

Article

Determinants of Hostile Versus Friendly Mergers and Acquisitions in the Global Insurance Sector: Evidence from the Post-Crisis Period

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Abstract

This study examines the relatively underexplored phenomenon of hostile takeovers within the insurance industry, a sector that played a significant role in the events surrounding the 2008 global financial crisis. Using a sample of 754 insurance merger and acquisition (M&A) transactions completed between 2008 and 2021, we investigate the determinants of hostile takeover activity. The dataset comprises acquiring and target firms from 46 countries and special administrative regions (SARs), providing a broad international perspective on post-crisis insurance-sector M&A dynamics. The findings reveal that several transaction- and firm-specific factors significantly affect the likelihood of hostile takeovers. In particular, a target firm's prior M&A experience, increases in target book value, higher bidder research and development expenditures, bid revisions, and acquisition premia are positively associated with takeover hostility. While descriptive analyses document notable variation across jurisdictions, the primary empirical evidence is derived from pooled regression models incorporating country fixed effects. The results contribute to the literature on insurance-sector consolidation by identifying industry-specific factors associated with hostile acquisition activity and enhancing understanding of how information asymmetries, strategic considerations, and governance mechanisms shape takeover outcomes. These findings offer valuable implications for corporate managers, investors, and policymakers operating within a globally interconnected and highly regulated insurance industry.

Keywords: hostile takeovers; insurance mergers and acquisitions; insurance industry; information asymmetry; corporate governance; cross-country analysis



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1. Introduction

Over the past two decades, mergers and acquisitions (M&A) have remained a prominent strategic mechanism through which firms pursue growth, efficiency, market expansion, and competitive advantage, while also serving as an important mechanism of corporate control and restructuring (Andrade et al., 2001; Bruner, 2002; Betton et al., 2009). The intensity and nature of M&A activity, however, have been shaped by periods of economic uncertainty and financial disruption that have compelled both practitioners and scholars to reassess the effectiveness of corporate strategies. Among such events, the 2008 global

financial crisis represents a defining moment in modern financial history, exposing vulnerabilities across financial institutions and fundamentally altering regulatory, governance, and risk-management frameworks. While the crisis serves as the backdrop for this study, our analysis does not undertake a before-and-after comparison. Instead, we focus exclusively on the post-crisis period (2008–2021), enabling an examination of takeover dynamics within the regulatory and institutional environment that emerged in the aftermath of the crisis.

The motivation for this study stems from a notable gap in the literature concerning the strategic responses of insurance companies following the global financial crisis. Previous research has extensively examined M&A activity in manufacturing, technology, banking, and energy sectors, often focusing on transaction characteristics, market reactions, corporate governance implications, ownership structures, takeover premiums, and valuation effects (S. Rossi & Volpin, 2004; Erel et al., 2012; Betton et al., 2009; Alexandridis et al., 2010). M&A activity has also been viewed as an important indicator of broader economic conditions. Mihm (2018), for example, argues that periods of intense merger activity frequently precede economic downturns, suggesting that apparent signs of market vitality may simultaneously signal heightened systemic risk. Despite the substantial body of research on M&A activity, comparatively little attention has been devoted to the insurance sector, notwithstanding its central role in the financial system and its significant involvement in the events surrounding the 2008 crisis. This gap is particularly important because insurance firms differ from industrial and banking firms in their dependence on actuarial reserves, long-tail liabilities, solvency regulation, and opaque risk exposures, all of which can intensify information asymmetry and transaction costs during acquisition negotiations (Cummins et al., 1999; Cummins & Xie, 2008; Eling & Schaper, 2017).

The insurance industry represents a particularly compelling setting for studying M&A activity. Unlike many other sectors, insurance companies maintain extensive interconnections with households, corporations, financial institutions, and governments, giving the industry a uniquely systemic character. Moreover, insurance firms operate under distinctive regulatory and operational conditions that differentiate them from industrial and banking organizations. Their valuation depends heavily on actuarial reserves, policy liabilities, and risk exposures that are often difficult for external stakeholders to assess. Transactions within the industry are further influenced by regulatory capital requirements, solvency standards, and the intangible nature of customer portfolios and contractual obligations. These characteristics create substantial information asymmetries and transaction costs, suggesting that the determinants of hostile and friendly acquisitions in the insurance sector may differ from those documented in other industries.

Although hostile takeovers have become less common in certain developed markets, particularly in the United States where takeover defenses have proliferated, they remain strategically relevant in jurisdictions characterized by stronger shareholder rights, more dispersed ownership structures, or different regulatory environments. In such contexts, hostile acquisitions continue to function as an important governance mechanism through which acquirers can overcome managerial resistance and pursue value-enhancing corporate restructuring. Given its high degree of regulatory complexity and global integration, the insurance industry provides an ideal context in which to examine the factors influencing the emergence of hostile takeover activity.

Despite the systemic importance of the insurance industry, existing M&A research has largely concentrated on banking institutions and industrial firms. This study addresses that gap by examining the determinants of hostile versus friendly takeover offers within the global insurance sector. Using a sample of 754 insurance M&A transactions completed between 2008 and 2021 across 46 countries and Special Administrative Regions (SARs), we investigate the firm- and deal-specific characteristics associated with takeover hostility.

While we provide descriptive evidence of variation across jurisdictions, our primary empirical strategy relies on pooled regression models incorporating country fixed effects. In our analysis, SARs such as Hong Kong are treated as distinct jurisdictions to reflect their unique legal, regulatory, and governance environments.

The importance of examining insurance-sector acquisitions became particularly evident during the global financial crisis. The near-collapse of American International Group (AIG), driven in part by its extensive exposure to credit default swaps and inadequate risk management practices, highlighted the systemic consequences of strategic decisions within large insurance organizations. The crisis demonstrated that insurance firms can exert substantial influence on financial stability, thereby reinforcing the need for greater scholarly attention to the strategic behavior and governance mechanisms operating within the industry.

The insurance industry also differs fundamentally from most other sectors in ways that may influence takeover hostility. Insurance companies operate under stringent solvency regulation, maintain complex liability structures, manage long-term contractual obligations, and rely heavily on proprietary actuarial information and risk assessment models. These characteristics increase information asymmetry, valuation uncertainty, and regulatory complexity during acquisition negotiations, thereby creating transaction costs that may affect whether an acquisition proceeds through friendly negotiations or escalates into a hostile takeover. Consequently, examining hostile acquisitions in the insurance sector is not merely an industry-specific application but provides an opportunity to evaluate Transaction Cost Theory in a setting where transaction costs are particularly pronounced.

Despite these important advances, several important gaps remain in the existing literature. First, prior studies overwhelmingly examine mergers and acquisitions in industrial, banking, or non-financial sectors, while hostile takeover dynamics within the insurance industry remain comparatively underexplored despite its unique regulatory environment, complex liability structure, and valuation challenges. Second, existing research primarily focuses on post-merger performance, value creation, or market reactions rather than on the determinants that distinguish hostile from friendly takeover outcomes. Third, although Transaction Cost Theory provides a natural framework for understanding governance choices under uncertainty and information asymmetry, it has rarely been applied to explain hostility in international insurance acquisitions. Addressing these gaps constitutes the primary motivation for the present study.

This study contributes to the literature in several important ways. First, it provides one of the earliest comprehensive investigations of the determinants of hostile versus friendly takeover outcomes within the insurance sector. Second, it extends the broader M&A literature by identifying insurance-specific drivers of takeover hostility, including target firms' prior acquisition experience, valuation dynamics, bidder research and development expenditures, bid revisions, and acquisition premia. Third, by employing a global sample covering multiple jurisdictions, the study offers insights into how these determinants operate within diverse regulatory and institutional environments while controlling for country-specific effects.

The study is grounded in Transaction Cost Theory (TCT), which posits that firms select governance structures that minimize the costs associated with conducting transactions under conditions of uncertainty and information asymmetry. Within the insurance sector, the opacity of liabilities, complexity of risk exposures, and extensive regulatory oversight can generate substantial transaction costs during acquisition negotiations. From a TCT perspective, hostile takeovers may emerge when managerial resistance, information asymmetries, or bargaining frictions increase the costs of reaching mutually agreeable outcomes.

This theoretical framework provides the foundation for our empirical investigation and informs the hypotheses developed later in the paper.

Beyond its theoretical contributions, this study offers practical implications for managers, investors, and policymakers. Understanding the conditions under which insurance-sector acquisitions become hostile can improve strategic decision-making, strengthen governance practices, and assist regulators in evaluating the potential consequences of consolidation within a highly regulated and systemically important industry.

This study makes three principal contributions to the mergers and acquisitions literature. First, it extends the limited evidence on hostile takeover determinants by focusing specifically on international insurance-sector acquisitions, a setting characterized by heightened regulatory complexity, informational opacity, and valuation uncertainty. Second, it contributes to the theoretical literature by applying Transaction Cost Theory as an integrated framework for explaining how information asymmetry, managerial incentives, and negotiation frictions jointly influence takeover hostility. Third, it contributes empirically by examining a large international sample of insurance M&A transactions across multiple countries over the post-financial-crisis period, thereby providing new evidence on the determinants of hostile acquisitions within a sector that has received comparatively limited attention in prior research.

The remainder of the paper is organized as follows: Section 2 reviews the relevant literature and develops the theoretical framework. Section 3 presents the data, variable construction, hypotheses, and empirical methodology. Section 4 reports and discusses the empirical findings. Finally, Section 5 concludes by outlining the study's implications, limitations, and avenues for future research.

2. Literature Review

Transaction Cost Theory (TCT), originally developed by Coase (1937) and further formalized by Williamson (1975, 1985), provides the principal theoretical lens for this study. TCT argues that firms select governance structures that minimize the costs associated with negotiating, monitoring, and enforcing transactions under conditions of uncertainty, information asymmetry, and opportunistic behavior. Within the context of mergers and acquisitions, hostile takeovers may emerge when transaction costs increase because negotiations between bidders and target management fail, information asymmetries become severe, or governance conflicts prevent mutually acceptable agreements. Accordingly, TCT provides a coherent framework for understanding why some acquisition attempts evolve into hostile transactions while others remain friendly.

Building upon Transaction Cost Theory, the existing literature can be organized around three interrelated mechanisms that increase transaction costs during acquisition negotiations: (i) information asymmetry and valuation uncertainty, (ii) managerial incentives and resistance, and (iii) deal-specific negotiation frictions such as bid revisions and acquisition premia. Organizing the literature in this way establishes a direct theoretical link between prior empirical evidence and the hypotheses developed later in the paper. This thematic structure also highlights the principal gap in the existing literature. Whereas prior studies typically examine individual determinants of M&A outcomes in isolation or across broad industry samples, the present study integrates information asymmetry, managerial incentives, and negotiation frictions within a unified Transaction Cost Theory framework to explain takeover hostility in international insurance-sector acquisitions.

Accordingly, the hypotheses developed below are derived from the Transaction Cost Theory framework rather than from empirical regularities alone. Specifically, variables associated with valuation uncertainty (e.g., leverage and book value changes) capture information asymmetry, managerial characteristics (e.g., management experience, ownership,

and compensation arrangements) reflect governance incentives and potential opportunistic behaviour, while deal-specific variables (e.g., bid revisions and acquisition premia) represent negotiation frictions that increase transaction costs during acquisition negotiations. Under Transaction Cost Theory, increases in these transaction costs reduce the likelihood of negotiated agreement and increase the probability that acquisition attempts become hostile rather than friendly.

Recent studies further support this analytical framework. [Macoris et al. \(2022\)](#) emphasize the interaction between governance motives and financial constraints in cross-border acquisitions, while [Ahmad et al. \(2024\)](#) show that board-level governance reforms significantly affect M&A performance in multi-country contexts. [Rouine \(2022\)](#) highlights the role of uncertainty in impeding successful deal completion. Collectively, these contributions underscore that M&A outcomes are shaped by both institutional conditions and firm-level frictions. Building on this literature, the present study focuses on a key unresolved question: how these forces jointly influence the likelihood of hostile versus friendly takeover outcomes in insurance M&A.

2.1. Information Asymmetry and Valuation Uncertainty

A substantial body of literature has examined the informational and structural characteristics of the insurance sector, highlighting its complexity and opacity. Early theoretical contributions, including [Roe \(1990\)](#) and [Calandro et al. \(2007\)](#), provide foundational insights into the financial structure of insurance firms and their interaction with broader financial markets. Subsequent empirical studies further elaborate on these dynamics. [Nissim \(2010\)](#), [Heldenbergh et al. \(2006\)](#), and [Bindabel \(2020\)](#) analyze financial disclosures, risk measurement, performance evaluation, and growth dynamics in insurance firms, while [Kessler \(2013\)](#) examines capital structure choices and [Sukhorukova and Chistiakova \(2018\)](#) investigate asset allocation strategies.

Collectively, this stream of research highlights the inherently opaque nature of insurance firms, where valuation depends on complex actuarial assumptions, long-term liabilities, and regulatory capital requirements. These features increase information asymmetry between bidders and targets, thereby raising transaction costs and complicating valuation accuracy. From a TCT perspective, such uncertainty is expected to influence negotiation outcomes and increase the likelihood of acquisition disagreement, including hostile takeover attempts.

2.2. Managerial Incentives and Resistance

A second strand of literature focuses on managerial behavior, incentives, and resistance in M&A transactions. [Okura and Yanase \(2013\)](#) examine the role of acquisition premiums in shaping deal outcomes, while [Zanghieri \(2009\)](#) investigates market structure and efficiency effects. [Jakubik and Zafeiris \(2018\)](#) analyze post-crisis business model adjustments, and [Glowalla and Sunyaev \(2013\)](#) emphasize the importance of data integration in post-merger performance.

More broadly, theoretical and empirical studies such as [Stein \(1988\)](#), [Pugh et al. \(1992\)](#), and [Raman et al. \(2013\)](#) highlight the importance of information asymmetry, research and development intensity, and managerial resistance in shaping takeover outcomes. [F. Rossi and Cebula \(2015\)](#) further link R&D activity to ownership concentration and leverage structures, suggesting that innovation intensity may influence bargaining dynamics.

Within the insurance literature, [Liang et al. \(2021\)](#), [Boubakri et al. \(2008\)](#), and [Yeh \(2013\)](#) examine financial performance, value creation, and defensive mechanisms, while [Kangetta and Kirai \(2017\)](#) and [Hung and Wu \(2016\)](#) focus on post-merger employment and managerial continuity concerns. Taken together, these studies suggest that managerial

entrenchment, private benefits of control, and resistance to loss of autonomy are central determinants of takeover resistance. Consistent with TCT, such frictions increase internal coordination costs and may shift negotiations toward hostile outcomes when voluntary agreement cannot be reached.

2.3. Deal-Specific Negotiation Frictions

A third strand of literature emphasizes transaction- and deal-level frictions that arise during the negotiation process. Prior research has examined cross-border and cross-industry M&A activity (Cummins et al., 2015; B. J. Kim & Park, 2016; Pervan et al., 2015), target firm performance and valuation outcomes (Borges et al., 2008; Lole, 2012; Sharma, 2020; Olurotimi et al., 2021; Al-Amri et al., 2012), as well as cost inefficiencies and restructuring outcomes (Fenn et al., 2008). Additional studies consider the roles of loss distribution mechanisms (C. Kim et al., 2020), leverage effects on acquisition premia (Kramaric, 2012), and systemic risk implications of consolidation waves (Mühlnickel & Weiß, 2015).

Further contributions by Cummins et al. (1999) and Barros et al. (2010) analyze efficiency gains and consolidation effects in insurance markets, while Cummins and Xie (2008) study acquisition dynamics under hostile conditions. Chan (2009) highlights the importance of cultural barriers in cross-border transactions, further complicating integration processes.

From a transaction cost perspective, these studies collectively suggest that deal-specific frictions—particularly bid revisions, premium adjustments, valuation disagreements, and integration uncertainties—constitute critical sources of negotiation costs. When such frictions intensify, they may impede cooperative bargaining and increase the probability that acquisitions transition from friendly negotiations to hostile takeovers.

Overall, the literature indicates that insurance M&A outcomes are shaped by a combination of informational opacity, managerial incentives, and negotiation frictions, all of which operate through the lens of transaction costs. However, despite this extensive body of research, limited attention has been given to how these mechanisms jointly determine hostility in insurance-sector acquisitions. This study addresses this gap by integrating these strands within a unified empirical framework. Table A1 (Appendix A) summarizes the key findings of prior insurance-related M&A studies.

3. Data and Hypotheses

3.1. Data

This study relies on a comprehensive, multi-source dataset covering 754 insurance-sector mergers and acquisitions (M&A) completed between January 2008 and December 2021. The sample begins in 2008 because the global financial crisis fundamentally reshaped the regulatory, governance, and risk-management environment of the insurance industry, making the post-crisis period an appropriate setting for examining takeover behavior. The sample extends through 2021 to provide a sufficiently long and internally consistent post-crisis observation window for examining the determinants of hostile takeover activity in the insurance sector. The dataset is constructed from Refinitiv Eikon, Refinitiv Datastream, Factiva, and the Institute for Mergers, Acquisitions and Alliances (IMAA). Each source contributes complementary information that enhances data reliability and completeness.

Research Design. This study employs a pooled cross-sectional, deal-level research design. Each observation represents one completed insurance-sector merger or acquisition transaction, rather than a firm-year observation or a panel observation. The unit of analysis is therefore the individual M&A deal. Because some firms may appear in more than one transaction over the sample period, the analysis focuses on transaction-level outcomes and deal-specific characteristics rather than firm-level panel dynamics. The objective is to

examine which firm-, governance-, and deal-level characteristics are associated with the probability that a transaction is classified as hostile rather than non-hostile.

Refinitiv Eikon provides deal-level characteristics, including announcement dates, bidder and target countries, transaction values, and initial deal classifications. Refinitiv Datastream is used to extract firm-level financial variables such as leverage (total debt to total assets), book value measures, and research and development (R&D) expenditures. Factiva news reports are used to validate the classification of transactions as hostile or friendly based on contemporaneous press coverage and official disclosures. The IMAA database serves as an additional verification source for deal frequency, classification, and transaction characteristics.

In cases of overlapping observations across databases, Refinitiv Eikon is used as the primary reference. However, when inconsistencies arise in deal classification, Factiva is given precedence due to its reliance on real-time reporting of managerial responses and market perceptions. Observations with unresolved inconsistencies or missing critical variables are excluded, resulting in a final consistent sample of 754 unique transactions. This procedure ensures the construction of a harmonized and replicable dataset.

Because the analysis is restricted to completed transactions, the findings should be interpreted as explaining the characteristics associated with successfully completed hostile and friendly acquisitions rather than the full universe of takeover attempts. Consequently, unsuccessful hostile bids are not represented in the sample, which may introduce selection bias and should be considered when interpreting the results.

Several variables commonly used in M&A research, such as toehold positions and competing bidders, are excluded due to incomplete or inconsistent reporting across databases. Given that information asymmetry is not directly observable, it is proxied using observable transaction- and firm-level indicators, including bid revisions, acquisition premia, and R&D intensity.

Detailed variable definitions, measurement procedures, expected theoretical relationships, and corresponding hypotheses are presented in Appendix A Table A4.

The dependent variable is a binary indicator equal to 1 for hostile takeovers and 0 for non-hostile transactions. The independent variables include target financial characteristics, bidder-level investment indicators, governance variables, and deal-level negotiation features. The study does not include moderating or mediating variables because the empirical objective is to estimate direct associations between observable transaction characteristics and hostile takeover likelihood. Detailed definitions, measurement procedures, expected signs, and theoretical justifications for all variables are reported in Tables A4 and A5 in Appendix A.

The dataset spans 46 countries and Special Administrative Regions (SARs), providing a broad international setting for examining post-crisis insurance M&A activity. SARs (e.g., Hong Kong) are treated as distinct jurisdictions to account for their unique regulatory and governance frameworks.

3.1.1. Classification of Takeover Type

M&A transactions are classified into two categories: hostile and non-hostile (friendly) takeovers. A transaction is defined as hostile when the bid is explicitly opposed by target management or when the offer is labeled as hostile in Refinitiv Eikon, Factiva, or IMAA. Friendly takeovers refer to transactions in which the target board publicly endorses the offer at the announcement stage. In ambiguous cases, classification is based on the target board's initial public stance. This approach is consistent with prior M&A literature and ensures comparability across studies.

Bid revisions, acquisition premia, and related negotiation variables are observed during the acquisition process leading to the completed transaction. Consequently, these variables are interpreted as transaction characteristics associated with completed hostile and friendly acquisitions rather than as exogenous predictors that necessarily precede the hostility classification.

The deal-level variables capturing bid revisions and acquisition premia are measured during the negotiation process that culminates in the completed transaction. Accordingly, these variables are interpreted as transaction characteristics associated with completed hostile and friendly acquisitions rather than as exogenous predictors that necessarily precede the hostility classification.

To enhance classification reliability, the hostility status of each transaction was cross-validated across Refinitiv Eikon, Factiva, and IMAA wherever corresponding information was available. Refinitiv Eikon provided the initial transaction classification, while Factiva was used to verify whether target management publicly opposed or rejected the offer based on contemporaneous news reports and official disclosures. IMAA served as an additional consistency check for transaction characteristics and deal status. When discrepancies arose across sources, the contemporaneous public position of the target board reported by Factiva was used as the deciding criterion because it directly documents managerial acceptance or opposition. Transactions for which hostility could not be classified consistently across the available sources were excluded from the final analytical sample.

3.1.2. Descriptive Statistics

Table 1A,B provide preliminary descriptive evidence on the differences between hostile and non-hostile insurance M&A transactions in the post-2008 period, while also situating these patterns within the broader M&A literature. The sample consists of 754 deals, of which 262 are hostile and 492 are non-hostile, indicating that hostile takeovers represent approximately one-third of transactions, a proportion consistent with prior evidence that hostile bids are relatively infrequent but economically significant (e.g., [Betton et al., 2009](#); [Eckbo et al., 2020](#)). As shown in Table 1A, target firms in friendly deals exhibit higher average leverage ($TD/TA = 14.06\%$) compared to hostile deals (8.08%), which aligns with the view that financially constrained firms have weaker bargaining positions and are less able to resist acquisition attempts ([Pugh et al., 1999](#); [Zanghieri, 2009](#); [Cummins & Xie, 2008](#); [Alexandridis et al., 2020](#)). In contrast, hostile transactions are associated with stronger pre-deal increases in book value (7.81% versus 4.41%), consistent with prior studies suggesting that valuation uncertainty and accounting-based distortions can intensify takeover disputes ([Goergen & Renneboog, 2004](#)).

Table 1A further indicates that bidder R&D intensity is substantially higher in hostile transactions (1.51% versus 0.32%), which is consistent with the literature linking innovation expenditure and information acquisition costs to heightened uncertainty and takeover aggressiveness ([Stein, 1988](#); [Pugh et al., 1992](#); [Raman et al., 2013](#); [Zhao et al., 2019](#); [Hsu et al., 2021](#)). Similarly, hostile deals exhibit a markedly higher incidence of bid revisions (70.22% versus 31.50%) and a greater number of revisions (1.99 versus 1.45), supporting the interpretation that repeated renegotiation reflects bargaining frictions and resistance by target management ([Walsh, 1989](#); [Franks & Mayer, 1996](#); [Pugh et al., 1999](#); [Chen et al., 2011](#); [Irani et al., 2025](#)). Acquisition premia are also more frequently observed in hostile deals (53.81% versus 18.69%) and are higher on average (1.35% versus 0.49%), a pattern broadly consistent with evidence that premiums rise in environments characterized by disagreement and asymmetric information ([Officer, 2003](#); [Dionne et al., 2015](#)). However, as emphasized in prior research, premium distributions are typically skewed, and thus these differences should be interpreted as descriptive rather than causal ([Shin & Cho, 2004](#)).

Table 1. (A) Descriptive Statistics for a Sample of 754 of Hostile vs. Non-hostile (Friendly) Takeovers. (B) Descriptive Statistics and Mean Difference Tests.

(A)				
	Hostile	Non-Hostile (Friendly)		
Number of deals	262	492		
Average TD/TA ratio (1 year prior)	8.08%	14.06%		
Average increase in target book value (1 year vs. 1 month prior)	7.81%	4.41%		
% of companies with previous M&A experience (relative to subcategory total)	72.13%	23.73%		
Average increase in R&D expenditures for bidders (1 year vs. 1 month prior)	1.51%	0.32%		
Presence of bid revisions (percentage out of subcategory total)	70.22%	31.50%		
Average number of revisions	1.99	1.45		
Presence of premia payment (percentage out of subcategory total)	53.81%	18.69%		
Average % of premium	1.35%	0.49%		
Presence of target management ownership (percentage out of subcategory total)	35.11%	22.35%		
Absence of compensation (percentage out of subcategory total)	63.74%	59.75%		
(B)				
Variable	Mean (Hostile)	Mean (Friendly)	Mean Difference	p-Value
TD/TA ratio (1 year prior)	553.6309	538.7969	14.834	0.928
Book Value Increase	0.3588	0.065	0.2937	<0.001 ***
Increase/Decrease R&D %	1.5175	0.3203	1.1972	<0.001 ***
R&D Increase	0.7824	0.5427	0.2398	<0.001 ***
Presence of Revisions	0.7023	0.315	0.3872	<0.001 ***
Number of Revisions	1.9924	1.4492	0.5432	<0.001 ***
Presence of Premia	0.5382	0.187	0.3512	<0.001 ***
Premia %	1.3376	0.4908	0.8468	<0.001 ***
Management Ownership	0.3473	0.2256	0.1217	0.0006 ***
Absence Compensations	0.6374	0.5976	0.0398	0.2831

*** Significance at 99% confidence interval.

Governance-related variables further reinforce these patterns. Table 1A shows that target firms in hostile transactions are more likely to have prior M&A experience (72.13% versus 23.73%), consistent with the idea that experienced managers possess stronger bargaining capabilities and more sophisticated defense strategies (D'Aveni & Kesner, 1993; Field & Mkrtchyan, 2017; Cuypers et al., 2017). Likewise, higher target management ownership in hostile deals (35.11% versus 22.35%) aligns with agency-based arguments that managerial equity stakes increase resistance to takeovers due to control and private benefit considerations (Boubakri et al., 2008; Yeh, 2013; Bates & Becher, 2017). Table 1B confirms that many of these differences are statistically significant, particularly for R&D measures, bid revisions, premia, and managerial ownership, while leverage differences are not statistically significant in the t-tests, suggesting that financial structure alone does not fully explain takeover hostility. Overall, the combined evidence from Table 1A,B is consistent with Transaction Cost Theory and prior M&A literature, indicating that hostile and non-hostile insurance acquisitions differ systematically in terms of financial constraints, information asymmetry, bargaining frictions, and managerial incentives, thereby motivating the econometric analysis that follows.

3.2. Cross-Country/Region Data

Our dataset comprises a comprehensive set of financial, operational, and transactional variables covering 754 insurance-sector mergers and acquisitions conducted between 2008 and 2021 across multiple jurisdictions. The sample includes 39 target countries/regions and 46 acquirer countries/regions, thereby providing a broad international setting for

analyzing post-crisis insurance M&A dynamics. Among target countries, Japan is the most frequently represented (203 observations), followed by the United States, Australia, the United Kingdom, Canada, India, South Korea, Singapore, Sweden, and Hong Kong Special Administrative Region (SAR) of the People's Republic of China (PRC). At the other extreme, countries such as Iceland, Sierra Leone, Hungary, and Spain appear only once in the sample. On the acquirer side, Japan again represents the most frequent country (177 observations), followed by the United States, Australia, the United Kingdom, Canada, India, Singapore, Germany, and France, in addition to Hong Kong SAR. This distribution is broadly consistent with the literature emphasizing the dominance of developed financial markets in global M&A activity and the growing role of Asian financial centers in cross-border transactions (S. Rossi & Volpin, 2004; Erel et al., 2012).

The cross-country descriptive statistics reveal substantial heterogeneity in firm financial structure and investment behavior. Targets located in Asian countries and SARs exhibit relatively high average book value per share (approximately USD 17.03) and substantial average current assets (approximately USD 1007 million), suggesting strong liquidity positions and asset-intensive balance sheets that may facilitate investment and expansion decisions. These firms also display relatively high average R&D expenditures (approximately USD 325.63 million), indicating a strong orientation toward innovation and technological investment. This pattern is consistent with prior evidence that financial development and institutional context shape innovation incentives and corporate investment behavior. In contrast, Australian targets display comparatively low average book value per share (USD 1.15) but high levels of intangible assets (approximately USD 2786 million) and a large average workforce (approximately 43,443 employees), suggesting a business model more reliant on intangible capital, brand value, and service-oriented expansion rather than physical asset accumulation. Similarly, firms in Belgium and Luxembourg exhibit moderate book value per share (USD 7.63) alongside relatively low current assets (USD 138.3 million), reflecting a more conservative balance sheet structure and a balanced asset composition, as indicated by an intangible-to-total assets ratio of 0.143.

Other jurisdictions also display notable heterogeneity. Brazilian targets exhibit exceptionally large values for current assets and liabilities (USD 14,067.4 million and USD 10,433.9 million, respectively), reflecting the scale of large domestic financial institutions and conglomerates, and are also characterized by sustained R&D investment activity. Canadian firms show moderate book values per share (USD 2.50), relatively low R&D expenditures (USD 42.18 million), and a large average workforce (approximately 59,635 employees), suggesting a balanced structure between operational scale and innovation investment. Indian targets are characterized by high intangible asset intensity but relatively low book value per share, while Singaporean firms exhibit lower book values combined with relatively high R&D expenditure. In contrast, South Korean targets display higher book values per share and strong net asset positions, whereas Swedish firms show high total assets with moderate R&D investment and no clear propensity toward hostile transactions. UK firms exhibit a mixed pattern of tender offers and hostile transactions, while US targets show relatively strong intangible asset valuation and moderate R&D intensity with a lower tendency toward hostile takeovers. Collectively, these patterns highlight substantial cross-country variation in financial structure, intangible asset intensity, and innovation investment, consistent with evidence that institutional and industry composition shape corporate investment behavior and M&A outcomes (S. Rossi & Volpin, 2004; Erel et al., 2012).

Cross-country heterogeneity is particularly relevant for understanding the determinants of hostile M&A activity. Accordingly, we conduct a country-level exploratory logit analysis to examine how the association between explanatory variables and hostile takeover likelihood varies across jurisdictions. Table 2 summarizes these results. The findings in-

dicates that the relevance of key determinants differs substantially across countries and SARs, consistent with prior research highlighting the role of institutional environments, governance systems, and market structure in shaping M&A outcomes. For example, in Japan, the United States, and France, higher TD/TA ratios are significantly associated with a lower likelihood of hostile takeovers at conventional significance levels, consistent with the argument that higher leverage constrains takeover resistance (Kessler, 2013). Although statistical significance is weaker in Australia, India, Germany, and Brazil, the direction of the relationship remains broadly consistent, suggesting that capital structure effects are context-dependent. In contrast, no statistically meaningful relationship is observed in China and Hong Kong SAR. Target management experience is statistically significant across most jurisdictions, including Japan, Australia, the United States, India, Germany, the United Kingdom, Brazil, and France, supporting the view that managerial sophistication and prior M&A exposure influence takeover outcomes (Stein, 1988; Pugh et al., 1992). Similar significance appears in Hong Kong SAR at the 10% level, while China again shows weaker effects.

Table 2 provides exploratory country-by-country evidence and should be interpreted with caution, particularly in jurisdictions with limited observations. The results suggest that certain determinants—such as R&D investment, valuation changes, and governance characteristics—vary in importance across institutional settings. However, these results are not intended as formal hypothesis tests. Instead, they serve as motivating evidence for the pooled econometric framework. The main empirical analysis relies on logit regressions with country fixed effects (Appendix A Table A10), which provide a more robust basis for inference by accounting for unobserved heterogeneity across jurisdictions.

Further patterns in Table 2 indicate that target book value increases are significantly associated with hostile takeover likelihood in most major markets, including Japan, Australia, the United States, Hong Kong SAR, India, Germany, the United Kingdom, China, and France, consistent with prior evidence linking valuation dynamics to takeover pressure (F. Rossi & Cebula, 2015). R&D increases are particularly significant in Australia, India, the United Kingdom, and China, suggesting that greater innovation intensity may heighten informational complexity and information asymmetry because innovative activities are inherently difficult for outside investors to evaluate (Aboody & Lev, 2000). Greater information asymmetry has been shown to influence bidders' takeover strategies and increase the likelihood of hostile acquisitions (Raman et al., 2013). Bid revisions are also broadly significant across most jurisdictions, reinforcing their interpretation as indicators of negotiation friction and strategic disagreement (Glowalla & Sunyaev, 2013). Similarly, acquisition premia are significant in most countries, although France exhibits sensitivity primarily to premium magnitude rather than its mere presence, indicating heterogeneity in valuation sensitivity across institutional contexts (Zanghieri, 2009; Okura & Yanase, 2013). Governance-related variables, including target management ownership and absence of compensation, are significant in most jurisdictions, consistent with agency-based explanations of managerial resistance and control incentives (Yeh, 2013; Hung & Wu, 2016; Kangetta & Kirai, 2017). However, exceptions exist, particularly in Germany and Brazil, where certain governance variables lose significance, suggesting that institutional and cultural factors may moderate their influence.

Table 2. Exploratory Descriptive Logit Test *p*-Values by Country and Special Administrative Region (For Illustrative Purposes Only).

Country	TD/TA Ratio (X1)	Target Management Experience (X2)	Book Value Increase (X3)	R&D Increase (X4)	Presence of Bid Revisions (X5)	Number of Revisions (X6)	Presence of Premia (X7)	Premia Percentage (X8)	Target Management Ownership (X9)	Absence of Compensations (X10)
Japan	0.001 ***	0.043 **	<0.001 ***	0.130	0.002 ***	0.050 *	0.070 *	0.003 ***	0.004 ***	0.090 *
Australia	0.053 *	0.001 ***	0.049 **	0.002 ***	0.003 ***	0.060 *	0.020 **	0.045 **	0.005 ***	0.130
United States	0.002 ***	0.050 *	0.040 **	0.030 **	0.004 ***	0.003 ***	0.060 *	0.011 **	0.070 *	0.040 **
Hong Kong SAR	0.120	0.080 *	0.011 **	0.040 **	0.010 **	0.007 **	0.003 ***	0.090 *	0.001 ***	0.005 ***
India	0.089 *	0.002 ***	0.002 ***	0.001 ***	0.150	0.002 ***	0.009 ***	0.030 **	0.006 ***	0.002 ***
Germany	0.070 *	0.005 ***	0.089 *	0.200	0.015 **	0.080 *	0.040 **	0.005 ***	0.100	0.080 *
United Kingdom	0.015 **	0.022 **	<0.001 ***	0.005 ***	0.045 *	0.110	0.005 ***	0.020 **	0.003 ***	0.009 ***
China	0.200	0.130	0.003 ***	0.090 *	0.005 ***	0.045 **	0.002 ***	0.070 *	0.050 *	0.030 **
Brazil	0.099 *	0.060 *	0.130	0.070 *	0.080 *	0.070 *	0.030 **	0.080 *	0.040 **	0.120
France	0.000 ***	0.030 **	0.040 **	0.002 ***	0.030 **	0.009 ***	0.120	0.040 **	0.002 ***	0.001 ***

* Significance at 90% confidence Interval; ** Significance at 95% confidence interval; *** Significance at 99% confidence interval.

Overall, the cross-country evidence highlights substantial heterogeneity in the determinants of hostile M&A activity across jurisdictions. These differences underscore the importance of institutional context in shaping transaction costs, bargaining frictions, and governance outcomes. Nevertheless, given the exploratory nature of Table 2 these results are interpreted as suggestive patterns rather than definitive statistical evidence. The main empirical conclusions of the study are derived from the pooled regression framework with country fixed effects reported in Section 4.4 and Appendix A Table A10.

3.3. Chi-Squared Tests

It is important to recognize that several variables in our dataset may not be independent, but instead may exhibit systematic associations reflecting underlying governance, bargaining, and negotiation dynamics in mergers and acquisitions. For instance, the absence of compensation arrangements may influence managerial resistance, which can subsequently affect bidder perceptions and contribute to hostile deal outcomes. Similarly, changes in target ownership structures may alter managerial incentives and negotiation behavior. To formally examine these interdependencies, we employ Pearson Chi-squared tests of independence to assess whether statistically significant relationships exist between key categorical variables.

Specifically, we conduct four Chi-squared tests: (i) Target Management Experience and Presence of Bid Revisions, (ii) Target Management Experience and Target Management Ownership, (iii) Presence of Bid Revisions and Presence of Premia, and (iv) Absence of Compensation and Presence of Bid Revisions. In addition to the Chi-squared statistic, we report effect size measures using Phi and Cramér's V coefficients, following Cohen's (1988) guidelines to assess the magnitude of associations beyond statistical significance.

The results, reported in Table A2 indicate that all tested relationships are statistically significant at conventional levels, suggesting non-random associations among the examined variables. In Test 1, we find a statistically significant association between target management experience and bid revisions, implying that experienced management is more likely to engage in iterative bargaining processes and renegotiations during the acquisition process. Test 2 also reveals a significant relationship between managerial experience and ownership structure, indicating that experienced managers are more likely to hold equity stakes, which may strengthen their incentives to resist or actively influence takeover negotiations.

Furthermore, Tests 3 and 4 demonstrate significant associations between the presence of bid revisions and premia, as well as between compensation absence and bid revisions. These findings are consistent with the view that bid revisions reflect negotiation frictions, which are often associated with upward adjustments in offer prices, and that weaker compensation alignment may intensify managerial resistance and prolong negotiations. Overall, these results align with prior M&A literature emphasizing the importance of bargaining frictions, managerial incentives, and deal dynamics in shaping takeover outcomes (e.g., Franks & Mayer, 1996; Pugh et al., 1999; Officer, 2003; Betton et al., 2009; Chen et al., 2011).

Regarding effect sizes, the Phi and Cramér's V statistics indicate that, although the associations are statistically significant, their strength varies across relationships. Specifically, the relationship in Test 3 (bid revisions and premia) exhibits a moderate effect size, while the associations in Tests 1, 2, and 4 are generally weak to modest in magnitude. This suggests that while these variables are interrelated, they capture different dimensions of the takeover process and should not be interpreted as strongly collinear or interchangeable constructs.

To further assess structural differences in the data, we complement the Chi-squared analysis with difference-in-means (DoM) tests across relevant binary and continuous variables, including managerial experience, bid revisions, ownership structure, and compensation arrangements. As reported in Table A3 (Appendix A), most comparisons are

statistically significant at conventional levels, particularly under unequal variance assumptions, indicating meaningful variation across subgroups rather than homogeneous population behavior.

Importantly, these tests are not intended to establish causal relationships or confirm randomness in the sampling process. Rather, they serve as preliminary diagnostic tools to verify whether the observed variables exhibit statistically meaningful associations and distributional differences that justify their inclusion in the subsequent econometric specification. Accordingly, the evidence supports the existence of structured interdependencies among governance, bargaining, and valuation variables, which motivates the multivariate analysis in Section 4.

3.4. Transaction Cost Theory

Transaction Cost Theory (TCT) provides the primary theoretical framework for explaining why certain insurance M&A transactions escalate into hostile takeovers. In its core formulation, TCT posits that when transaction costs—arising from information asymmetry, contracting frictions, monitoring difficulties, or managerial opportunism—become sufficiently high, firms adjust governance structures to minimize inefficiencies and internalize coordination costs. Within the context of mergers and acquisitions, hostile takeovers can therefore be interpreted as an alternative governance mechanism that bypasses negotiation frictions, reduces bargaining delays, and mitigates resistance from entrenched target management.

Building on this perspective, the hypotheses developed in this study (H1–H8) are grounded in the expectation that variables increasing transaction costs or intensifying negotiation frictions are associated with a higher likelihood of hostile takeover outcomes. In other words, deal characteristics that exacerbate information asymmetry, increase bargaining complexity, or strengthen managerial resistance are expected to shift acquirers toward more direct and less cooperative acquisition strategies.

In the insurance industry, transaction costs are particularly pronounced due to the structural complexity of firms and markets. These costs are amplified by difficulties in valuing intangible and actuarially driven assets such as reserves, reinsurance exposures, underwriting portfolios, and long-tail liabilities. They are further intensified by information asymmetries related to risk models, pricing strategies, and claims management practices, as well as by heterogeneous regulatory frameworks across jurisdictions that increase compliance and due diligence burdens. In cross-border transactions, these frictions are often compounded, making negotiated acquisitions more costly and time-consuming.

From this standpoint, hostile takeovers may emerge when acquirers anticipate that prolonged negotiations—driven by managerial entrenchment, strategic opacity, or repeated bid revisions—will generate coordination and monitoring costs. In such cases, acquirers may prefer to bypass negotiation channels altogether in order to reduce uncertainty and accelerate control acquisition. Following completion, acquirers typically implement post-merger integration strategies aimed at reducing internal transaction costs, including the consolidation of actuarial systems, integration of risk management platforms, harmonization of IT infrastructure, and elimination of duplicated compliance and administrative functions. These restructuring actions are intended to improve operational efficiency and reduce governance inefficiencies that may have persisted under the target firm's prior management.

Consistent with this interpretation, we formalize our hypotheses by linking observable deal-level and firm-level characteristics to the probability of hostile acquisition, as summarized in Table A5 (Appendix A). Specifically, leverage and changes in book value are treated as proxies for valuation uncertainty and information asymmetry; managerial experience,

ownership, and compensation arrangements capture governance incentives and potential managerial resistance; while bid revisions and acquisition premia represent negotiation frictions that increase the costs of reaching mutually acceptable agreements. Accordingly, each explanatory variable is linked to a specific Transaction Cost Theory mechanism before being translated into a testable empirical hypothesis. This approach is consistent with prior empirical M&A literature that emphasizes the role of transaction frictions and governance structures in shaping takeover outcomes.

Finally, in line with S. Rossi and Volpin (2004) and Erel et al. (2012), we explicitly account for cross-country institutional heterogeneity in our empirical specification. This is particularly important in the insurance sector, where regulatory regimes, capital requirements, and supervisory frameworks differ substantially across jurisdictions. Accordingly, we incorporate country fixed effects in the econometric models to ensure that estimated relationships are not driven by unobserved institutional differences across markets.

3.5. Hypotheses

This study examines the determinants of takeover outcomes by focusing on the factors that influence whether an acquisition is conducted as a hostile or non-hostile (friendly) transaction. Building on the theoretical framework developed in Section 3.4, and consistent with prior empirical M&A literature, we develop a set of testable hypotheses linking firm-, deal-, and governance-level characteristics to the likelihood of hostile takeovers. In particular, we focus on variables capturing financial structure, managerial incentives, bargaining frictions, and information asymmetry, all of which are expected to shape negotiation dynamics and acquisition strategies.

The following hypotheses are formulated and tested in this study (see also Tables A4 and A5 in the Appendix A):

- H1.** *A higher TD/TA ratio is expected to be negatively associated with the likelihood of hostile takeovers.*
- H2.** *Target management experience is expected to be positively associated with the likelihood of hostile takeovers.*
- H3.** *An increase in the target's book value is expected to be positively associated with the likelihood of hostile takeovers.*
- H4.** *Higher R&D expenditures by the bidder are expected to be positively associated with the likelihood of a hostile takeover.*
- H5.** *The presence of bid revisions is expected to be positively associated with the likelihood of hostile takeovers.*
- H6.** *The presence of premia is expected to be positively associated with the likelihood of hostile takeovers.*
- H7.** *Target management ownership is expected to be positively associated with the likelihood of hostile takeovers.*
- H8.** *The absence of compensation agreements is expected to be positively associated with the likelihood of hostile takeovers.*

Each hypothesis represents an empirically testable association between a specific explanatory variable and the probability that a deal is classified as hostile. These hypotheses are operationalized in the logit regression framework presented in Section 4.4, where the dependent variable is a binary indicator distinguishing hostile from non-hostile takeovers, and the explanatory variables correspond directly to the constructs outlined above.

Importantly, the hypotheses are formulated in terms of associations rather than strict causal effects. Given the cross-country and observational nature of the dataset, the empirical analysis identifies statistically significant correlates of hostile takeover activity, while acknowledging that potential endogeneity and unobserved heterogeneity may limit causal interpretation. This approach is consistent with established empirical M&A studies (e.g., S. Rossi & Volpin, 2004; Erel et al., 2012), which similarly emphasize association-based inference in the context of heterogeneous international deal environments.

Because several explanatory variables, particularly bid revisions and acquisition premia, arise during the acquisition process, potential endogeneity and reverse causality cannot be completely ruled out. Accordingly, the empirical analysis is interpreted as identifying statistical associations rather than causal determinants. The results should therefore be understood as showing which firm- and deal-level characteristics are associated with hostile takeover outcomes, rather than establishing that these variables cause hostility. This interpretation is also reflected in the robustness checks and limitations discussed later in the manuscript.

To test these hypotheses, we employ a binary logistic regression model because the dependent variable distinguishes between hostile and non-hostile takeover transactions. Logistic regression is the appropriate empirical approach for modelling dichotomous outcomes, as it estimates the probability that a transaction is classified as hostile conditional on a set of firm-, deal-, and governance-level characteristics. The model is estimated using maximum likelihood with heteroskedasticity-robust standard errors, while additional specifications incorporating country fixed effects and clustered standard errors are used as robustness checks to account for institutional heterogeneity across jurisdictions.

4. Tests and Regression Analysis

4.1. Multicollinearity Tests

Prior to estimating the baseline logit model, we conduct multicollinearity diagnostics to assess whether the explanatory variables exhibit linear dependence, which could inflate standard errors and distort coefficient stability. Variance Inflation Factors (VIFs) are used for this purpose, with values below the conventional threshold of 5 indicating that multicollinearity is not a concern.

The results, reported in Table A6 (Appendix A), indicate that all VIF values are well below the conventional threshold of 5, ranging from 1.1 (Presence of Premia) to 3.2 (R&D Increase). These values indicate that multicollinearity is not a concern and that the estimated coefficients are unlikely to be adversely affected by linear dependence among the explanatory variables. Overall, the diagnostic results confirm the robustness of the empirical model and support the reliability of the subsequent regression analysis by ensuring that estimated effects are not driven by redundancy or overlap among explanatory variables.

4.2. Logit Model

The empirical analysis is based on a sample of 754 insurance M&A transactions over the period 2008–2021, of which 262 are classified as hostile takeovers. Given that the dependent variable is binary—taking the value of 1 for hostile takeovers and 0 otherwise—we employ a logistic regression framework to estimate the probability that a transaction is classified as hostile conditional on a set of firm-, deal-, and governance-level characteristics. The logit model is statistically significant at the 1% level ($\text{Prob} > \chi^2$ is <0.001), with a likelihood ratio chi-square of 392.75 and a pseudo R^2 of 0.4032, indicating strong explanatory power for cross-sectional M&A outcomes. The results are reported in Table 3.

Table 3. Logit Model for the Dependent Variable “Hostile Takeover” and Independent Variables.

Hostile Takeover	Number of Observations = 754		Prob > chi2 = 0.0000	
	LR chi2(10) = 392.75		Pseudo R ² = 0.4032	
	Coefficient	Std. Err.	z	p Value
(X1) TD/TA Ratio	−0.0000251	0.0000518	−0.48	0.628
(X2) Target Management Experience	2.106678	0.2160012	9.75	<0.001 ***
(X3) Book Value Increase	2.195484	0.2815193	7.8	<0.001 ***
(X4) R&D Increase	0.9808865	0.2314023	4.24	<0.001 ***
(X5) Presence of Bid Revisions	1.321114	0.3504703	3.77	<0.001 ***
(X6) Number of Revisions	0.0648249	0.1894225	0.34	0.732
(X7) Presence of Premia	1.432475	0.3940873	3.63	<0.001 ***
(X8) Premia Percentage	−0.012093	0.118684	−0.1	0.919
(X9) Target Management Ownership	0.1247434	0.2508326	0.5	0.619
(X10) Absence of Compensations	−0.0974221	0.2216193	−0.44	0.66
Constant	−3.97604	0.3732215	−10.65	<0.001 ***

*** Significance at 99% confidence interval.

The findings show that several variables are statistically significant determinants of hostile takeover probability. In particular, Target Management Experience (X2), Book Value Increase (X3), R&D Increase (X4), Presence of Bid Revisions (X5), and Presence of Premia (X7) all exhibit positive and statistically significant coefficients at the 1% level. These results suggest that hostile takeovers are more likely in situations characterized by experienced target management, increases in firm valuation indicators, higher bidder investment in R&D, and observable negotiation frictions such as bid revisions and premia.

From a transaction cost and information asymmetry perspective, these findings are consistent with the interpretation that hostile bids emerge when negotiation frictions are high and when acquirers perceive that bilateral bargaining processes are unlikely to efficiently resolve valuation uncertainty. In the insurance sector, R&D expenditures often reflect investments in actuarial modeling, risk analytics, and digital underwriting systems, which may signal both strategic uncertainty and information gaps that intensify takeover competition.

In contrast, the results indicate that TD/TA Ratio (X1), Number of Revisions (X6), Premia Percentage (X8), Target Management Ownership (X9), and Absence of Compensation (X10) are statistically insignificant in the full specification. While some of these variables exhibit expected signs, their effects are not statistically distinguishable from zero once other covariates are included in the model. This finding is also theoretically informative. From a Transaction Cost Theory perspective, these variables may influence takeover negotiations indirectly or only under specific institutional or firm-level conditions that are not fully captured in the present model. For example, leverage may affect financing capacity without materially influencing negotiation hostility, while management ownership and compensation arrangements may operate differently across governance systems and regulatory environments. Similarly, once the presence of bid revisions is accounted for, the number of revisions may provide little additional explanatory power. Consequently, the absence of statistical significance should not be interpreted as evidence that these factors are universally unimportant, but rather that they do not exhibit an independent association with hostile takeover probability within the present international insurance sample.

Overall, the model results support the view that hostile takeover likelihood is primarily driven by managerial experience, valuation dynamics, innovation-related expenditures, and negotiation frictions rather than capital structure or ownership-based incentives alone. These findings are broadly consistent with prior empirical M&A literature emphasizing the role of information asymmetry, bargaining costs, and managerial behavior in shaping takeover outcomes.

4.3. Heteroskedasticity Test

Following the multicollinearity and association diagnostics presented in the previous sections, we further examine the presence of heteroskedasticity in the error structure of the regression model. Heteroskedasticity refers to the situation in which the variance of the error term is not constant but instead varies systematically with one or more explanatory variables. In the context of logistic regression and cross-sectional M&A data, this is a relevant concern, as deal-level heterogeneity and cross-country variation may induce non-constant variance in unobserved factors.

To formally test for heteroskedasticity, we employ the Breusch–Pagan test, which evaluates the null hypothesis of homoskedasticity (constant error variance) against the alternative hypothesis that the error variance is a function of one or more explanatory variables. The results are reported in Table A7 (Appendix A). The test yields a Chi-squared statistic of 61.46 with 10 degrees of freedom, which is statistically significant at the 1% level. Accordingly, we reject the null hypothesis of homoskedasticity and conclude that heteroskedasticity is present in the model residuals.

This result is not unexpected in the context of international M&A data, where heterogeneity in firm size, regulatory environments, and transaction structures can naturally generate non-constant variance in unobserved components. It indicates that the dispersion of residuals is systematically related to at least one of the explanatory variables, reinforcing the need for appropriate correction in the estimation strategy.

To ensure valid statistical inference in the presence of heteroskedasticity, all reported logit models are estimated with Huber–White heteroskedasticity-robust standard errors. This adjustment leaves the estimated coefficients unchanged but provides robust standard errors, *z*-statistics, and *p*-values that are consistent even when the assumption of constant variance is violated. Consequently, the statistical inference reported in Table 3 and the subsequent robustness analyses remains reliable. This adjustment corrects the estimated variance–covariance matrix without altering coefficient estimates, thereby ensuring that the reported *z*-statistics and *p*-values in Table 3 and subsequent tables remain reliable under heteroskedasticity.

In addition, as a further robustness check, we estimate an alternative specification using standard errors clustered at the acquirer-country level to account for potential within-country correlation in error terms. The results, reported in Table A12 (Appendix A), remain qualitatively and statistically consistent with the baseline findings, confirming the robustness of the empirical results across different error structures.

4.4. Robustness Analysis

Given that residual diagnostics do not indicate major distortions in model performance, we proceed with the regression analysis in which the nature of the acquisition (hostile versus friendly) is the dependent variable. It is important to note that the baseline specification excludes direct measures of toeholds and competing bidders due to lack of coverage in the dataset. While this omission may introduce potential omitted variable bias, we mitigate it by including proxies for information asymmetry and by conducting robustness checks with firm size and leverage (Appendix A Table A9). The results, reported in Appendix A Table A9, confirm that the main findings remain consistent. Moreover, consistent with prior evidence that toeholds and rival bidders are less common in regulated sectors such as insurance (Betton et al., 2009; Eckbo et al., 2020), the potential bias is expected to be less severe in this context.

For the cross-country dimension, we rely on pooled regressions with country fixed effects (Appendix A Table A10), which provide a more reliable test of institutional heterogeneity than country-by-country estimations. In the country fixed-effects specification,

countries represented by only a single observation do not contribute to the estimation of within-country effects and are therefore omitted automatically by the estimation procedure. Consequently, the effective sample size in the fixed-effects model may be smaller than that of the baseline pooled logit model, whereas all observations remain included in the baseline specification. Again, the dependent variable (Y) is binary and takes the value of 1 for hostile takeovers and 0 for friendly acquisitions. All regressions are estimated with heteroskedasticity-robust standard errors, and country-clustered standard errors (Appendix A Table A12) confirm the robustness of the main findings.

The principal regression results are presented in Table 3 and discussed in the preceding section. Because the dependent variable is binary, the pooled logit model constitutes the primary empirical specification used throughout the analysis. The robustness analyses reported in Appendix A (Tables A9, A10 and A12) demonstrate that the principal findings remain substantively unchanged across alternative model specifications, thereby strengthening confidence in the reported associations.

4.5. Fixed Effects Robustness

To ensure that our results are not driven by unobserved heterogeneity, we re-estimate the baseline models using country fixed effects, following S. Rossi and Volpin (2004) and Erel et al. (2012), who emphasize the importance of controlling for institutional differences in cross-border M&A analysis. The results, reported in Appendix A Table A10, indicate that the main findings remain robust. The estimated coefficients retain their signs and statistical significance, indicating that the baseline results are robust to the inclusion of country fixed effects.

In addition, we re-estimate the models after excluding transactions announced during the 2008–2009 global financial crisis and the 2020–2021 COVID-19 period. The results remain qualitatively unchanged, suggesting that the estimated relationships are not driven by crisis-specific market distortions. This reinforces the stability of the baseline findings across different macroeconomic environments.

This fixed-effects robustness step is particularly important given the geographical diversity of the sample. By incorporating country fixed effects, we control for time-invariant institutional and regulatory differences across jurisdictions, ensuring that the observed relationships are not driven by unobserved cross-country heterogeneity.

4.6. Sensitivity Analysis

We conduct a sensitivity analysis to examine the stability of the baseline results when key explanatory variables are systematically excluded from the model. This approach allows us to assess whether the remaining variables continue to explain variation in hostile takeover likelihood. Specifically, we exclude Target Management Experience, Book Value Increase, and Absence of Compensations, and re-estimate the model. The results are presented in Table A8 (Appendix A).

The sensitivity analyses reported in Appendix A Tables A8 and A9 indicate that the principal findings remain qualitatively unchanged after excluding selected explanatory variables and introducing additional firm-level controls. The consistency of the estimated coefficients across alternative specifications provides further evidence that the reported associations are robust and are not driven by a particular model specification.

5. Summary and Conclusions

This study examines the determinants of hostile takeovers in the insurance industry and provides evidence on the key factors influencing whether acquisitions occur through

friendly or hostile mechanisms. A central contribution of this paper is the explicit distinction between hostile and friendly takeovers within a global insurance-sector sample.

Our results show that hostile takeovers are systematically associated with Target Management Experience, increases in Book Value, bidder R&D expenditure, bid revisions, and the presence of premia. These findings suggest that hostility tends to emerge when negotiation frictions, valuation uncertainty, or managerial resistance increase transaction costs. By contrast, friendly takeovers are more likely when these frictions are absent or reduced.

It is important to note that our analysis does not compare takeover activity before and after the 2008 financial crisis. Instead, the study focuses exclusively on the post-crisis period, using 2008 as a structural reference point that motivates the sample design.

Taken together, these findings provide support for Hypotheses H2, H3, H4, H5, and H6, while Hypotheses H1, H7, and H8 are not supported by the empirical evidence. Overall, the results are broadly consistent with the Transaction Cost Theory framework developed in this study, indicating that variables associated with information asymmetry, managerial incentives, and negotiation frictions play a more important role in explaining takeover hostility than traditional governance or leverage characteristics. Accordingly, the empirical findings directly address the study's primary objective of identifying the determinants of hostile takeover activity in the international insurance sector.

The insignificance of leverage is consistent with the specific financial structure of insurance firms, where debt may reflect temporary liquidity management rather than financial distress. In particular, insurance firms may use borrowing as a form of pre-financing until premiums or reinsurance inflows are realized (Lekkerkerker & Peters, 1995). As a result, leverage does not necessarily capture financial weakness or bargaining constraints in this sector.

Similarly, the findings suggest that the presence of bid revisions and premia is more important than their intensity. Once revisions or significant premia appear, bidders may interpret them as indicators of negotiation frictions or escalating costs, which can trigger hostile strategies. In this sense, the decision to adopt a hostile approach appears to be driven more by the existence of bargaining friction than by its magnitude.

The insignificance of target management ownership and compensation can be explained by the distinctive governance structure of insurance firms. In this industry, managerial influence is often strongly linked to relational capital and control over client portfolios, which are central to revenue generation. As a result, formal ownership stakes and compensation arrangements may play a less decisive role in shaping takeover outcomes than in other industries.

From a theoretical perspective, these findings are broadly consistent with Transaction Cost Theory, which suggests that when governance mechanisms such as ownership and compensation fail to effectively reduce transaction costs, their explanatory power over takeover outcomes diminishes. Accordingly, these variables do not systematically influence hostile takeover likelihood in the insurance sector.

From a policy perspective, the results highlight the importance of valuation transparency and improved disclosure practices in reducing informational frictions that may contribute to hostile takeovers. Regulators and practitioners should also be attentive to early signals of negotiation breakdown, such as repeated bid revisions or rapidly increasing premia, as these may indicate a heightened probability of hostile acquisition.

Finally, several limitations should be acknowledged. First, the study relies on observational transaction-level data, which allow the identification of statistically significant associations but do not permit definitive causal inference. Second, although the dataset is compiled from multiple internationally recognized databases, certain deal-

specific characteristics—including toehold positions, competing bidders, and proxy contest activity—were unavailable on a sufficiently consistent basis and therefore could not be incorporated into the empirical analysis. Third, information asymmetry, a central concept underlying Transaction Cost Theory, cannot be directly observed and is instead proxied through variables such as R&D expenditure, bid revisions, and acquisition premia. While these proxies are well supported in the literature, they cannot capture every dimension of informational frictions. Finally, because the analysis focuses exclusively on insurance-sector mergers and acquisitions, the findings may not be directly generalizable to other industries with different institutional and operational characteristics. Future research could extend the present study in several directions. First, future studies may incorporate additional deal-specific variables, including toehold positions, competing bidders, ownership concentration, and board characteristics, as more comprehensive international datasets become available. Second, richer measures of information asymmetry, such as analyst following, bid–ask spreads, or disclosure quality, could provide a more direct test of the mechanisms proposed by Transaction Cost Theory. Third, future research could extend the cross-country analysis by examining differences across legal origins, shareholder protection regimes, insurance regulatory frameworks, and regional institutional environments. Such analyses would complement the pooled country fixed-effects approach adopted in this study and provide a more detailed understanding of how institutional settings influence hostile takeover activity. Finally, the application of causal identification strategies, such as quasi-experimental designs or natural experiments, may further strengthen inference regarding the determinants of takeover hostility. Overall, this study contributes to the M&A literature by highlighting the specific factors associated with hostile takeovers in the insurance sector and demonstrating that negotiation dynamics and informational frictions are more important determinants than traditional financial structure variables.

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Appendix A

Table A1. Summary of Major Findings for Insurance-related Studies.

Set 1: Value, Performance, and Growth		Set 3: R&D, Information, and Technology	
Author	Nature	Author	Nature
(Roe, 1990)	T	(Stein, 1988)	E
(Heldenbergh et al., 2006)	T	(Pugh et al., 1992)	E
(Calandro et al., 2007)	T	(Cummins et al., 1999)	TE
(Chan, 2009)	TE	(Barros et al., 2010)	TE
(Nissim, 2010)	T	(Raman et al., 2013)	E
(Lole, 2012)	E	(F. Rossi & Cebula, 2015)	E
(Cummins et al., 2015)	E	Set 4: Role of Managers and Employees	
(B. J. Kim & Park, 2016)	E	Author	Nature
(Pervan et al., 2015)	E	(Mayers et al., 1997)	E
(Bindabel, 2020)	T	(Boubakri et al., 2008)	E
(Sharma, 2020)	E	(Yeh, 2013)	E
(Liang et al., 2021)	E	(Hung & Wu, 2016)	E
(Olurotimi et al., 2021)	E	(Kangetta & Kirai, 2017)	E
Set 2: Leverage, Costs, Premiums, and Regulation		Set 5: Efficiency and Performance	
Author	Nature	Author	Nature
(Zanghieri, 2009)	T	(Cummins et al., 1999)	TE
(Kramaric, 2012)	E	(Borges et al., 2008)	E
(Glowalla & Sunyaev, 2013)	T	(Cummins & Xie, 2008)	T
(Kessler, 2013)	T	(Fenn et al., 2008)	E
(Okura & Yanase, 2013)	T	(Al-Amri et al., 2012)	E
(Mühlnickel & Weiß, 2015)	E	(C. Kim et al., 2020)	E
(Jakubik & Zafeiris, 2018)	T		
(Sukhorukova & Chistiakova, 2018)	T		

“T” refers to theoretical study; “E” refers to empirical study; “TE” refers to theoretical study with empirical evidence.

Table A2. Summary Table for all Chi-squared Tests with corresponding *p*-Values, PHI, and Cramér’s V.

	Test 1	Test 2	Test 3	Test 4
Exact Significance (2-sided)	<0.001 ***	0.095 *	<0.001 ***	0.043 **
Exact Significance (1-sided)	<0.001 ***	0.056 *	<0.001 ***	0.023 **
PHI Value	0.192	0.061	0.365	0.075
PHI Approximate Significance	<0.001 ***	0.093 *	<0.001 ***	0.039 **
Cramér’s V Value	0.192	0.061	0.365	0.075
Cramér’s V Approximate Significance	<0.001 ***	0.093 *	<0.001 ***	0.039 **

*** Significance at 99% confidence interval; ** Significance at 95% confidence interval; * Significance at 90% confidence interval.

Table A3. *p*-Values of Difference of Means (DoM) Tests Assuming Equal and Unequal Variances.

	t-Test: Two-Sample Assuming Unequal Variances		z-Test: Two Sample for Means	
	P(T <= t) One-Tail	P(T <= t) Two-Tail	P(Z <= z) One-Tail	P(Z <= z) Two-Tail
DoM Test 1	0.042985476 **	0.085970952 *	0.042882706 **	0.085765412 *
DoM Test 2	<0.001 ***	<0.001 ***	<0.001 ***	<0.001 ***
DoM Test 3	<0.001 ***	<0.001 ***	<0.001 ***	<0.001 ***
DoM Test 4	<0.001 ***	<0.001 ***	<0.001 ***	<0.001 ***
DoM Test 5	<0.001 ***	<0.001 ***	<0.001 ***	<0.001 ***
DoM Test 6	<0.001 ***	<0.001 ***	<0.001 ***	<0.001 ***
DoM Test 7	<0.001 ***	<0.001 ***	<0.001 ***	<0.001 ***

*** Significance at 99% confidence interval; ** Significance at 95% confidence interval; * Significance at 90% confidence interval.

Table A4. Operational Definitions and Measurement of Variables.

Variable	Operational Definition	Measurement	Expected Sign	Hypothesis
X1—TD/TA Ratio	Target leverage	Total debt ÷ Total assets (%)	—	H1
X2—Target Management Experience	CEO/Top management experience	Number of years in executive position before acquisition announcement	+	H2
X3—Book Value Increase	Growth in target's book value	Percentage change in book value from one year before the announcement to the month preceding the transaction	+	H3
X4—R&D Increase	Bidder R&D intensity	Percentage increase in bidder R&D expenditures before acquisition	+	H4
X5—Presence of Bid Revisions	Whether the bid was revised	Dummy variable (1 = revision, 0 = no revision)	+	H5
X6—Number of Bid Revisions	Number of revisions	Count variable	+	H5
X7—Presence of Acquisition Premium	Whether premium was offered	Dummy variable equal to 1 if the transaction is completed at a positive reported premium, and 0 otherwise.	+	H6
X8—Acquisition Premium (%)	Size of premium	Premia Percentage (X8) measures the reported takeover premium (expressed as a percentage) for each transaction. A positive value indicates that the transaction was completed at a premium, regardless of magnitude. The variable is interpreted as the size of the reported premium, while Presence of Premia (X7) captures whether any positive premium was reported.	+	H6
X9—Target Management Ownership	Equity ownership	Percentage of target shares held by management	+	H7
X10—Absence of Compensation Agreement	Compensation arrangement	Dummy (1 = no compensation agreement, 0 = agreement exists)	+	H8

Table A5. Key Insights for Hypothesis Formation on Hostile Takeovers Using Transaction Cost Theory.

Hypothesis	Variable	Key Insight
H1	TD/TA Ratio (Debt-to-Total Assets)	Firms with higher debt levels may discourage hostile bids, as acquirers seek to avoid the complexities and risks of integrating highly leveraged targets. Acquirers prefer targets with lower financial uncertainty.
H2	Target Management Experience	Acquirers may pursue hostile takeovers if target management has prior M&A experience (which signals readiness for restructuring). Experienced target management may attract hostile bids due to exploitation or over negotiation.
H3	Book Value Increase	An increase in a target's book value increases the likelihood of a hostile takeover because higher-value firm-specific resources become more attractive to potential acquirers.
H4	R&D Increase	Acquirers in innovation-intensive sectors pursue hostile takeovers to internalize specialized assets, avoiding high costs and uncertainties of external transactions. High bidder R&D spending increases likelihood of hostility.
H5	Bid Revisions	Repeated bid revisions lead to frustration and higher transaction costs, making hostile takeovers more attractive. The presence of bid revisions signals higher deal complexity, potentially driving acquirers to pursue hostility.
H6	Presence of Premia	Higher acquisition premia increase the cost of negotiated acquisitions and may therefore be associated with a greater likelihood of hostile takeovers as bidders seek to limit further negotiation costs.
H7	Target Management Ownership	Management ownership can increase transaction costs as managers may resist offers misaligned with their interests. Hostile bids are more likely when target management has ownership, as acquirers expect resistance.
H8	Absence of Compensations	Absence of compensations aligns with acquirer's cost-saving strategies, However, when target managers lack compensations, they have less incentive to cooperate. This may lead to hostile takeovers.

Table A6. Variance Inflation Factors (VIF) for the Explanatory Variables.

Variable	VIF
TD/TA Ratio	1.8
Target Management Experience	2.1
Book Value Increase	1.5
R&D Increase	3.2
Presence of Bid Revisions	1.3
Number of Revisions	2.4
Presence of Premia	1.1
Premia Percentage	2.0
Target Management Ownership	1.9
Absence of Compensations	1.4

Table A7. Breusch–Pagan Heteroskedasticity Test for Hostile Takeovers.

H0:	Constant variance
Variables:	All Independent Variables (X1, X2, X3, X4, X5, X6, X7, X8, X9, and X10)
chi2(10) =	61.46
Prob > chi2 =	<0.001 ***

*** Significance at 99% confidence interval.

Table A8. Sensitivity Test with the Exclusion of Target Management Experience, Book Value Increase, and Absence of Compensations.

Variable	Coefficient	Std. Error	z	P > z
Constant	−3.5021	0.412	−8.499	<0.001 ***
TD/TA Ratio	0.0157	0.702	0.022	0.982
R&D Increase	0.7913	0.278	2.846	0.004 ***
Presence of Bid Revisions	1.6624	0.243	6.837	<0.001 ***
Presence of Premia	1.8952	0.241	7.865	<0.001 ***

*** Significance at 99% confidence interval.

Table A9. Sensitivity Tests Including Additional Firm-level Controls (Target Size and Acquirer Leverage) and Excluding Selected Baseline Variables (Target Management Experience, Absence of Compensations, and Book Value Increase).

Variable	Coefficient	Std. Error	z	P > z
Constant	−3.5021	0.412	−8.499	<0.001 ***
TD/TA Ratio	0.0157	0.702	0.022	0.982
Significant R&D Increase	0.7913	0.278	2.846	0.004 ***
Presence of Bid Revisions	1.6624	0.243	6.837	<0.001 ***
Presence of Premia	1.8952	0.241	7.865	<0.001 ***
Target Size	0.5624	0.352	1.598	0.11
Acquirer Leverage	−0.2371	0.482	−0.492	0.622

*** Significance at 99% confidence interval.

Table A10. Formal Cross-country Analysis: Pooled Logit Regression with Country Fixed Effects (Controls for Institutional Heterogeneity).

Variable	Baseline Coef. (SE)	Country FE Coef. (SE)
TD/TA Ratio	−0.000027 (0.000054)	−0.000041 (0.000064)
Target Mgmt Experience	2.126 * (0.219)	2.261 * (0.234)
Book Value Increase	2.108 * (0.280)	2.338 * (0.308)
R&D Increase (%)	0.288 * (0.058)	0.288 * (0.062)
Presence of Revisions	1.317 * (0.351)	1.425 * (0.378)

* Significance at 90% confidence interval. Note: The dependent variable is Hostile Takeover (dummy). The country's fixed effects based on Target Nation are included in column two (2). Country dummy coefficients and other control variables (e.g., Number of Revisions, Premia, Ownership, and Compensation) are omitted for brevity. The standard errors are listed in parentheses. This specification includes country fixed effects to account for institutional and regulatory heterogeneity across jurisdictions. This pooled approach provides a more reliable cross-country test than country-by-country regressions with limited sub-sample.

Table A11. Descriptive Statistics of Premium Percentage.

Statistic	Value
Mean	0.785
Median	0.000
Std. Dev.	1.411
25th Percentile	0.000
75th Percentile	0.980
Min	0.000
Max	9.870

Table A12. Robustness check with country-clustered standard errors.

Variable	Coef.	Std. Err.	z	P > z
Constant	−3.6043	0.4643	−7.7623	<0.001 ***
TD/TA Ratio (M\$)	0	0	−0.8957	0.3704
Target Management Exp.	2.1211	0.1847	11.4852	<0.001
Book Value Increase	2.1122	0.2464	8.5709	<0.001
Δ R&D %	0.2636	0.129	2.043	0.0411 **
R&D Increase (dummy)	0.1204	0.6019	0.2	0.8415
Presence of Revisions	1.3196	0.2694	4.8984	<0.001
Number of Revisions	0.0461	0.1413	0.3266	0.744
Presence of Premia	1.4716	0.5141	2.8625	0.0042 ***
Premia %	−0.0444	0.1357	−0.3272	0.7435
Management Ownership	0.1015	0.1994	0.5093	0.6105
Absence of Compensations	−0.0973	0.1549	−0.6281	0.53

Note: Country-clustered standard errors yield consistent results. *** Significance at 99% confidence interval; ** Significance at 95% confidence interval.

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