, 2025b). Country levels have much more variability under this scheme, and enforcement also involves higher fines for suspected transhipment passed through third countries. By way of comparison, US tariffs fall in the low double-digits for some partners and climb far higher elsewhere; goods described as duty evasion via third countries may also be subject to 40% tariffs (Al Jazeera, 2025; WilmerHale, 2025; The Washington Post, 2025). These measures significantly increase landed costs for Indonesian exporters in textiles, electronics, furniture, seafood and intermediate products with direct pass-through into prices, demand and working capital cycles. (The White House, 2025a; The White House, 2025b; Al Jazeera, 2025; WilmerHale, 2025; The Washington Post, 2025).

These pressures are compounded by the macro backdrop. The World Bank, in its Global Economic Prospects June 2025, lowered anticipated global growth for 2025 to 2.3 percent and attributed the cut to increased trade barriers and uncertainty, where it expects growth in trade volume to remain modest (World Bank, 2025a). Concurrent news reporting highlights similar drivers (Reuters, 2025; Associated Press, 2025). In a major stand-off between East and West, the US and China extended this 90-day truce in August 2025 that maintains a 30% tariff on Chinese imports to the US and tariffs of up to 10% on US goods shipped to China (Reuters, 2025), preventing an immediate steep jump but not lifting the broader regime. Marine risk has also increased: in the Red Sea, Houthi attacks necessitated expensive rerouting; insurance premiums have doubled, and Suez transits have narrowed, making logistics for exporters even more volatile (World Bank 2025; Reuters 2025; Associated Press 2025).

Indonesia's exposure is material. Exports amounted to US\$266.5 billion in 2024, or 2.7% growth year-on-year, driven by non-oil-and-gas manufacturing and resource-based products most affected by US demand and dollar financing conditions (BPS-Statistics Indonesia 2015). Year-over-year growth in real GDP was 5.12% in the second quarter of 2025, suggesting continued robustness as firms reprice to the new tariff environment (Reuters, 2025). Various analysts and park operators record surging demand, especially for assembly work near West Java and the major ports, with industrial land costs rising 15–25% y/y (Reuters, 2025). At the same time, other countries are ramping up origin-verification to combat transhipment, thereby increasing compliance costs along ASEAN supply chains (The Washington Post 2025). (BPS-Statistics Indonesia, 2025; Reuters, 2025; The Washington Post, 2025).



Formal hedging has gained prominence in domestic policy settings. In January 2025, Indonesia ordered natural-resource exporters to keep all of the proceeds of their exports onshore for one year, in place of earlier partial-retention regulations. Bank Indonesia paired the rule with interventions and liquidity operations to stabilize the rupiah, while signaling prudence on rate moves (Reuters, 2025; Orrick, 2025). At the same time, Indonesia's derivatives market infrastructure and product depth remain comparatively thin, which can elevate basis risk and execution costs versus advanced markets and makes the Indonesian setting analytically distinctive for testing hedge effectiveness (World Bank, 2024; World Bank, 2025). (Reuters, 2025; Orrick, 2025; World Bank, 2024; World Bank, 2025).

These external and domestic shifts sharpen the empirical problem. Indonesian non-financial firms face concurrent exposures to exchange rates, input and output commodity prices, and interest rates, transmitted through tariff-induced changes in demand, margins, and financing conditions. Corporate hedging provides a toolkit that includes currency forwards, commodity derivatives, interest rate swaps, and operational tactics such as input substitution and market diversification. Yet net performance implications are ambiguous in an emerging-market context where derivative access, disclosure, and microstructure differ from developed markets. This study, therefore, examines associations between firms' hedging choices and performance in 2015–2024, using within-firm identification to mitigate time-invariant confounds and macro shocks, while leaving realized post-2025 outcomes for future work.

## II. LITERATURE REVIEW

### A) *Corporate Hedging*

According to Modigliani and Miller (1958), a firm's financial policy, including hedging or risk management, would not affect value because shareholders could costlessly offset any corporate position through their own portfolios. In practice, market imperfections make risk management economically relevant, and modern theory therefore identifies specific conditions under which managing currency, commodity, and interest rate exposures can alter observable outcomes. The central motives span distress, financing, taxes, agency, and stakeholder relationships, and together they explain when hedging is likely to help or hurt near-term accounting performance while improving risk-adjusted value over longer horizons.

A first channel is the reduction of expected distress costs. By smoothing cash flows, hedging lowers the probability and deadweight losses of financial distress and preserves operating continuity and debt service capacity, which can support accounting measures such as ROA and ROE when large downside states are avoided (Smith & Stulz, 1985; Clark & Mefteh-Wali, 2023). And a second is financing frictions and underinvestment. Risky cash flows ( $w^*$ ) in this environment force firms to defer positive-NPV projects, and these effects are compounded when internal funds are erratic; hedging risky streams of cash flow into more stable budgets ameliorates the underinvestment problem à la Meyers and stabilizes both growth and investment paths (Froot et al., 1993; Myers, 1977; Géczy, Minton, & Schrand, 1997; Gay & Nam, 1998; Judge, 2020). A third channel arises from tax convexity. If the corporate tax schedule is convex, lowering earnings volatility reduces expected tax payments and increases after-tax cash flow, although this effect is often secondary to financing and distress considerations and is sensitive to local tax design (Graham & Rogers, 2002). The third channel is through agency motives, if the agency cares. Managers with undiversified human capital may hedge to minimize their personal risk even if the shareholder gains of hedging are low, and effective contracting mechanisms can indeed align managers' incentives so that management's tendency to hedge adds value rather than serving as insurance against bad luck (Stulz 1984; DeMarzo & Duffie 1995; Boubaker & Nguyen 2019). Third, reducing stakeholder cost of capital through hedging lowers earnings volatility and may alleviate creditor concerns and increase debt capacity to support a more solid capital structure (Graham & Rogers, 2002; Aabo, Hansen, & Pantzalis, 2019; Hidayat & Nurwahyuni, 2022).

These are functioning in different ways for financial and operational hedges, and the payoff forms matter to what we see in data. Derivatives allow the payoff profiles to be offset with target risks, and can achieve instant variance reduction of cash flows related to currency, commodity or interest rate sources. And derivative programs pose direct costs, basis risk and timing lags in addition to reducing tail losses and enhancing leverage, which creates testable trade-offs between low ROA in the average year and greater downside protection or better ability to borrow when variations in shocks do occur (Géczy et al., 1997; Graham & Rogers, 2002; Judge, 2020). Operational hedging, in contrast, involves matching the exposure by means of supplier or market diversification, currency cost-revenue matching and capacity re-allocation across regions and product lines and these natural hedges may be slower to implement, lumpy and capacity-constrained but protect margins (if input-output prices are alignable including commodity chains) while leaving asset efficiency unchanged if fixed costs increase as reconfiguration takes place (Kumar & Sreeram, 2020).

E608 But whether financial and operational hedges are substitutes or complements is itself an empirical issue. Some multinationals achieve this risk reduction mostly through matching currency revenues and costs, replacing derivatives, while others add derivatives on top of operational arrangements to address leftover exposures. Indeed, evidence suggests that operating hedges alone do not add value or at least consistently contribute value, whereas financial hedges tend to do so in the

markets where derivative markets are illiquid but the need for hedging is high due to rigid constraints such as borrowing costs and market access being limited (Hadian & Adaoglu, 2020; Lee & Park, 2019). The mix chosen by any firm will therefore depend on instrument availability, basis alignment, governance, and the temporal profile of shocks.

A further distinction is between risk and return. Hedging is designed to reduce volatility rather than increase the unconditional mean of earnings, so any improvement in average accounting performance must exceed program costs and the residual basis risk. As a result, studies often find muted or mixed associations with accounting metrics in ordinary periods, alongside improvements in risk-adjusted value where lower volatility is rewarded by investors and creditors. This so-called hedging premium is typically assessed with market-based measures such as Tobin's Q and meta-analytic syntheses that aggregate evidence across settings and instruments (Bartram, Brown, & Conrad, 2011; Geyer-Klingeberg, Hang, & Rathgeber, 2020; Abdel-Khalik, 2022; Zhao, 2020). Taken together, these arguments yield concrete, testable expectations that will be formalized later as signed hypotheses. FX and interest rate derivatives can stabilize financing conditions and expand sustainable leverage, yet they may display non-positive average associations with ROA when costs, basis risk, and timing mismatches are material; commodity hedging is more likely to support EBITDA margins where input and output prices are naturally alignable; operational hedging can buffer margins but may show weaker links to accounting returns when adjustment costs are high. Each expectation follows directly from the distress, financing, tax, agency, and stakeholder channels outlined above and provides the theoretical scaffolding for the empirical tests that follow.

#### **B) Empirical Evidence on Corporate Hedging and Firm Performance**

Empirical findings on hedging are mixed, and the balance of evidence strongly indicates that outcomes hinge on instrument choice, exposure alignment, market structure, and identification. The positive strand shows that well-targeted financial hedges can be value enhancing: Allayannis and Weston (2001) document a 4–5 percent higher Tobin's Q for US firms using foreign exchange derivatives, Carter et al. (2006) find that jet fuel hedging improves profitability and valuation in US airlines where input costs are directly hedgeable, and Bartram et al. (2011) report reduced risk with marginally higher value among global derivative users, a pattern reinforced by more recent evidence in Clark and Mefteh-Wali (2023). Our results are in line with the case where exposures are observable, hedge instruments have good matching to the underlying risks, and governance ensures that hedging has clear connections with financing and investments.

A second vein of literature emphasizes limited or no average effect, typically generated when positions are small, basis risk is substantial, or managerial incentives distort value. According to Guay and Kothari (2003), many derivative programs are small relative to firm value at the level of cash flows and assets. Jin and Jorion (2006) do not find a valuation differential for oil hedgers, suggesting that commodity basis risk, production uncertainty or potential selection into hedging can neutralize such expected gains. Tufano (1996) greets the mixed results on gold mining and stresses the conditioning role of managerial incentives. These findings suggest that hedging can lower downside risk while leaving mean performance unchanged if implementation costs, timing mismatches, or selection effects are nontrivial.

Between these poles lies a large body of conditional evidence clarifying when hedging helps and where it does not. Nguyen and Faff (2008) show that FX hedging is more effective than interest rate hedging, consistent with tighter exposure-instrument alignment in currency risk management, while Bae et al. (2018) demonstrate that FX derivatives mitigate against risk without necessarily increasing valuation, consistent with a not fully-priced volatility advantage. Instrument design matters: options and other convex payoffs are shown to enhance downside protection relative to linear instruments in turbulent states, which resonates with the results in Clark and Mefteh-Wali (2023). Pooling data across studies, the meta-analysis of Geyer-Klingeberg et al. (2020) finds an average hedging premium of approximately 1.8% with the most pronounced impact in FX programs, whereas Abdel-Khalik (2022) stresses that integrating financial and operational risk management tends to perform better than applying solely one instrument after another.

Context matters greatly in emerging markets, and access to derivatives, liquidity, and disclosure levels are not the same as those that we find in developed countries. In Turkey, Ayтурk et al. (2016) quantify large value gains from FX hedging, while in Malaysia, Hadian and Adaoglu (2020) found that financial approaches to FX also outperform operational methods. Focus on Indonesia operates in the presence of greater motives to hedge under financing frictions: Purnomo et al. (2024) and Hassan et al. (2025) find that firms with FX, commodity and interest rate hedges outperform those without, particularly when more highly leveraged or growth oriented. However, not all evidence out of emerging markets is positive; Kwong (2016) reports valuation discounts in Malaysia due to speculative hedging and emphasizes the importance of governance and risk policy in disentangling insurance from bets. Identification strategies also make a difference; narrowly-focused programmes that counteract nondiversifiable shocks directly can shift the performance needle more straightforwardly, such as Perez-Gonzalez and Yun (2013), who find it for weather derivatives in US utilities where exposures are observable and hedgeable.

Outside the realm of valuation, hedging effects on accounting performance are also context-dependent. Web-based research like Allayannis et al. (2012) and Choi et al. (2013) relate hedging with higher ROA and ROE, Jory et al. (201) find no

ROA gains in commodity-related firms when they operate with high to basis risk and production volatility. FCF variability generally falls with hedging, although average FCF may stay fairly constant: leverage tends to rise because lenders see hedging as a risk-decreasing activity, and the descendants reduce spreads and increase borrowing capacity (Graham & Rogers, 2002; Lin & Smith, 2007). Liquidity impacts are less well-researched; derivatives might reduce precautionary cash bridge, or change working capital requirements, operational hedges could immobilize funds in inventory or capacity moving, and hence current ratio moves while mean cash generation does not. In a volatile input environment, commodity hedging generally supports EBITDA margins by enhancing pass-through or gross spread stability, and this is in line with the results in Carter et al. (2006) and Jin and Zhang (2019)'[Munguia','Hedahls']. In sum, this literature indicates testable tensions that will inform the empirical analysis in this thesis. Where basis risk, costs, and timing mismatches are large, FX and interest rate hedging may show non-positive associations with ROA even as they enhance debt capacity and lower tail risk; where input and output prices are naturally alignable, commodity hedging is more likely to lift EBITDA margins; where governance is strong and instruments are appropriately scaled, hedging benefits are more likely to be priced into valuation; and where programs are speculative or poorly aligned, valuation penalties can emerge. These tensions motivate the signed, mechanism-anchored hypotheses formalized later and connect instrument choice and market setting to the specific performance metrics evaluated in the Indonesian context.

#### **C) Hedging Effectiveness and Financial Performance Outcomes**

On balance, evidence suggests that the valuation benefits of hedging may depend on the choice of which risks are addressed and to what extent instruments match underlying exposures. Meta-evidence and large cross-country samples show that interest rate and commodity hedging in isolation tend to command at best modest value premia, and sometimes even a small discount, whereas investors appear to be more consistent in valuing FX risk reduction, possibly due to the perception that currency shocks are more exogenous and idiosyncratic than funding-rate or input-price on financial products (Bartram et al., 2011; Lin et al., 2021). Firms that combine derivatives and operational hedging, meanwhile, have higher performance outcomes, consistent with broadening the scope of shock absorption as well as lowering the remaining basis risk (He & Ng, 2022). These results are stronger in less-mature financial markets, and in high-tax regions where financing frictions and tax convexity further raise the benefit from smoothing volatility (Allayannis, Lel, & Miller, 2012; Deng & Wang, 2021). The tax policy embeds the following logic: hedging can reduce expected taxes under progressive schemes, and by fixing pre-tax income, can increase after-tax cash flows (Graham & Rogers, 2002).

Taken together, these results imply testable, metric-specific expectations for the analysis that follows. FX programs should most visibly influence valuation and capital structure through lower perceived risk and greater debt capacity, while commodity hedging is more likely to support EBITDA margins where input-output prices can be aligned, with mixed effects on ROA once program costs are netted. Hedge to fixed interest rate should stabilize financing costs and debt service, however, with less direct valuation consequence unless the leverage is paramount. Strategic hedging is able to transform liquidity/working capital from inventory and sourcing adjustments, and increases the contribution of value when it is joined with derivatives. These hypotheses associate instruments with the ROA, ROE, free cash flow, leverage, current ratio and EBITDA margin as the intermediary between bibliographic references and signed hypotheses provided ISSU (Bartram et al., 2011; Lin et al., 2021; He & Ng, 2022; Allayannis et al., 2012; Deng & Wang, 2021; Graham & Rogers 2002).

#### **D) Hedging in Emerging Markets**

Recent works provide a closer look at hedging in emerging markets. Non-financial firms in Turkey using derivatives contributed to an increase in firm value, particularly when the foreign currency exposure was taken into account (Ayturk et al., 2016). Adaoglu and Hadian (2020) found that Malaysian MNCs earn a long-term premium by using derivatives up to 19 percent and value discounts when their operational hedge is the foreign debt. This comparison reflects the unintended risk of mismatched hedging and emphasises the benefit of financial as opposed to natural hedging when exposures do not match (Ahmed et al., 2020). In Indonesia, Purnomo et al. (2024) studied 380 non-financial companies, indicating that FX and commodity hedging were beneficial to the firm value through the stabilization of Earnings and reductions in capital costs under macroeconomic fluctuation. Hassan et al. (2025) confirmed this in the Asia-Pacific, where multi-instrument hedging (FX, interest rate and commodity) led to improved firm returns with FX instruments dominating. Profitability, cross-sectional variance of return and growth orientation had positive influences on hedging that support the prediction that more exposed firms hedge more (Zhao, 2020; Zainudin et al., 2022). These results are consistent with previous studies by Nance et al. (1993) and Géczy, Minton, and Schrand (1997), who found that larger firms faced greater financial constraints and hedge more because they are more susceptible to cash flow volatility and have better access to the derivatives markets.

#### **E) Mixed or Negative Hedging Outcomes**

Not all hedging outcomes are positive, and the literature isolates clear conditions under which value penalties arise. Kwong (2016) documents that Malaysian derivative users can post stronger accounting results (e.g., ROA and ROE) yet be penalized in valuation through lower Tobin's Q, a pattern consistent with investor skepticism about the intent, scale, and

alignment of programs. Where disclosures are thin or policies appear discretionary, markets may infer speculation rather than insurance, amplifying discounts (Jankensgård, 2018). Diagnostic lenses from prior work reinforce these mechanisms: small positions or poor exposure matching blunt impact (Guay & Kothari, 2003); basis risk and production uncertainty dilute benefits in commodity settings (Jin & Jorion, 2006); and managerial motives can push programs away from shareholder value (Tufano, 1996). Together, costs, timing mismatches, selection into complex instruments, and opacity explain why hedging can reduce downside risk yet still depress contemporaneous profitability or valuation when implementation is misaligned with the underlying exposures.

A second complication is endogeneity, which muddies interpretation of observed correlations. Firms often initiate or scale hedging reactively in response to deteriorating performance or rising risk, so negative associations between hedging and outcomes can reflect adverse selection rather than inefficiency. Causal designs clarify this distinction: exploiting a natural experiment in weather derivatives for US utilities, Perez-Gonzalez and Yun (2013) show that exogenous adoption lifts value and profitability, indicating that appropriately targeted hedging creates rather than merely correlates with performance. The empirical implication is a set of testable tensions: reactive programs under strain may coincide with lower ROA even as volatility falls, whereas proactive, well-disclosed, and exposure-aligned programs should improve margins or expand debt capacity in ways investors ultimately reward. These tensions motivate the identification strategy and signed hypotheses developed later and underscore the central roles of governance, transparency, and instrument–exposure fit in determining whether hedging delivers measurable benefits.)

### III. RESULTS AND DISCUSSION

#### A) Descriptive Statistics and Preliminary Insights

Before providing the regression results, a few key summary statistics give context. Descriptive statistics for the 342 firm-year observations are reported in Table 6. The mean value of ROA is 3.3%, and the standard deviation is 9.0%, suggesting a high level of variability in firm profitability. The downfall in ROE stands at 5.0% on average, which is even more dispersed due to leverage and the negative equity phenomenon that might cause the ROE to be inflated or disfigured (DeAngelo & Roll, 2015). Free cash flow (FCF), although on average, the IDR 3.53 trillion is positive, is strongly asymmetric. Most firm-years have negative or low FCF, and only a few commodity firms have high values during periods of prosperity.

**Table 1: Descriptive Statistics of the Selected Sample**

VARIABLES	(1)	(2)	(3)	(4)	(5)
	N	mean	sd	min	max
FX hedging	342.000	0.775	0.418	0.000	1.000
Commodity hedging	342.000	0.570	0.496	0.000	1.000
Interest rate hedging	342.000	0.494	0.501	0.000	1.000
Operational hedging	342.000	0.772	0.420	0.000	1.000
Revenue	342.000	19,530.194	48,439.309	8.960	330,920.000
Net income	342.000	2,098.414	5,900.559	-10,000.000	39,204.199
Assets	342.000	29,385.051	63,866.411	16.220	472,925.000
Liabilities	342.000	10,614.672	24,732.624	5.950	201,429.000
FCF	342.000	3,533.638	8,343.902	-6,300.910	52,949.121
ROA	342.000	0.033	0.090	-0.814	0.685
ROE	342.000	0.050	0.525	-6.000	6.375
Leverage	342.000	0.575	2.602	-33.000	5.535
Current ratio	342.000	1.506	0.916	0.130	10.820
EBITDA margin	342.000	0.155	0.188	-0.709	1.390

Leverage, measured by the liabilities-to-equity ratio, averages 0.58 with a median closer to 0.5. Roughly 10% of firm-year observations record leverage ratios above 3, and a few display negative equity, resulting in negative leverage figures. The average current ratio is 1.51, with a median of approximately 1.2. While most firms maintain a safe liquidity buffer, a few companies report unusually high current ratios due to large cash or inventory holdings. EBITDA margin averages 15.5%, ranging from -70.9% to 139.0%, illustrating performance variation between distressed and highly profitable firms. Those figures are in line with the literature on emerging market volatility and firm heterogeneity (Chen et al., 2020; Boubakri & Saffar, 2019).

FX hedging is reported in 77.5% of firm-year observations, suggesting wide use of currency risk management. Commodity hedging, which was reported in 57% of LOB exposures, is a manifestation of sector concentration among mining, agriculture and transportation. Interest rate hedging is reported to be approximately 49.4%, which could ultimately apply to firms that are highly leveraged. Operational hedging, often through geographic or sourcing diversification, takes place in 77.2%, particularly among multinationals (Bartram et al., 2018). At the firm level, 39% (15/38) did not financially hedge from 2015 to 2024, primarily small domestic firms. It was almost always mining companies, with around 10 firms that consistently hedged at least one risk, usually both FX and the rate of exposures. It means that the lack of outward hedging in our study could be because exporting manufacturers had other ways to reduce risk depending on the volatility environment, similarly to a study suggesting that macroeconomic uncertainty influences the level of export hedging (Purnanandam, 2007; Dionne & Triki, 2020). Over time, FX hedging increased from 40% to 55% from 2017–2019 during the trade tensions and Rupiah depreciation and continued at that level through Reza Kurniawan / J. of Economics, Business, and Accountancy Ventura Vol. Annual reports reveal firms increasingly characterised hedging as preparation for the US tariffs of 2025 (Bank Indonesia, 2022). This is consistent with the long-standing literature on hedging adaptations in response to market and regulatory changes (Hecht & Tay, 2022; Makar & Huffman, 2013).

The Pearson correlation coefficients demonstrate important preliminary associations between the essential variables. ROA and FRR have a moderate positive correlation (0.3363), implying that companies with higher profitability also create better internal cash flows. EBITDA margin has a strong relationship with ROA (0.5554) and FCF (0.5430), indicating that companies with higher operating performance are more likely to turn revenue into profit as well as cash flow. ROE correlates weakly with ROA (0.0208) and FCF (0.0860), likely indicating equity volatility in the sample (\(\pm\)). Leverage also has a poor negative relationship with ROA (-0.0806) and nearly no relationship with FCF (0.0029), which is consistent with the theory that highly leveraged firms are less profitable or more constrained by cash flow. The current ratio is positively correlated with ROA (0.1233) and FCF (0.1006), so that more liquid firms will have better financial performance. None of the predictors were overly correlated (all above 0.70), indicating that there was no serious multicollinearity in the data.

## B) Regression Result

**Table 2: Regression results for Fixed Effect**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	FE ROA	FE FCF	FE ROE	FE Leverage	FE Current Ratio	FE EBITDA
FX hedging	-0.120*** (0.023)	-252.592 (1,506.356)	0.276 (0.280)	8.118*** (0.825)	-0.091 (0.313)	-0.024 (0.043)
Commodity hedging	0.470*** (0.039)	-632.962 (2,535.286)	-0.648 (0.472)	-4.808*** (1.388)	0.492 (0.527)	0.585*** (0.073)
Interest rate hedging	-0.018 (0.024)	-161.261 (1,576.451)	-0.335 (0.294)	-7.891*** (0.863)	-0.181 (0.328)	-0.050 (0.045)
Operational hedging	0.004 (0.033)	-47.528 (2,128.130)	0.009 (0.396)	0.043 (1.165)	0.020 (0.442)	-0.005 (0.061)
Revenue	-0.000 (0.000)	0.067** (0.028)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000*** (0.000)
Net income	0.000*** (0.000)	0.521*** (0.059)	0.000** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000* (0.000)
Assets	-0.000*** (0.000)	-0.037 (0.029)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000** (0.000)
Liabilities	0.000 (0.000)	-0.149*** (0.039)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Constant	-0.128*** (0.034)	4,483.290** (2,191.877)	0.378 (0.408)	0.943 (1.200)	1.295*** (0.456)	-0.141** (0.063)
Observations	342	342	342	342	342	342
R-squared	0.669	0.327	0.023	0.282	0.024	0.315
Number of panels	38	38	38	38	38	38

### a. Impact of Hedging on Profitability (ROA and ROE)

This study shows that the impact of hedging on profitability (ROA and ROE) is heterogeneous depending on the type of instrument. FX hedging tends to be negatively correlated with ROA, reflected by the coefficient of -0.120 ( $p < 0.01$ ) in the fixed-securities model, which may be due to the selection of companies with high exposure, hedging costs, or accounting timing (Bartram et al., 2011; Zhang et al., 2020; Kwong, 2016; Fok et al., 2022). In contrast, commodity hedging showed a significant positive effect on ROA (+0.470,  $p < 0.01$ ) as this strategy was effective in stabilizing margins in resource-intensive sectors (Perez-Gonzalez & Yun, 2013; Lien & Sun, 2016; Géczy et al., 2007; Judge, 2021). Interest

rate and operational hedging do not show a significant effect on short-term profitability, although random-effects models highlight the negative effects of hedging operations (Hadian & Adaoglu, 2020; Yilmaz & Tanyeri, 2021). ROE results follow a similar pattern, but are more volatile because they are affected by equity fluctuations. The findings emphasize that the effectiveness of hedging depends on the type of exposure, timing, and treatment of the accounting, and that hedging does not necessarily increase accounting profitability in the short term (Haushalter, 2000; Jin & Jorion, 2006; Clark & Mefteh-Wali, 2022).

#### **b. Impact on Leverage and Financial Policy**

The results show that the impact of hedging on capital structure and financial policy varies according to the type of instrument. FX hedging significantly increases leverage (FE: +8.118,  $p < 0.01$ ), suggesting that foreign exchange risk management allows companies to access more debt (Graham & Rogers, 2002; Zhao, 2022; Gamba et al., 2020). In contrast, commodity hedging tends to lower leverage (FE: -4.808,  $p < 0.01$ ), reflecting conservative strategies and the use of hedging as a substitute for external financing in the resource sector (Campello et al., 2011). Interest rate hedging is also associated with lower leverage (FE: -7.891,  $p < 0.01$ ), which may reflect the use of hedging when the debt structure stabilizes or declines (Nguyen & Faff, 2007). Operational hedging does not show a significant influence on leverage, indicating that long-term strategies such as geographic diversification do not immediately change the capital structure (Dessaint & Matray, 2017). These findings confirm that the effects of hedging on financial policy are heterogeneous, where different instruments affect debt capacity and capital structure decisions differently, especially in emerging markets with access to foreign debt and high volatility (Bartram et al., 2022; Campa & Simić, 2021).

#### **c. Impact on Liquidity (Current Ratio) and Cash Flow**

The analysis shows that hedging has no significant effect on short-term liquidity or free cash flow (FCF). Operational hedging showed a negative tendency to the current ratio in the random effects model (-0.490,  $p \sim 0.06$ ), likely because large companies using hedging managed working capital more efficiently or had short-term liabilities that increased liabilities, but this effect was inconsistent in the fixed-effects model. Hedging forex, commodities, and interest rates does not significantly affect the current ratio, nor does the FCF, although there are anecdotal indications that commodity hedging helps prevent a cash crunch in periods of decline. The control variables show that revenue and net income are positively related to FCF, while liabilities are negative, signaling that the company's financial logic remains reflected in the model. Overall, these findings indicate that while hedging has an impact on profitability and leverage, hedging practices do not directly change a company's liquidity management or cash flow from year to year.

#### **d. Impact on Operating Performance (EBITDA Margin)**

The results showed that commodity hedging had a significant positive effect on EBITDA margin (FE: +0.585,  $p < 0.01$ ; RE: +0.327,  $p < 0.01$ ), which suggests that commodity hedging helps companies maintain operational profitability relative to sales, in line with the findings of Carter et al. (2006) on commodity-price-dependent industries. In contrast, FX hedging and interest rate hedging showed no significant effect on margins, likely due to hedging costs or price constraints and production costs, while operational hedging showed a small negative effect on the random effects model (-0.106,  $p < 0.05$ ), which may reflect the characteristics of multinationals with high overhead. These findings confirm that the benefits of hedging on operational performance are heterogeneous, with the most obvious impact occurring in the commodity hedge that protects the company's core margins.

#### **e. Comparison with Prior Literature, Similar Studies, and Unexpected Results**

The results of the study show that the impact of hedging largely depends on the type of risk the company faces. Commodity hedging provides a clear improvement in performance, especially on ROA and EBITDA margins, as it can stabilize earnings amid volatility in commodity prices such as coal and nickel, in line with Khan et al. (2021) and Lin & Su (2020). In contrast, FX hedging exhibits a neutral or negative effect on accounting performance, likely because some exporters derive natural benefits from currency depreciation offset by hedging, so margins do not improve (Jin & Jorion, 2006; Madura & Fox, 2020). Operational hedging does not provide short-term financial benefits, as Allayannis & Weston (2001) and Bartram et al. (2022) found, as these strategies are as long-term as geographic diversification and supply chain restructuring. Comparisons with other literature show a consistent and distinct pattern: commodity-based derivatives hedging improves performance, while FX and interest rate hedging do not necessarily result in increased profitability, emphasizing that the primary purpose of hedging is protection against specific risks rather than an increase in average profits (Hassan et al., 2025; Hadian & Adaoglu, 2020; Bae et al., 2018; Bartram et al., 2011; Al-Hadi et al., 2019). Robustness checks confirm that the main effects of hedging emerge contemporaneously and that the significant impact of commodity hedging reflects the ability of hedging to mitigate large losses within a single period of the company.

#### IV. CONCLUSION

The results of the study show that the impact of corporate hedging is heterogeneous depending on the type of instrument and the risks the company faces. Commodity hedging has been shown to increase profitability (ROA and EBITDA margin) and protect operational performance, especially in the resources sector, and tends to lower leverage by supporting a more conservative capital structure. In contrast, FX hedging has a neutral or negative effect on profitability and increases leverage, likely due to hedging costs, the selection of companies with high exposure, and accounting timing. Interest rate hedging has little or no significant impact on profitability, leverage, or liquidity, while operational hedging does not provide short-term financial benefits, although it can structurally affect operating margins in large or multinational companies. Overall, the findings confirm that hedging is most effective when adjusted to the specific risks and conditions of the company, with the primary objective being risk mitigation rather than simply an increase in average profits, as well as that the effect of hedging on profitability, capital structure, and operational performance needs to be considered contextually according to instrument type and risk exposure.

#### Interest Conflicts

The author(s) declare(s) that there is no conflict of interest concerning the publishing of this paper. This research was conducted independently and did not receive financial support from any firm, organization, or entity that could influence the results or interpretation of the study.

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