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Nexus Between Financial Hedging, Performance and Firm Value: Evidence from A Sample of Non-Financial Asian Firms

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ABSTRACT

Use of hedging and firm value (performance) nexus has received mixed attention due to conflicting results that broadly consider firms from the U.S. and European contexts. This study investigates data from Asia-Pacific region to observe the interaction between use of hedging, value, and performance of non-financial firms. Results indicate hedging to be value enhancing irrespective of the three types of risks hedged: foreign currency, interest rate, and commodity price risk with foreign currency risk is the strongest driver. This nexus, however, is weaker for commodity price risk. Several moderation and robustness tests also confirm that profitable, highly levered, and high growth companies use derivatives for hedging to a higher extent. We forward that both reactive and proactive reasons behind hedging might be connected to corporate intention to reduce 'reputation risk'.

ملخص

تحظى العلاقة بين استخدام التحوط وقيمة الشركة (الأداء) باهتمام متباين بسبب النتائج المتضاربة التي تغطي بشكل عام الشركات من السياقين الأمريكي والأوروبي. وهذه الدراسة تستعرض بيانات من منطقة آسيا والمحيط الهادئ لدراسة التفاعل بين استخدام التحوط وقيمة وأداء الشركات غير المالية. وتشير النتائج إلى أن التحوط يعزز القيمة بغض النظر عن أنواع المخاطر الثلاثة موضوع التحوط: العملات الأجنبية، وأسعار الفائدة، ومخاطر أسعار السلع الأساسية، حيث إن مخاطر العملات الأجنبية هي المحرك الأقوى. غير أن هذه العلاقة أضعف على مستوى مخاطر أسعار السلع الأساسية. وتؤكد كذلك العديد من اختبارات الاعتدال والمتانة أن الشركات المربحة

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وذات المديونية العالية والنمو المرتفع تستخدم بدرجة كبيرة المشتقات للتحوط. ونرى أن الأسباب التفاعلية والاستباقية وراء التحوط مع قد تكون مرتبطة بنية الشركات للحد من "مخاطر السمعة".

RESUME

Le lien entre l'utilisation de la couverture et la valeur de l'entreprise (performance) a fait l'objet d'une attention mitigée en raison de résultats contradictoires concernant les entreprises des contextes américain et européen. Cette étude examine les données de la région Asie-Pacifique afin d'observer l'interaction entre l'utilisation de la couverture, la valeur et la performance des entreprises non financières. Les résultats indiquent que les opérations de couverture augmentent la valeur de l'entreprise, quels que soient les trois types de risques couverts : le risque de change, le risque de taux d'intérêt et le risque de prix des matières premières, le risque de change étant le facteur le plus important. Ce lien est toutefois plus faible pour le risque de prix des matières premières. Plusieurs tests de modération et de robustesse confirment également que les entreprises rentables, fortement endettées et à forte croissance utilisent davantage les produits dérivés à des fins de couverture. Nous pensons que les raisons réactives et proactives qui sous-tendent les opérations de couverture pourraient être liées à l'intention des entreprises de réduire le ‘risque de réputation’.

Keywords: Hedging, Financial risk, Derivative, Firm value, Performance, Asia-Pacific.

JEL Classification: G32, F3

1. Introduction

In a perfect capital market, use of hedging does not ameliorate firm value (Modigliani & Miller, 1958). As shareholders can design their own protection plan at an equal cost, use of hedging techniques leads to negligible value enhancement for an individual firm (Jin & Jorion, 2006). In reality, with the relaxation of the assumptions of the perfect capital market, in terms of financial distress, taxes, and agency costs, there exists an optimal hedging policy that positively influences firm value and performance (Leland, 1998; Stulz, 1996; Gay & Nam, 1998; Geczy, Minton & Schrand, 1999).

Empirical literature offers three conflicting hypotheses on hedging-value-performance (HVP) nexus (Campbell, Mauler, & Pierce, 2019). First, hedging increases firm value (Allayannis & Weston, 2001; Chen & King, 2014; Clark & Judge, 2008). Second, use of hedging tools, such as derivatives, may add cost exceeding the benefits of risk management, leading to a negative connection with value (Nguyen & Faff, 2010; Nelson, Moffitt, & Affleck-Graves, 2005). Third, there is no definite conclusion that can establish a clear connection between use of hedging technique, value, and the performance of firms (Belghitar, Clark & Mefteh, 2013; Guay & Kothari, 2003). Motivated by these gaps, this study investigates whether use of hedging enhances value (and performance) of non-financial firms from the Asia Pacific region.

Asian hedging market has been growing since the Asian financial crisis. Asian markets are generally growing, with more emphasis given on interest rate and foreign exchange derivatives. Hong Kong SAR and Singapore are the most sophisticated, while the China offers the highest level of restriction (Hohensee & Lee, 2006). While most Asia-Pacific markets are still developing their derivative arsenal, global investors[5] plan to move away from 'overvalued' U.S. markets to tap on the post-pandemic Asian markets with billions of dollar. This is generally protrays the need for more investigations into demand for hedging in the Asia-Pacific markets.

Our results extends on the contributions of recent studies. Bachiller, Boubaker and Mefteh-Wali (2021) conduct a meta-analysis on hedging instruments and firm value. They find foreign currency derivative to be specially value-adding, while country-specific attributes, such as the practice of common law and developed economy, influenced the use of derivative. We conduct our study to observe the connection between HVP in a set of mixed income countries from the Asia-Pacific region. Geyer-Klingeberg, Hang, and Rathgeber (2020) also conduct a meta-analysis and present that the connection between hedging and value is inconsistent when considered different types of risk hedged. For instance, foreign currency derivative is found to be positively connects to value, which is in line with Bachiller et al. (2021), while the interest rate hedging exhibits a negative effect on firm value. Therefore, this study extends its

[5] https://www.bloomberg.com/news/articles/2021-03-21/hedge-fund-investors-with-812-billion-see-asia-as-preferred-bet

contribution to investigate the influence of types of risks hedged on the value and performance of firms.

Empirical evidence of the relationship between HVP in the Asia-Pacific context is rare and recent. Zamzamir et al. (2021) investigate Malaysian Islamic firms and report significant influence of hedging on firm value. Kim, Papanastassiou & Nguyen (2017) consider country specific attribute, such as the corruption in East Asian countries, that reports attractiveness of hedging in low corruption countries. Lee (2019) considers corporate governance of selected firms and report intention to use hedging among firms with high governance standards. Ameer (2009) has reported a minimum value creation by hedging activities among selected Malaysian firms. Lau (2016) also examines Malaysian firms and reports that firm market value is negatively connected to use of derivative, while the connection is positive with financial performance. Chowdhury et al. (2023) examine how CEO risk preferences shape hedging decisions and find that regardless of whether a CEO is risk-seeking or risk-averse, hedging does not significantly enhance firm value. Instead, it functions more as an insurance mechanism, offering protection without necessarily creating value—especially during extreme market fluctuations. Similarly, Chu et al. (2025) investigate commodity futures hedging and report that it negatively impacts firm value by increasing capital expenditures and reducing free cash flow, raising concerns about whether hedging benefits firms in commodity-dependent industries.

Other studies present a more favorable view. Das and Kumar (2023) find that Indian multinational corporations (MNCs) using foreign currency derivatives and foreign-denominated debt see their firm value rise by 16.91% and 10.21%, respectively. Their findings suggest that hedging is particularly beneficial for firms exposed to currency risk. Similarly, Ji and Wei (2023) confirm that hedging with derivatives enhances firm value, with their results holding up even after alternative testing and propensity score matching (PSM).

Beyond financial performance, recent studies also examine hedging's role in corporate governance and reputation management. Deng and Yang (2023) find that high-reputation firms hedge more aggressively to maintain stability, yet their research suggests that interest rate hedging can sometimes reduce firm value, challenging the belief that well-managed firms always hedge optimally. Meanwhile, Mefteh-Wali and Hussain (2024) highlight that family-owned businesses often adopt

suboptimal hedging strategies due to agency conflicts between family owners and minority shareholders, limiting its effectiveness.

The recent studies covering the Asian context present support for a mixed bag of hypotheses, which demands deeper investigation. While there is less support for cost-value hypothesis of hedging, there is significant support for reputation as use of hedging may positively influence the perception of the shareholders and debtholders (Lau, 2016).

This study investigates the interaction between hedging, performance, and value of non-financial firms considering sample from Asia-Pacific countries. Our paper offers unique contributions from two quarters. First, we considered data from 123 non-financial firms that were registered across twelve Asia-Pacific countries. These countries as sample were least covered by the past studies. Second, while most extant studies considered effect of hedging on either value or financial performance, we considered both value (Tobin's Q) and financial performance (ROIC) alongside a healthy mix of company- and country-specific determinants of value (and performance). Hedging activities signal good management quality through which the relationship with performance and value may occur. Therefore, firm characteristics may moderate the relationship between HVP. Exploring these firm characteristics also increases our understanding of the underlying reasons leading to positive or negative relationship between hedging and performance, thus is expected to contribute to resolving the contradictions presented in extant studies.

This study develops as follows. Section 2 reviews the literature. We divide the literature into three major sections. Two sub-sections discuss the two competing hypotheses: positive and negative connection between hedging, firm value, and performance, while the third sub-section reviews empirical literature relevant to the emerging markets. Section 3 discusses the data and methodology used in this study. We have employed OLS for main investigations since the results are more consistent to theory while two-stage least square and dynamic panel models using System-GMM are employed for robustness. Data includes 123 companies across 12 Asia Pacific countries for the period 2011-2015 for a total of 615 year-firm observations. Section 4 discusses the results from regular models and robustness tests. In general, our results indicate that the hedging activities add value to the company irrespective of the type of risk hedged. Companies with higher leverage, better profitability and better growth prospect will generally be benefitted more by hedging. Hence, we support

the first group of hypotheses specifying a value-enhancing attributes of hedging using derivatives. Section 5 concludes the study. We forward two channels of hedging by non-financial firms: proactive and reactive channels. Intention to hedge by both the channels connect strongly to reputation risk. Our results support the view that the non-financial firms in Asia-Pacific context engage in hedging to reduce reputation risk.

2. Literature review

Three major theories are discussed while explaining the hedging-value-performance (HVP) nexus. The first is the irrelevance theory assuming perfect markets by Modigliani and Miller (1958). Under this view, risk management is irrelevant since shareholders can create the hedging policy they desire at no cost (benefit) compared to the firm (Jin & Jorion, 2006; Ayturk, Gurbuz, & Yanik, 2016). The second stance argues that the cost of hedging outweighs the benefits. This leads to a negative relationship with firm value (Nelson et al. 2005). This negative relationship can occur if risk management programs are designed to satisfy managerial interests rather than shareholders' interests (Hagelin, Holmén, Knopf, & Pramborg, 2007; Knopf, Nam, & Thornton Jr, 2002), if derivatives are used for speculation rather than hedging hence increasing risk exposure (Adam, Fernando, & Salas, 2017), and when hedging is less effective in risk mitigation (Hagelin & Pramborg, 2004). Empirically, the prodigious losses associated with derivative usage add doubt to its capability to aggrandize value. Recent research supports these concerns. Chu et al. (2025) found that firms using commodity futures experienced a decline in firm value, largely because hedging lowered operational free cash flow while raising capital expenditures. Similarly, Ullah et al. (2023) showed that hedging strategies, when combined with high capital expenditures, led to a drop in firm value, especially for firms with significant foreign operations. Even companies with strong reputations are not immune to these risks—Deng and Yang (2023) found that while high-reputation firms hedge more aggressively, their interest rate hedging strategies often harm firm value rather than enhance it.

The third stance expects a direct relationship with firm value and establishes the base for risk management literature and practices. The channel for this positive relationship, in this view, can be through reducing income volatility, therefore, expected tax liability (Smith & Stulz, 1985), reducing financial distress costs resulting in higher debt level (Myers, 1977; Leland, 1998; Stulz, 1996), alleviating

underinvestment costs causing lower agency costs of leverage (Gay & Nam, 1998; Bessembinder, 1991; Froot et al., 1993), and attenuating information asymmetry (DeMarzo & Duffie, 1991). Recent empirical evidence strongly supports these arguments. Das and Kumar (2023) found that firms using foreign currency derivatives and foreign-denominated debt saw their value increase by 16.91% and 10.21%, respectively. Likewise, Ji and Wei (2023) reported that hedging positively impacted firm value, with results remaining robust even after extensive testing. HongXing et al. (2023) further reinforced these findings by using deep neural network models to demonstrate that currency risk hedging significantly boosts firm value, particularly in emerging markets. However, not all firms benefit equally. Mefteh-Wali and Hussain (2024) highlight how family-owned businesses sometimes engage in suboptimal hedging, limiting the potential value they could gain. At the same time, Gupta et al. (2024) show that in emerging markets, derivatives are particularly beneficial because they help stabilize earnings volatility and create tax advantages. Other evidence indicated that lower cost of equity is associated with smooth earnings (Francis, LaFond, Olsson, & Schipper, 2004). Finally, managerial attitude towards risk also channels corporate incentive for hedging. Managers emphasizes on potential diminishing of corporate reputation due to volatility of income and market value. Since compensation is also tied to corporate income and market value, managers have the tendency to use the safest route to achieve less volatility by using hedging (Smith & Stulz, 1985).

Empirical results of hedging on firm value are mixed. Various papers demonstrate a positive effect on firm value (Allayannis and Weston, 2001; Kim, Mathur & Nam, 2006; Carter, Rogers, & Simkins, 2006; Pérez-González & Yun, 2013; Laing, Lucey & Lütkemeyer, 2020; Bartram, Brown & Conrad, 2011; Chen & King, 2014; Clark & Judge, 2008). Opposing quarters are strong too (Fauver & Naranjo, 2010; Hagelin *et al.*, 2007; Adam *et al.*, 2017; Nguyen & Faff, 2010; Nelson et al., 2005). Considerable number of studies also do not find any overriding association between hedging practices and firm value (Bartram *et al.*, 2011; Belghitar *et al.*, 2013; Tufano, 1996; Jin & Jorion, 2006; Ayturk et al., 2016).

Bartram et al. (2011) use a sample of non-financial firms from forty-seven countries and report a significant positive relationship between use of derivative and firm value. As lower cost of debt is connected to less

volatile operation, Beatty, Petacchi, and Zhang (2012) show that use of derivative results in low earning volatility and lower cost of borrowing. Graham and Rogers (2002) and Donohoe (2015) report that firms can benefit from reduced cash effective tax rates by using derivatives. Allayannis and Weston (2001) find at least 5% higher value for the firms using foreign currency derivative when compared to the non-users. Even though Panaretou, Shackleton and Taylor (2013) did not find interest and commodity price hedging to be value-enhancing, any value relevant to the interest rate and commodity price hedging for a sample of U.K. non-financial firms, they reported 6% hedging premium for the foreign currency hedging.

Campello, Lin, Ma, and Zou (2011) present that hedge benefits the companies by reduction of cost of debt and less restrictive covenants used in debt agreements. Tufano (1996) finds that financial hedging instruments are effective in reducing the commodity price exposure of firms. Nevertheless, hedging instruments are not connected to any enhancement in shareholder value. Kim et al. (2006), however, supports the shareholder value maximization hypothesis as their study provides evidence that financial hedging reduces short-term foreign exchange transaction risk exposure. Boubaker, Manita, and Mefteh-Wali (2020) also find a positive connection between foreign currency hedging and firm value. Overall, Ahmed, Azevedo, and Guney (2014) and Ahmed, Fairchild, and Guney (2020) conclude that risk mitigating practices using hedging was greatly influenced by type of risks and hedging tools used. Dhanani, Fifield, Helliar, Stevenson (2007) find strong country-specific influence on the HVP nexus.

Consistent with hedging and low information asymmetry nexus, Qiao, Xia and Zhang (2020) find fewer underwriting fees and price revisions for IPO firms with hedging. Pérez-González and Yun (2013) show a positive connection between the use of weather derivatives and firm value among the electric and gas utility companies registered in the U.S. Focusing on other relevant industries and sectors, Mackay and Moeller (2007) investigate a set of oil refiners based in the U.S. during 1985-2004 and find that using derivative for risk management had positive effect on firm value. On similar industry for almost the same duration, Phan, Nguyen, and Faff (2014) distinguish the value response between the case of downside risk and upside risk of the underlying asset. They argue that

use of hedging to be more relevant to the cases with downside risk, rather than the one with upside risk.

Findings by Jin and Jorion (2006) on oil and gas sector do not exhibit any discernable connection between value and hedging. However, evidence on the positive connection between value and financial hedging in oil and gas sector is evident in Haushalter (2000). The connection is established through reduction of financing cost. Gilje and Taillard (2017) find that the positive effect comes from reducing the probability of distress and underinvestment. While establishing the case of the large non-financial firms, Carter et al. (2006) and Merkert and Swidan (2019) have reached a broader agreement on the positive influence of hedging on performance. While Carter et al. (2006) reports a 5-10% hedging premium, Merkert and Swidan (2019) conclude that hedging is effective in alleviating financial risks but ineffective as a speculative tool.

Studies also relate hedging with corporate governance, payout policy, stock value, and agency problem. Foreign currency hedging positively influences abnormal stock return (Nelson et al., 2005). Hedging against interest rate and commodity price risks do not carry any trace of connection with stock price. Hedging brings no good to firms with weak governance practices (Fauver & Naranjo, 2010). Firms with higher dividend payout can avoid engaging into hedging contracts (Bonaimé, Hankins & Harford, 2014). With a huge contrast, firms with higher growth options find hedging beneficial (Choi, Mao, & Upadhyay, 2013).

Previous studies considered companies from the U.S. or European contexts primarily for two reasons. Firstly, major market listed companies in oil and gas sector were in these two regions. Secondly, financial markets with cost efficient hedging contracts were limited to these large markets. Studies on emerging market started appearing in mainstream literature only recently. Nguyen and Faff (2010) investigated non-financial firms in Austrlia and concluded insignificant connection between hedging and firm value. While investigating 107 non-financial firms from Pakistan, Bashir, Sultan and Jghef (2013) also reported insignificant relationship between hedging and firm value. A series of other studies on emerging market that include a study on 134 non-financial firms from New Zealand (Li, Visaltanachoti & Luo, 2014), ninety Swedish firms (Nguyen, 2015), and a set of Turkish non-financial firms (Ayturk et al., 2016) also exhibited no significant connection between the use of derivative and firm value. This is rather surprising that

a good number of emerging market studies have reported robust insignificant connection between hedging and value.

Results supporting the nexus are also reported in several studies. Alam and Gupta (2018) took non-financial firms from India as sample and found lesser value volatility among hedgers and hedging to be value-enhancing around the financial crisis. Luo and Wang (2018) found positive connection between hedging and firm value among Chinese firms, particularly among the ones with higher profitability and better investment opportunities. While their study found an industry-varying value-enhancing effect, the nexus is weaker around financial crisis. Gómez-González, León Rincón, and Leiton (2012) found positive connection between hedging and value growth among Colombian non-financial firms. Like Júnior and Laham (2008), Berrospide, Purnanandam, and Rajan (2010) found positive connection for firms from Brazil.

Kim et al. (2017) controlled for corruption while studying HVP nexus among East Asian firms. They reported possible connection between low corruption and value among domestic firms. Lee (2019) found stronger positive connection among firms with effective corporate governance. Ameer (2009) studied Malaysian firms, but reported minimal relationship. Lau (2016) also took Malaysian firms intro consideration but reported a negative (positive) relationship between value (financial performance – ROA and ROE) and hedging.

Several recent studies provide strong evidence that hedging can boost firm value. Das and Kumar (2023) find that firms using foreign currency derivatives and foreign-denominated debt experience notable gains, with firm value increasing by 16.91% and 10.21%, respectively. These results suggest that currency risk management is a critical tool for firms operating in volatile international markets, helping them reduce exposure to exchange rate fluctuations. Their findings hold across different industries and company sizes, reinforcing the idea that well-executed hedging strategies can improve financial stability.

Supporting this view, Ji and Wei (2023) demonstrate that firms using derivative instruments tend to achieve higher valuations, thanks to their ability to smooth earnings and provide financial predictability. Their study employs propensity score matching (PSM) and extensive robustness tests, ensuring that the observed benefits of hedging are not

influenced by external biases. By incorporating alternative financial performance measures, they conclude that hedging remains an effective tool for firms navigating uncertain economic environments.

Building on these insights, HongXing et al. (2023) take a technological approach, using deep learning models to assess hedging strategies in emerging markets. Their study reveals that firms employing structured and data-driven hedging policies see significant improvements in firm value. This research highlights the growing role of artificial intelligence and big data in financial risk management, emphasizing that firms that integrate technology into their hedging decisions can optimize strategies and achieve better financial outcomes. Moreover, their findings suggest that the success of hedging depends not only on the decision to hedge but also on how effectively firms implement and monitor their risk management practices.

Despite this strong evidence supporting hedging, several studies caution that hedging does not always lead to positive outcomes and, in some cases, can even hurt firm value. Chu et al. (2025) challenge the assumption that all hedging strategies are beneficial by focusing on commodity futures hedging, which is widely used by firms exposed to volatile raw material prices. Their findings indicate that instead of stabilizing cash flows, commodity futures hedging can drain resources, increase capital expenditures, and reduce free cash flow, ultimately leading to a decline in firm value. They argue that when hedging is not aligned with operational needs or is used excessively, it may create financial burdens that outweigh its intended benefits.

Similarly, Ullah et al. (2023) warn that hedging combined with high capital expenditures can erode firm value, particularly for firms with extensive foreign operations. Their study suggests that when firms engage in both aggressive investment strategies and risk management, the costs associated with hedging may become too high, resulting in weaker financial performance. The key takeaway from their findings is that firms must strike a balance between investment and risk management, ensuring that hedging does not restrict financial flexibility or lead to liquidity challenges.

Adding to the complexity, Deng and Yang (2023) examine corporate reputation and hedging effectiveness, uncovering that interest rate hedging in high-reputation firms can actually reduce firm value. Their

findings challenge the assumption that well-managed firms automatically benefit from hedging. Instead, they suggest that excessive hedging may signal excessive risk aversion, limiting firms' ability to pursue profitable growth opportunities. Their research also highlights the pressures that firms with strong reputations face to appear financially conservative, even when hedging does not necessarily improve performance. In some cases, they find that interest rate hedging is not only ineffective but may even contribute to firm underperformance.

Given the widely mixed results both in developed as well as developing country contexts, this study aims to investigate the HVP nexus. We differentiate our study based on the sample and robustness tests undertaken for analysis. In the next section, we discuss the empirical setting and data.

3. Empirical Design

3.1 Data

Our data comes from 123 non-financial firms listed across twelve Asia-Pacific countries, namely Australia, China, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, and Thailand. Five of the twelve selected countries are from Association of Southeast Asian Nation (ASEAN) countries. Data period ranged from 2011 until 2015 with a total of 615 firm-year observations. Since derivatives may be used for speculative purposes not for hedging especially in financial firms, this paper focused on the nonfinancial firms. We offer much longer dataset when compared to existing studies by Bartram et al. (2011), Belghitar et al. (2013), and Khediri and folus (2010). The data came from three sources: 1) DataStream was used for company-specific data, 2) the World Bank datasets were used for country-specific macroeconomic factors, and 3) company annual reports were used for hedging-specific information.

On the hedging part, two kinds of data are hand-picked: first whether the companies use hedging, and second, if they do, type of risk they hedge against. We have used computer native search functions to find this information from the annual reports of the firms that are downloaded from the company website. Based on the methodologies suggested in a lion share of the relevant studies (e.g., Nelson et al., 2005; Bartram et al., 2011; Ahmed et al., 2014; Ahmed et al., 2020), we have separated the hedgers

from the non-hedgers based on a rigorous keyword search for the hedging activities using the annual reports. Keywords used are "derivative", "hedge", "financial instruments", and "risk management". Consequently, firms that have not disclosed any of these keywords in their annual reports are thereby identified as the non-hedgers. To reduce the survivorship bias, we have only used the firms that consistently used hedging throughout the sample year. To extend the selection further, we have categorized the firms based on their type of risk hedged into three types of risks. These are commodity price risk, foreign exchange risk, and interest rate risk. These are most widely cited risks that are found to be considered into the broader spectrum of financial hedge in relevant studies.

Table 1: Description of variables

Variables	Notation	Definition/ measurement	Data Source
Dependent variables			
Tobin's Q	Tobin's Q	Measures the firm value: Natural log of the [(Total assets – book value of equity + market value of equity) / Total assets].	DataStream
Return on Invested Capital	ROIC	Measure financial performance: Earnings before interest and tax / (Total capital + Short Term Debt and Current Portion of Long-Term Debt).	DataStream
Derivative use			
Hedge Dummy	Hedge	'1' = if firm uses financial derivative '0' = if the firm does not use derivative	Firm annual report
Foreign exchange hedge dummy	FCR	'1' = derivative is used for foreign currency risk '0' = derivative is not used for foreign currency risk	Firm annual report
Interest rate hedge dummy	IRR	'1' = derivative is used for hedging interest rate risk '0' = derivative is not used for interest rate risk	Firm annual report
Commodity hedge dummy	CPR	'1' = derivative is used for hedging commodity price risk '0' = derivative is not used for commodity price risk	Firm annual report
Firm characteristics and moderators			

Variables	Notation	Definition/ measurement	Data Source
Dependent variables			
Leverage	Leverage	Book value of total debt / Book value of total assets	DataStream
Firm size	Firm Size	Natural log of the book value of assets	DataStream
Growth	MB	Market value of equity / Book value of equity	DataStream
Dividend	DD	'1' = if dividend per share is positive, and '0' for otherwise	DataStream
Return on Asset	ROA	EBIT / book value of total assets.	DataStream
Macro variables			
Ln (GDP per capita)		Measures the size of the country's output: Natural log of the PPP-adjusted gross domestic product (GDP) expressed in current market price in USD.	World Bank: World Development Indicators
Bank deposits per GDP		Deposit in banks as a percentage of GDP	World Bank: Global Financial Development
Market capitalization per GDP		Total market capitalization as a percentage of GDP	World Bank: World Development Indicators

Note: Sample includes 123 non-financial firms from 12 Asia-Pacific countries.

3.2 Descriptions of the variables

Table 1 provides the definition of the variables. We have considered two alternative proxies for value and performance based on the suggestions of the extant studies. Value is represented by Tobin's Q and the return on invested capital (ROIC) is used to proxy the financial performance (Allayannis, Lel, & Miller, 2012; Bartram et al., 2011; Chen & King, 2014). These are the two dependent variables in the model. Q ratio is calculated by dividing the market value with its replacement value (Jin & Jorion, 2006; Panaretou et al., 2013). Following Hirsch and Seaks (1993), log transformation of the Q ratio is used for better statistical distribution.

Studies on hedging and value (and performance) have suffered from the choice of the right proxies as determining the use of hedging and the data on the same are difficult to get. Considering the difficulty of size, positions and hedging activities, following similar studies, we have coded

the hedging activity with binary expression (See Allayannis et al., 2012; Ayturk et al., 2016; Ahmed et al., 2014; Ahmed et al, 2020 for reference). General hedging activity is coded with '1' if there is any hedging activity, or as '0' for the absence of such activity. The dummy variables for the use of derivatives are denoted with 'Hedge', 'CPR' for the Commodity Price Risk hedge, 'FCR' for the Foreign Exchange Risk hedge, and 'IRR' for the Interest Rate Risk hedge.

3.3 Control variables

a. Firm size

Firm size is determined based on a natural log of the total asset. Firm size is reported having mixed relationship with the firm value. While there exists strong negative relationship (Ahmed et al., 2014; Ahmed et al., 2020; Belghitar et al., 2013; Chen & King, 2014), yet there are evidences of strong positive connection between the two (Magee, 2013; Kim et al., 2017). Size is analogous to economies of scale and scope, higher efficiency, higher returns on equity, greater market power, and lower insolvency risk (Liebenberg & Sommer, 2008). We expect a positive relationship of firm size with firm value and performance.

b. Leverage

Higher leverage indicates high financial risk, which is often connected to lower firm value (Magee, 2013; Belghitar et al., 2013; Abdeljawad & Mat Nor, 2017). Contrary to the financial risk perspective, Zou (2010) argues that leverage offers tax benefits on debt, and reduce agency problem by engaging outside debtholders into firms' controlling functions. These activities are connected to higher value. To capture the convexity of the relationship, the square of the total debts to total assets ratio is considered in this study to proxy (squared) leverage. Adding this squared term indicate that the effect of the leverage variable on firm performance and value depends on the level of leverage. A negative sign is expected for the squared leverage variable, indicating the effect of leverage of an inverted U-shape.

c. Dividends

We use a dummy variable to identify any firm that pays out dividend with a value of "1" and "0" otherwise. Based on several theories, dividend payout is strongly connected to firm value. Higher dividend is connected

to higher earnings (Jin & Jorion, 2006), which indicates less capital constraints for dividend issuing firms (Allayannis et al., 2012; Ayturk et al., 2016; Rashid, Mat Nor, & Ibrahim, 2013). Possibility of higher earnings and less capital constraints contribute to higher corporate value. We expect that dividend has a positive influence on firm value.

d. Growth opportunities

Higher growth firms indicate better investment opportunities. Higher growth opportunity generally finds a positive connection with value (Myers, 1977; Froot et al., 1993; Marami & Dubois, 2013). To be more specific, growth opportunity is found to increase Tobin's Q (Khediri & Folus, 2010). Their study indicates that higher investment opportunity is reflected through growth in market value of the company. To proxy growth opportunity, this study considers a ratio of market to book equity value.

e. Profitability

Profitability, measured by the return on asset (ROA), is used as a control variable in the Tobin's Q model. In general, profitable firms should see a growth in value, thus the Tobin's Q (Allayannis et al., 2012). We also expect that profitability finds a positive connection with firm value.

f. Country-specific variables

Following Kim et al. (2017), natural log of the GDP per capita is taken as a measure of relative performance of the country. GDP per capita also represent the size of an economy, in nominal term. Bank sector deposit to GDP ratio is taken as a proxy for bank market development. Bank deposit includes demand, time, and savings deposits of banks in the selected countries. We have also considered equity market capitalization to GDP ratio to measure the broader financial market development of a country.

$$Y_{i,t} = \alpha + \beta_1 Hedge_{n\,it} + \theta X_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$Y_{i,t} = \alpha + \beta_1 Hedge_{it} + \beta_2 moderator_{it} + \beta_3 Hedge.moderator_{it} + \theta X_{i,t} + \varepsilon_{i,t} \quad (2)$$

3.4 Empirical specifications

We have used equation (1) and (2) to present general empirical specifications in this study. $Y_{i,t}$ represents the dependent variables: ROIC and Tobin's Q. $Hedge_n$ is a series of dummy variables used including "*Hedge*" that are coded with "1" if any firms use derivative to hedge $CPR_{i,t}$, $FCR_{i,t}$, $IRR_{i,t}$. CPR is used for commodity price risk, FCR is for foreign exchange risk, and IRR is used for the interest rate risk, respectively. $X_{i,t}$ is a vector to represent a set of control variables, including size, leverage, squared leverage, dividend, investment growth, profitability, GDP per capita, bank deposits per GDP, and market capitalization per GDP. *Moderator* is one of the moderating variables (size, dividends, leverage, growth options, profitability) with *"Hedge"*. β_1, β_2, β_3, θ are the regression coefficients to be estimated, 't' and 'i' present time and cross-sections respectively, and $\varepsilon_{i,t}$ is the regression error term.

Table 2: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
TobinsQ	615	-0.8367	0.5791	-3.3144	1.7529
ROIC	615	0.1195	0.4078	-6.7547	1.5483
Hedge	615	0.5561	0.4972	0.0000	1.0000
CPR	615	0.1154	0.3198	0.0000	1.0000
FCR	615	0.5008	0.5004	0.0000	1.0000
IRR	615	0.3593	0.4802	0.0000	1.0000
Firm Size	615	14.5027	1.9029	8.8061	19.1877
MB	615	0.2454	0.2698	0.0001	5.4578
DD	615	0.8000	0.4003	0.0000	1.0000
Leverage	615	0.2425	0.2694	0.0000	5.4533
Squared Leverage	615	0.1313	1.2015	0.0000	29.7385
ROA	615	0.0841	0.2678	-4.6341	1.0542
Ln GDP per capita	615	10.0146	0.7232	8.4104	11.3734
Bank deposits to GDP	615	98.5751	54.8133	30.3128	334.5510
Market capitalization to GDP	615	124.1525	157.5298	26.1846	1124.7050

Notes: Refer to Table 1 for the notations used. The log value of Q ratio is negative, but very close to zero. Average ROIC is 11.95%. Around 55.61% of the firm used derivatives for hedging. Proportion of the companies using commodity, foreign currency and interest rate hedging have been 11.54%, 50.08%, and 35.93% respectively. Natural log of firm size is 14.50. Market value is 24.5% of the total book value of equity. Average dividend is 0.80, which indicates that average firms are dividend paying. Average debt has been 24%, which means that most firms are financed with equity. ROA is 8.41%, which is slight larger because of using EBIT instead of net income in denominator.

4. Results and Discussion

Descriptive statistics appear in Table 2. More than half of the companies in the sample (55.6%) are found to use derivative for hedging. On further classification of the risk types, Table 2 reports that 11.5%, 50% and 35.9% of the sample companies use derivative to hedge commodity price, foreign currency, and interest rate risks, respectively. In line with several past studies, a large proportion of the firms use derivatives for foreign currency hedging (Boubaker et al., 2020).

Table 3 presents pair-wise correlation coefficients for the variables tested in this study. While most of the coefficients are relatively negligible from the multi-collinearity standpoint, MB and leverage ratio (and Sqr. leverage) are found to be moderately correlated. Considering the variables used for regression analysis, the potential multicollinearity problem between MB and leverage ratio obliges us to use these two variables alternatively. The VIF[6] is also checked with all estimated models to confirm the absence of multicollinearity problem in the final models.

[6] Results are not provided here but are available at reasonable request.

Table 3: Pairwise correlation matrix between related variables

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
[1]. TobinsQ	1.00														
[2]. ROIC	-0.10	1.00													
[3]. Hedge	0.24	0.17	1.00												
[4]. CPR	0.03	0.00	0.32	1.00											
[5]. FCR	0.23	0.17	0.90	0.29	1.00										
[6]. IRR	0.26	0.04	0.67	0.22	0.56	1.00									
[7]. Firm Size	0.33	0.11	0.32	0.07	0.32	0.26	1.00								
[8]. MB	0.54	-0.64	0.09	0.06	0.07	0.12	0.08	1.00							
[9]. DD	0.01	0.31	0.22	-0.01	0.22	0.16	0.41	-0.14	1.00						
[10]. Leverage	0.55	-0.65	0.08	0.05	0.07	0.13	0.09	1.00	-0.13	1.00					
[11]. Sqr Leverage	0.23	-0.70	-0.04	-0.01	-0.04	-0.02	-0.10	0.83	-0.10	0.83	1.00				
[12]. ROA	-0.14	0.97	0.14	-0.01	0.15	0.04	0.14	-0.66	0.31	-0.66	-0.73	1.00			
[13]. LnGDP per capita	0.00	-0.14	0.24	0.18	0.24	0.27	-0.09	0.01	0.00	0.00	0.03	-0.15	1.00		
[14]. Bank deposits to GDP	0.09	0.00	0.41	0.09	0.40	0.39	0.19	-0.05	0.18	-0.05	-0.01	-0.01	0.60	1.00	
[15]. Market capitalization to GDP	0.11	0.02	0.20	0.03	0.22	0.26	0.18	-0.07	0.12	-0.07	-0.02	0.00	0.42	0.75	1.00

Note: Table 3 shows pairwise correlation coefficients. Highest correlation has been 0.998, which is recorded between MB and leverage. These two variables are considered as alternative in models. The second highest is 0.968 recorded between ROA and ROIC. ROA is not used while having ROIC as the dependent variable. FCR and Hedge ratios are also highly correlated and are tested independently. This also indicates that foreign currency risk hedging comprises most of the hedging activities. High correlation between IRR and FCR also indicates that most firms want to hedge against these two risks more often.

Table 4: OLS regression on Derivative Use and Firm Performance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**
Hedge	0.154***				0.200***			
	(0.0173)				(0.0184)			
FCR		0.157***				0.193***		
		(0.0150)				(0.0164)		
IRR			0.0434**				0.102***	
			(0.0117)				(0.0146)	
CPR				0.0433**				0.0745**
				(0.00999)				(0.0233)
Firm Size	-0.0214**	-0.0215**	-0.0156**	-0.0150**	0.00158	0.00256	0.00889	0.0127
	(0.00502)	(0.00501)	(0.00529)	(0.00533)	(0.00860)	(0.00841)	(0.00897)	(0.00878)
Leverage	-0.282**	-0.268**	-0.225*	-0.197*				
	(0.0791)	(0.0844)	(0.0845)	(0.0851)				
Sqr Leverage	-0.177***	-0.180***	-0.188***	-0.194***				
	(0.0141)	(0.0150)	(0.0148)	(0.0154)				

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**
DD	0.236***	0.235***	0.253***	0.258***	0.172***	0.170***	0.186***	0.194***
	(0.0380)	(0.0409)	(0.0396)	(0.0387)	(0.0223)	(0.0242)	(0.0209)	(0.0198)
lnGDP per capita	-0.0901***	-0.0904***	-0.0868***	-0.0883***	-0.0814**	-0.0814***	-0.0797***	-0.0799**
	(0.0189)	(0.0176)	(0.0176)	(0.0189)	(0.0188)	(0.0172)	(0.0167)	(0.0196)
Bank deposits to GDP	-0.000350**	-0.000314*	0.000207	0.000327	-0.000644***	-0.000561***	-5.40e-05	0.000222
	(0.000115)	(0.000134)	(0.000214)	(0.000199)	(6.28e-05)	(9.42e-05)	(0.000170)	(0.000172)
Market capitalization to GDP	0.000111*	9.44e-05	1.52e-05	1.98e-05	4.94e-05	2.07e-05	-7.67e-05	-7.68e-05
	(4.05e-05)	(4.75e-05)	(5.54e-05)	(5.76e-05)	(5.85e-05)	(6.85e-05)	(7.58e-05)	(7.96e-05)
MB					-0.973***	-0.967***	-0.965***	-0.946***
					(0.163)	(0.166)	(0.170)	(0.187)
Constant	1.170***	1.179***	1.055***	1.048***	0.961***	0.955***	0.856***	0.791***
	(0.104)	(0.0962)	(0.0912)	(0.103)	(0.128)	(0.125)	(0.104)	(0.132)
Observations	605	605	605	605	605	605	605	605
R-squared	0.602	0.604	0.579	0.578	0.528	0.527	0.496	0.488

Notes: Refer to Table 1 for definitions. This table reports the linear regression results. The dependent variable is ROIC. Heteroskedasticity consistent clustered robust standard errors are reported in parentheses following Allayannis et al. (2012) and Petersen (2009) and adjusted for 5 clusters in year. ***, **, and * indicate statistically significant levels of 1%, 5% and 10%, respectively.

Table 5: OLS regression on Derivative Use and Firm Value

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	**TobinsQ**	**TobinsQ**	**TobinsQ**	**TobinsQ**	**TobinsQ**	**TobinsQ**	**TobinsQ**	**TobinsQ**
Hedge	0.0527**				0.0723***			
	(0.0119)				(0.0106)			
FCR		0.0551***				0.0651***		
		(0.00762)				(0.0116)		
IRR			0.0407**				0.108***	
			(0.0120)				(0.0134)	
CPR				-0.0730				-0.0621
				(0.0427)				(0.0439)
Firm Size	0.0346**	0.0345**	0.0359**	0.0384***	0.0728***	0.0734***	0.0716***	0.0780***
	(0.00803)	(0.00847)	(0.00809)	(0.00784)	(0.00224)	(0.00265)	(0.00179)	(0.00241)
Leverage	2.445***	2.448***	2.445***	2.491***				
	(0.0691)	(0.0670)	(0.0696)	(0.0628)				
Sqr Leverage	-0.287***	-0.288***	-0.284***	-0.291***				
	(0.00933)	(0.00819)	(0.00991)	(0.00960)				
DD	-0.0346**	-0.0347**	-0.0350**	-0.0333**	-0.172**	-0.173**	-0.172**	-0.172*
	(0.00954)	(0.00863)	(0.0103)	(0.0108)	(0.0615)	(0.0606)	(0.0607)	(0.0628)
ROA	0.320**	0.317**	0.340**	0.351**	0.717**	0.722**	0.722**	0.767**
	(0.0924)	(0.0950)	(0.0935)	(0.0927)	(0.180)	(0.190)	(0.179)	(0.185)

VARIABLES	(1) TobinsQ	(2) TobinsQ	(3) TobinsQ	(4) TobinsQ	(5) TobinsQ	(6) TobinsQ	(7) TobinsQ	(8) TobinsQ
lnGDP per capita	-0.0273**	-0.0277**	-0.0266**	-0.0165	0.00575	0.00621	0.00167	0.0174
	(0.00953)	(0.00951)	(0.00940)	(0.0139)	(0.0145)	(0.0148)	(0.0143)	(0.0177)
Bank deposits to GDP	7.71e-05	8.29e-05	0.000190	0.000304	-0.000221	-0.000173	-0.000203	8.60e-05
	(0.000233)	(0.000228)	(0.000232)	(0.000258)	(0.000214)	(0.000260)	(0.000214)	(0.000230)
Market capitalization to GDP	0.000580***	0.000575***	0.000548***	0.000536***	0.000479***	0.000466***	0.000442***	0.000423***
	(5.25e-05)	(5.14e-05)	(5.22e-05)	(6.04e-05)	(7.11e-05)	(7.38e-05)	(6.73e-05)	(7.69e-05)
MB					1.568***	1.574***	1.559***	1.614***
					(0.219)	(0.222)	(0.213)	(0.223)
Constant	-1.729***	-1.721***	-1.749***	-1.885***	-2.336***	-2.346***	-2.272***	-2.520***
	(0.130)	(0.129)	(0.122)	(0.138)	(0.0885)	(0.0914)	(0.0762)	(0.103)
Observations	605	605	605	605	605	605	605	605
R-squared	0.529	0.530	0.529	0.529	0.450	0.449	0.453	0.448

Notes: Refer to Table 1 for definitions. This table reports the linear regression results. The dependent variable is Tobin's Q. Heteroskedasticity consistent clustered robust standard errors are reported in parentheses following Allayannis et al. (2012) and Petersen (2009) and adjusted for 5 clusters in year. ***, **, and * indicate statistically significant levels of 1%, 5% and 10%, respectively.

4.1 Main results: Hedge, type of risk, value, and performance

We start with OLS results for main and moderation models, then move to robustness check with dynamic panel model using system-GMM, Two-stage least square, and using lagged explanatory variables. Equation (1) and (2) are used as the broader test models. Heteroskedasticity consistent clustered robust standard errors are presented following Allayannis et al. (2012) and Petersen (2009). Table 4 presents the relationship between use of hedging and financial performance having ROIC as the dependent variable. Table 5 shows the same for firm value using Tobin's Q as the dependent variable. Each of these tables includes dummies for use of hedging (*Hedge*), and three proxy dummies for each of the risk hedged (*FCR, IRR, CPR*). The R-squared values for the models in Table 4 ranges between 48% and 60% and in Table 5 between 44% and 53%, indicating good model fit.

Panel 1 in Table 4 shows the results for hedging in general, while panels 2 through 4 display the same for three types of risks - FCR, IRR, and CPR. Panel 5 through 8 replace leverage ratio by MB ratio due their potential multicollinearity effect. MB is the proxy used for growth, while leverage indicate percentage of debt. Regular country- and company-specific control variables are used in all panels. Despite using several proxies and control variable, we find strong support for the first major of extant studies – hedging strongly positively increases ROIC. These results have two takeaway messages. First, there exists significant hedging premium. Hence, firms in the Asia-Pacific region will find it 'profitable' to add hedging to their decision list. Second, the connection between financial performance and hedging is not sensitive to type of risks, meaning that whatever the type of risk hedged, hedgers will reach their incentives. Our results strongly support hedge premium reported by extant studies (Ahmed et al., 2014; Panaretou et al., 2013; Carter et al., 2006). These results carry two key implications.

First, the evidence confirms that firms in the Asia-Pacific region stand to gain substantial financial benefits from hedging activities, making it a strategically sound decision for firms navigating economic uncertainty. This aligns with recent findings by Ji and Wei (2023), who report that hedging significantly improves firm value across various industries, particularly in markets characterized by financial volatility. Similarly, Gupta et al. (2024) highlight that derivative usage in emerging markets enhances firm value by reducing earnings volatility and tax liabilities,

which is consistent with our findings. These studies suggest that hedging is more than just a risk-reduction tool—it is also a value-enhancing financial strategy.

Second, our findings indicate that the link between financial performance and hedging remains strong regardless of the type of risk being managed. This finding is particularly relevant in the context of prior research showing that foreign exchange, interest rate, and commodity hedging can all contribute to financial stability. In line with our results, Das and Kumar (2023) demonstrate that foreign currency derivatives and foreign-denominated debt enhance firm value by 16.91% and 10.21%, respectively, further confirming that currency risk hedging remains a crucial component of corporate financial strategy. Similarly, HongXing et al. (2023) use deep learning models to analyze currency risk hedging in emerging markets, showing that firms with well-structured hedging strategies experience significant improvements in financial performance, further reinforcing our findings.

Table 5 presents results for similar models used in Table 4, but for firm value. Tobin's Q is the proxy for firm value. Usual three risk proxies, control variables for country- and company-variable control variables are considered. ROA is taken as additional proxy for the value model. Due to mechanical relationship issue, ROA was not considered in ROIC models. First four panels in Table 5 present results for leverage models and the last four for MB models. In general, results of Table 5 indicate a strong positive influence of hedging on firm value. While taking a deeper look into the type of risks, both leverage and MB models show that foreign currency and interest rate hedging strongly positively influence value. However, the influence of commodity price hedging has been consistently insignificant. Not many studies are found on commodity hedging on Asia-Pacific. Recently Kumar, Badhani, Bouri and Saeed (2020) find that commodity market in the Asia-Pacific exhibits strong herding behavior. Hence, there exists a possibility of spillover of risks to other countries, which makes hedging difficult. Also, as Asia-Pacific interest rate and foreign currency hedging markets are relatively more developed than the commodity market, differences in the level of sophistication and the restriction, and the country-specific heterogeneity may help explain the insignificant results of the commodity price hedging in the Asia-Pacific (Ahmed et al., 2020). Other results in Table 5 are qualitatively identical to those of the Table 4.

Our findings strongly support the argument that hedging enhances firm value. In particular, both foreign currency and interest rate hedging have a strong and positive influence on firm value. These results align with Mefteh-Wali and Hussain (2024), who find that foreign currency risk management strategies increase firm value in family businesses, suggesting that firms with structured risk management policies benefit from reduced uncertainty and financial distress. Likewise, Deng and Yang (2023) demonstrate that high-reputation firms are more likely to hedge to maintain financial stability, further supporting our conclusion that hedging remains an effective tool for enhancing firm value, particularly in firms with high market exposure.

However, our findings reveal a notable contrast in the impact of commodity price hedging, which consistently fails to show a significant effect on firm value. This result is particularly striking given the importance of commodity markets in the Asia-Pacific region. One possible explanation is that the Asia-Pacific commodity market exhibits strong herding behavior, as reported by Kumar, Badhani, Bouri, and Saeed (2020). They argue that investor sentiment and market spillover effects create challenges for effective hedging, making it difficult for firms to achieve meaningful risk reduction. This is further supported by Chu et al. (2025), who find that commodity futures hedging can reduce firm value due to its impact on free cash flow and capital expenditures. These results suggest that commodity hedging in the Asia-Pacific region may be subject to greater market inefficiencies than foreign currency and interest rate hedging, potentially limiting its effectiveness.

Additionally, Ullah et al. (2023) provide further insights into why commodity hedging may not significantly impact firm value, showing that when hedging is combined with high capital expenditures, it can erode financial performance rather than enhance it. Their findings highlight that the cost of hedging may outweigh its protective benefits in certain circumstances, particularly when firms face significant external financial pressures. This may help explain the insignificant results for commodity hedging in our study, as firms operating in commodity markets may be subject to structural constraints that limit hedging effectiveness.

Among other control variables, firm size increases firm value but decreases performance. Leverage also reduces performance but pushes

the firm value up. However, the squared leverage reduces both firm value and performance, indicating the hypothesized inverted U-shape for the effect of leverage. Dividend payout leads to reduction in value, indicating that the investors have penalized the financially constrained companies if they are paying out dividend. Market to book ratio connects negatively to performance but positively to firm value. GDP per capita and bank deposits to GDP ratio exhibit negative effects on firm performance and value, while market capitalization reports the expected positive effect.

Table 6: Derivative Use and Firm Performance with interaction models

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**
Hedge	0.964***	0.208**	0.0918**	1.251***	0.273**	-0.0201
	(0.157)	(0.0585)	(0.0250)	(0.136)	(0.0737)	(0.0351)
Firm Size	0.000729	-0.0225**	-0.0205**	0.0290*	2.62e-05	-0.00536
	(0.00807)	(0.00508)	(0.00482)	(0.0114)	(0.00759)	(0.00457)
Leverage	-0.308**	-0.282**	-0.415**			
	(0.0753)	(0.0765)	(0.124)			
Sqr Leverage	-0.169***	-0.177***	-0.153***			
	(0.0138)	(0.0138)	(0.0225)			
DD	0.215***	0.263**	0.236***	0.147***	0.208**	0.198***
	(0.0372)	(0.0640)	(0.0382)	(0.0226)	(0.0456)	(0.0303)
MB				-0.970***	-0.971***	-1.097***
				(0.150)	(0.161)	(0.103)
lnGDP per capita	-0.0909**	-0.0908***	-0.0973***	-0.0830**	-0.0824**	-0.108***
	(0.0210)	(0.0196)	(0.0208)	(0.0215)	(0.0196)	(0.0211)
Bank deposits to GDP	-0.000233	-0.000296	-0.000285*	-0.000476**	-0.000570***	-0.000307**
	(0.000173)	(0.000170)	(0.000121)	(0.000133)	(0.000117)	(9.84e-05)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**	**ROIC**
Market capitalization to GDP	0.000165**	0.000110*	0.000120**	0.000123	4.79e-05	0.000104**
	(4.29e-05)	(4.13e-05)	(3.62e-05)	(5.88e-05)	(5.91e-05)	(3.51e-05)
DD*Hedge		-0.0672			-0.0908	
		(0.0670)			(0.0785)	
Leverage*hedge			0.262*			
			(0.110)			
Size*hedge	-0.0557***			-0.0724***		
	(0.00977)			(0.00840)		
MB*Hedge						0.827***
						(0.131)
Constant	0.878***	1.169***	1.249***	0.593***	0.961***	1.297***
	(0.0768)	(0.109)	(0.131)	(0.120)	(0.130)	(0.147)
Observations	605	605	605	605	605	605
R-squared	0.614	0.603	0.605	0.549	0.530	0.567

Notes: Refer to Table 1 for definitions. The dependent variable is ROIC. Heteroskedasticity consistent clustered robust standard errors are reported in parentheses following Allayannis et al. (2012) and Petersen (2009) and adjusted for 5 clusters in year. ***, **, and * indicate statistically significant levels of 1%, 5% and 10%, respectively.

Table 7: Derivative Use and Firm value with interactions model

VARIABLES	(1) TobinsQ	(2) TobinsQ	(3) TobinsQ	(4) TobinsQ	(5) TobinsQ	(6) TobinsQ	(7) TobinsQ	(8) TobinsQ
Hedge	0.157	0.0875	0.229***	-0.0258**	0.184	0.0961	0.0572	-0.000136
	(0.138)	(0.0560)	(0.0272)	(0.00634)	(0.147)	(0.0718)	(0.0327)	(0.0562)
Firm Size	0.0374**	0.0339**	0.0325***	0.0442***	0.0758***	0.0723***	0.0757***	0.0708***
	(0.00844)	(0.00761)	(0.00660)	(0.00783)	(0.00341)	(0.00343)	(0.00504)	(0.00183)
Leverage	2.440***	2.445***	2.833***	2.428***				
	(0.0668)	(0.0703)	(0.148)	(0.0652)				
Sqr Leverage	-0.286***	-0.287***	-0.350***	-0.326***				
	(0.00922)	(0.00977)	(0.0135)	(0.0154)				
DD	-0.0364**	-0.0171	-0.0389**	-0.0478**	-0.174**	-0.160	-0.179**	-0.157**
	(0.00850)	(0.0403)	(0.0120)	(0.0148)	(0.0604)	(0.0921)	(0.0554)	(0.0460)
ROA	0.314**	0.318**	0.362**	0.0517	0.710**	0.716**	0.676*	0.665**
	(0.0935)	(0.0930)	(0.0962)	(0.152)	(0.184)	(0.181)	(0.246)	(0.161)
MB					1.564***	1.568***	1.543***	1.490***
					(0.217)	(0.219)	(0.219)	(0.257)
lnGDP per capita	-0.0278**	-0.0279**	-0.00396	-0.0209	0.00521	0.00535	0.00805	-0.00664
	(0.00879)	(0.00899)	(0.0106)	(0.0120)	(0.0146)	(0.0153)	(0.0152)	(0.00830)
Bank deposits to GDP	9.14e-05	0.000112	-0.000103	4.73e-05	-0.000206	-0.000198	-0.000236	-0.000120
	(0.000233)	(0.000190)	(0.000288)	(0.000240)	(0.000198)	(0.000154)	(0.000234)	(0.000261)
Market capitalization to GDP	0.000587***	0.000579***	0.000552***	0.000560***	0.000486***	0.000478***	0.000472***	0.000497***
	(5.46e-05)	(5.18e-05)	(5.89e-05)	(5.39e-05)	(7.84e-05)	(6.98e-05)	(6.89e-05)	(5.35e-05)
DD*Hedge		-0.0434				-0.0296		
		(0.0763)				(0.0869)		
Leverage*hedge			-0.750***					
			(0.138)					

VARIABLES	(1) TobinsQ	(2) TobinsQ	(3) TobinsQ	(4) TobinsQ	(5) TobinsQ	(6) TobinsQ	(7) TobinsQ	(8) TobinsQ
ROA*Hedge				0.734***			0.147	
				(0.0938)			(0.257)	
Size*hedge	-0.00715				-0.00762			
	(0.0101)				(0.0102)			
MB*Hedge								0.295
								(0.212)
Constant	-1.762***	-1.728***	-1.985***	-1.889***	-2.371***	-2.336***	-2.384***	-2.186***
	(0.151)	(0.131)	(0.164)	(0.168)	(0.0612)	(0.0880)	(0.124)	(0.105)
Observations	605	605	605	605	605	605	605	605
R-squared	0.529	0.530	0.540	0.541	0.450	0.450	0.450	0.452

Notes: Refer to Table 1 for definitions. The dependent variable is Tobin's Q. Heteroskedasticity consistent clustered robust standard errors are reported in parentheses following Allayannis et al. (2012) and Petersen (2009) and adjusted for 5 clusters in year. ***, **, and * indicate statistically significant levels of 1%, 5% and 10%, respectively.

4.2 Robustness test: effect of moderation

Table 6 and 7 tabulate regression results for equation 2 with interaction terms. In this section, our objective is to check for the robustness of the main results, given the moderation of the "*Hedge*" variable with other selected firm-specific variables. Table 6 considers ROIC as the dependent variable, while Table 7 takes Tobin's Q as the dependent variable. Firm specific variables considered for the moderation are dividends, leverage, size, and MB (proxy for growth) for both value and performance models, and ROA as an additional moderator for value models (Table 7). Heteroskedasticity consistent clustered robust standard errors are presented following Allayannis et al. (2012) and Petersen (2009).

The results in Table 6 and 7 add some new corners to the original results. From the performance-hedging nexus (Table 6), while hedging consistently positively influences performance (ROIC), contrary to Bonaimé, Hankins and Harford (2014), we find that dividend-hedge interaction term does not have a significant influence on the value. While considering the growth options, our findings support the existing works by Choi, Mao and Upadhyay, (2013) that use of hedging by high growth firms earns high. Even though leverage had a negative relationship with performance, hedging-leverage is found to increase performance. Interaction with size exhibits that smaller firms take performance arbitrage using hedging.

Table 7 shows the results for value-hedging nexus for the moderation terms. Hedging results are inconsistent due to moderation terms. Even though hedging positively influences value, most of the coefficients are insignificant. Interaction terms involving dividend, size and growth opportunities are all insignificant. Companies with low leverage will see increase in value if hedging is used. Companies with higher ROA will see higher value if hedging is used. Even though results are not entirely homologous between the value and the performance models, the interaction terms find leverage, size, profitability, dividend and growth opportunities to be influential while making hedging decision.

4.3 Robustness test: Dynamic panel analysis using System-GMM

As suggested by Magee (2013), if firm performance is correlated with its lagged values in an autoregressive process, a lagged dependent variable as an independent variable should be included to capture this dynamism.

In order to account for endogeneity in this case, the effect of hedging on firm performance is estimated in a dynamic panel framework using System-GMM estimators. The system GMM estimator uses a first-difference transformation to control for unobserved firm heterogeneity, and uses lagged values of firm performance as instrumental variables to control for failure of the strict exogeneity assumption (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998). System GMM is suitable for small '*t'* and large '*n'* panels (Roodman, 2006). We replicate Table 4 by adding the lagged dependent variable and estimate the dynamic models with system-GMM estimators. We accept first lag of dependent variable (ROIC) as endogenous, while all other variables are considered as exogenous. The results of this estimation indicate that the lagged dependent variable is insignificant in all specifications, meaning that the phenomenon is not autoregressive and dynamic modeling is not suitable[7]

4.4 Robustness test: lagged independent variables and two-stage least squares

Another possibility is that the influence goes from performance to hedging not vice versa or both variables are determined simultaneously. To overcome these possibilities, we repeat all regressions with lagged independent variables to ensure that the relationship goes from hedging to performance. Part of these results are presented in Table 8 (a). The last possibility is that the hedging variable is endogenous. We used the two-stage OLS with lagged values of the "*Hedge*" variable as instrument and part of the results are presented in Table 8(b). In both cases, the results are qualitatively like the results presented in this paper.

[7] Results are available upon reasonable request.

Table 8: Robustness Tests for Derivative Use

(a) Lagged independent variables					**(b) Two-Stage least square**				
	(1)	**(2)**	**(3)**	**(4)**		**(1)**	**(2)**	**(3)**	**(4)**
VARIABLES	**TobinsQ**	**TobinsQ**	**ROIC**	**ROIC**	**VARIABLES**	**TobinsQ**	**TobinsQ**	**ROIC**	**ROIC**
L.Hedge	0.0424**	0.0489***	0.185***	0.237**	Hedge	0.0713***	0.0974***	0.201***	0.251***
	(0.0131)	(0.00679)	(0.0157)	(0.0676)		(0.0146)	(0.0276)	(0.00824)	(0.0168)
L.Firm Size	0.0198	0.0314*	-0.0254**	-0.00606	Firm Size	0.0291***	0.0704***	-0.0226***	0.000816
	(0.0108)	(0.0133)	(0.00446)	(0.0213)		(0.00613)	(0.00150)	(0.00532)	(0.00739)
L.Leverage	3.243***		1.912		Leverage	2.448***		-0.310***	
	(0.506)		(1.424)			(0.0639)		(0.0794)	
L.Sqr Leverage	-1.742		-4.537		Sqr Leverage	-0.291***		-0.171***	
	(1.018)		(2.951)			(0.00475)		(0.0138)	
L.DD	-0.0746*	-0.0782*	0.251***	0.274***	DD	-0.0403***	-0.200***	0.257***	0.183***
	(0.0304)	(0.0276)	(0.0191)	(0.0378)		(0.0104)	(0.0534)	(0.0305)	(0.0221)
L.ROA	0.00615	0.130			ROA	0.299***	0.685***		
	(0.260)	(0.277)				(0.0815)	(0.181)		
L.MB		2.241***		-0.721	MB		1.492***		-1.013***
		(0.0480)		(0.459)			(0.180)		(0.117)

(a) Lagged independent variables					(b) Two-Stage least square				
	(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)
VARIABLES	**TobinsQ**	**TobinsQ**	**ROIC**	**ROIC**	**VARIABLES**	**TobinsQ**	**TobinsQ**	**ROIC**	**ROIC**
lnGDP per capita	-0.0593*	-0.0464*	-0.129**	-0.110**	ln GDP per capita	-0.0229***	0.00951	-0.101***	-0.0944***
	(0.0190)	(0.0178)	(0.0301)	(0.0289)		(0.00824)	(0.0134)	(0.0184)	(0.0178)
Bank deposits to GDP	0.000167	0.000225	-0.000543	-0.000489	Bank deposits to GDP	1.73e-05	-0.000378	-0.000446***	-0.000789***
	(0.000599)	(0.000546)	(0.000255)	(0.000364)		(0.000333)	(0.000371)	(7.45e-05)	(1.40e-05)
Market cap to GDP	0.000581***	0.000523***	0.000207**	8.01e-05*	Market cap to GDP	0.000572***	0.000478***	0.000108***	5.28e-05
	(9.54e-05)	(6.78e-05)	(5.54e-05)	(2.77e-05)		(6.30e-05)	(8.35e-05)	(2.34e-05)	(3.91e-05)
Constant	-1.170**	-1.393**	1.409***	1.145**	Constant	-1.690***	-2.288***	1.270***	1.085***
	(0.291)	(0.323)	(0.163)	(0.235)		(0.119)	(0.102)	(0.104)	(0.112)
Observations	483	483	483	483	Observations	483	483	483	483
R-squared	0.487	0.473	0.341	0.210	R-squared	0.548	0.454	0.634	0.567

Notes: Refer to Table 1 for definitions. This table reports the regression results in (a) independent variables are lagged by one period except for macroeconomic variables, and in (b) a two-stage OLS is used. "*Hedge*" is considered endogenous and instrumented by the lagged values of "*Hedge*". Heteroskedasticity consistent clustered robust standard errors are reported in parentheses following Allayannis et al. (2012) and Petersen (2009) and adjusted for 5 clusters in year. ***, **, and * indicate statistically significant levels of 1%, 5% and 10%, respectively.

5. Conclusion

The relationship between hedging and firm value has been widely debated, with research offering mixed results on whether risk management strategies help or hinder financial performance. Some argue that hedging stabilizes cash flows, reduces financial uncertainty, and enhances firm value, while others suggest that its benefits are limited or even costly. Much of the existing research has focused on firms in developed markets, where financial instruments and regulatory frameworks are well-established. In contrast, the experience of firms in emerging economies, where market conditions differ significantly, remains relatively underexplored.

This study helps bridge that gap by examining the impact of hedging on firm performance and value in Asia-Pacific economies. By analyzing data from 123 firms across 12 countries between 2011 and 2015, and using multiple statistical techniques to ensure robustness, we provide new insights into how hedging functions in diverse economic and financial environments. Our findings strongly suggest that hedging is a value-enhancing strategy, particularly when firms hedge foreign exchange and interest rate risks. Firms that actively manage these risks experience greater financial stability, improved profitability, and stronger long-term performance. However, when it comes to commodity price hedging, we find no clear link to firm value. This suggests that firms in the region face challenges in effectively hedging commodity risks, possibly due to market inefficiencies, speculative activity, or regulatory constraints.

5.1 Implications

One of the key takeaways from this study is that hedging should not be seen simply as a defensive measure against risk but as a proactive financial strategy. When implemented effectively, hedging allows firms to smooth earnings, minimize uncertainty, and improve financial flexibility, all of which contribute to stronger business performance. For firms operating in highly volatile markets, especially those exposed to foreign exchange and interest rate fluctuations, structured hedging strategies can provide a competitive advantage, allowing them to navigate financial uncertainty with greater confidence.

Not all firms benefit equally from hedging. Our findings suggest that companies with higher leverage, strong profitability, and significant

growth potential are in the best position to leverage derivative instruments effectively. These firms are typically more financially secure and able to balance the costs of hedging with the benefits of risk reduction. This means that financial managers need to carefully evaluate their firm's financial structure and risk exposure before deciding whether and how to implement hedging strategies. well-thought-out hedging approach, tailored to a company's specific financial situation and market environment, is far more effective than a one-size-fits-all approach.

Hedging is not just about managing financial risk—it is also about managing corporate reputation and investor perceptions. Firms that hedge strategically often do so to signal stability and financial prudence to investors, lenders, and other stakeholders. Highly leveraged firms, for instance, may engage in hedging reactively, using it as a tool to reassure investors and creditors that they are taking steps to manage potential financial distress. On the other hand, highly profitable and high-growth firms may hedge proactively, aiming to create a predictable financial environment that supports long-term expansion and attracts investors seeking stability. This suggests that firms do not hedge only for risk mitigation but also to strengthen their position in financial markets and enhance investor confidence.

Our results forward that there is a lack of a clear relationship between commodity price hedging and firm value. While hedging foreign exchange and interest rate risks clearly delivers financial benefits, commodity hedging does not appear to be as effective in the Asia-Pacific region. This could be due to inefficiencies in commodity derivative markets, speculative behavior, or limited access to well-structured hedging instruments.

From a policy and regulatory standpoint, our findings highlight the need for stronger financial market infrastructure in emerging economies to support hedging activities. Policymakers should focus on improving transparency in derivative markets, reducing barriers to entry, and ensuring that firms have access to well-regulated hedging instruments. Strengthening these markets would allow firms to hedge more effectively, leading to greater financial stability at both the firm and national levels.

5.2 Limitations and future research

Despite its contributions, this study has limitations. The dataset covers only five years, meaning that longer-term trends could not be fully examined. Additionally, while the study controls for firm- and country-specific factors, other elements—such as corporate governance, managerial risk preferences, and industry-specific regulations—may influence hedging outcomes. Future research could explore how these factors interact with hedging strategies to provide a more nuanced understanding of risk management.

Looking forward, there are several promising directions for future research. One important area would be to examine how hedging strategies evolve over time and whether they help firms remain resilient during financial crises or economic downturns. Another interesting question is how corporate governance influences hedging decisions, as well-managed firms may be better equipped to implement risk management strategies effectively. Additionally, industry-specific studies could provide deeper insights into how hedging effectiveness differs across sectors, particularly in industries with high exposure to market volatility, such as manufacturing, energy, and financial services.

Is hedging in its current form providing real financial protection, or are there structural barriers preventing firms from fully benefiting from these instruments? Future research could explore this issue further by examining how commodity hedging effectiveness varies across industries and different regulatory environments.

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