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Ownership Concentration and Extreme Downside Risk: The Mediating Role of Landbanking in Property Development Firms

Ardo Ryan Dwitanto[1], Adler Haymans Manurung[2], Nera Marinda Machdar[3], Wastam Wahyu Hidayat[4]

Abstract

Purpose

This study examines how controlling ownership and landbanking intensity jointly relate to firms' exposure to extreme downside risk in listed property development firms in Indonesia. It extends corporate governance research by focusing on tail-risk outcomes and by identifying strategic asset allocation as a key mechanism linking ownership structure to risk.

Design/methodology/approach

Using panel data of publicly listed property firms in Indonesia, extreme downside risk is measured by Expected Shortfall at the 5% level (ES5). Panel regression models are used to examine the relationships among controlling ownership, landbanking intensity, and tail-risk exposure, while mediation analysis is employed to evaluate the indirect effect of controlling ownership through landbanking decisions.

Findings

The results show that controlling ownership is negatively associated with both extreme downside risk and landbanking intensity, whereas landbanking is negatively associated with tail-risk exposure. Mediation analysis provides evidence of partial mediation, indicating that controlling shareholders enhance firms' resilience to severe market downturns both directly and indirectly through disciplined landbanking strategies.

Research limitations/implications

The analysis relies on financial statement proxies to measure landbanking, which may not fully capture the qualitative or spatial characteristics of land reserves. Future research could incorporate more detailed measures, such as land size, location and development timelines, and examine whether these relationships hold across different institutional contexts.

Practical implications

The findings suggest that investors, managers and policymakers should consider ownership structure and landbanking strategies jointly when assessing firms' vulnerability to extreme market downturns. Governance mechanisms that promote disciplined asset allocation may enhance firms' resilience to adverse shocks.

Originality/value

This study contributes by linking corporate governance to real estate asset management to explain firms' exposure to extreme downside risk. It conceptualizes landbanking as a governance-mediated real options mechanism and demonstrates how ownership structures shape firms' resilience through strategic asset allocation.

[1] IPMI Institute, Jakarta, Indonesia
[2] Faculty of Economics and Business, Universitas Bhayangkara Jakarta Raya, Jakarta, Indonesia.
[3] Faculty of Economics and Business, Universitas Bhayangkara Jakarta Raya, Jakarta, Indonesia
[4] Faculty of Economics and Business, Universitas Bhayangkara Jakarta Raya, Jakarta, Indonesia

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Introduction

Real estate companies operate in highly capital-intensive, asset-specific environments that are subject to significant cyclical fluctuations. Unlike many industrial firms, which can quickly adjust production or redeploy assets, property developers invest heavily in land acquisition and long-term projects that depend significantly on macroeconomic conditions, financing options, and regulatory policies. Since real estate assets are illiquid and difficult to redeploy, negative market shocks can lead to ongoing financial strain and substantial downside risks for firms in this sector. During cyclical downturns, asset values may decrease, credit conditions may tighten, and projects may be delayed, all of which increase the likelihood of severe losses (Liu, Liu, and Zhang, 2019). Therefore, understanding what drives extreme downside risks is vital for investors, managers, and policymakers seeking to maintain the stability and sustainability of the real estate market.

Traditional real estate research primarily focuses on firm valuation, capital structure, and operational performance (Liow, 2010; Ooi and Sirmans, 2004). Although these areas offer valuable insights into property firm behavior, they may not fully capture a firm's vulnerability during severe market downturns. Standard performance metrics, such as profitability ratios or market valuation ratios, tend to reflect average outcomes rather than extreme negative events. In contrast, tail risk measures aim to quantify potential losses in worst-case scenarios within the return distribution. Expected Shortfall, a coherent risk metric that averages losses above a specific Value-at-Risk level, is a useful tool for assessing extreme downside risks (Artzner et al., 1999; Acerbi and Tasche, 2002). Since tail risk has proven to be economically significant in financial markets and influences asset pricing (Kelly and Jiang, 2014), examining the factors that affect extreme downside risk can offer insights into firms' financial fragility and resilience.

Research indicates that corporate ownership structures significantly influence a company's strategic choices and risk profiles. Agency theory suggests that conflicts between managers and shareholders can cause inefficient investments and risky behaviors, especially when oversight is lacking (Jensen and Meckling, 1976). Larger ownership shares can mitigate these issues by improving supervision and aligning managers' interests with those of major shareholders (Shleifer and Vishny, 1997). Yet, the effect of ownership concentration on firm risk is nuanced. Controlling shareholders might promote risk discipline and safeguard capital, but they could also pursue aggressive investments driven by their incentives and risk tolerance (John, Litov, and Yeung, 2008). Consequently, exploring how controlling ownership influences firm risk remains a key empirical concern, particularly in industries with substantial capital requirements.

These governance factors are especially crucial in emerging markets, where ownership tends to be concentrated, and corporate governance systems may be less developed. In such environments, controlling shareholders usually hold significant influence over corporate strategy and financial decisions (Claessens, Djankov, and Lang, 2000). Their impact can shape investment plans, funding methods, and risk management. In property development firms, where decisions involve large, long-term investments, the strategic goals of controlling shareholders can greatly influence the company's vulnerability to market downturns.

Property development companies depend heavily on strategic land reserves. Landbanking—the practice of acquiring and holding undeveloped land for future projects—is a key strategic decision that affects their development pipelines, financing requirements, and market risk exposure. These land reserves offer flexibility, enabling developers to modify project timing and size in response to market changes. However, maintaining large land inventories can also drain substantial financial resources and increase vulnerability to market downturns if property values fall or lending conditions tighten. Therefore, landbanking requires a careful balance between operational flexibility and financial risk.

Although important, the relationship between corporate governance and landbanking strategies has not been thoroughly explored in real estate research. Existing studies have focused on how land acquisition and development timing affect valuation (Ooi and Sirmans, 2004; Lu and Hwang, 2015), but there is limited investigation into how ownership structures influence landbanking choices and how these decisions impact a company's vulnerability to extreme downside risk. Understanding this

governance–strategy link is especially vital in property markets characterized by cyclic fluctuations and ownership concentration.

This study tackles this gap by examining how controlling ownership affects a firm's exposure to severe downside risk, both directly and indirectly through landbanking intensity. It considers landbanking a strategic link connecting governance structures to risk outcomes, grounded in corporate governance theory and strategic asset management in real estate markets. Using panel data from publicly listed Indonesian property developers and measuring extreme downside risk with Expected Shortfall at the 5 percent tail level (ES5), the study investigates three key questions: whether controlling ownership influences extreme downside risk, whether ownership concentration affects landbanking activity, and whether landbanking functions as a mediator through which governance structures impact firms' tail-risk exposure.

The Indonesian property market offers a suitable context for this research. In emerging economies like Indonesia, concentrated ownership and rapidly evolving regulations influence corporate governance and strategic choices. These markets often experience sharp boom-and-bust cycles, making resilience in downturns essential for companies and investors. Analyzing how ownership concentration and landbanking strategies jointly affect the risk of substantial losses deepens our understanding of governance, strategy, and risk management in the real estate industry.

This study enhances the property management literature by highlighting the extreme downside risk relative to traditional performance metrics. It extends previous research by linking ownership structure to tail-risk exposure via strategic landbanking, merging ideas from corporate governance and property asset management. The study shows that tail-risk exposure is a crucial performance aspect for real estate firms and frames landbanking as a governance-driven real options strategy that allows controlling shareholders to shape strategic flexibility and risk. Moreover, by examining landbanking's mediating role, the research reveals how ownership structures influence firms' resilience during market downturns through strategic asset management.

The following section outlines the theoretical framework and develops hypotheses on the relationships among controlling ownership, landbanking, and extreme downside risk.

Literature Review and Hypothesis Development

Controlling Ownership and Extreme Downside Risk

Corporate governance theory emphasizes the impact of ownership structure on managerial incentives, strategic choices, and a company's risk level. According to agency theory, conflicts between managers and shareholders can lead to inefficient investments and risky actions if oversight is inadequate (Jensen and Meckling, 1976). In firms with dispersed ownership, shareholders often struggle to monitor managers effectively, allowing managers greater autonomy to pursue projects that may not benefit long-term value.

In contrast, ownership concentration can reduce agency problems by improving oversight and aligning managerial choices with the interests of controlling shareholders (Shleifer and Vishny, 1997). This governance method is especially important in emerging markets, where external oversight and institutional safeguards are often weaker. In these settings, controlling shareholders usually exert significant influence over strategic and financial decisions, including investment strategies and risk management (Claessens et al., 2000). Since controlling shareholders typically hold large and less diversified stakes, they face higher firm-specific risks and thus have stronger incentives to prevent actions that could cause serious losses.

However, the relationship between ownership concentration and firm risk is not necessarily negative. Previous research shows that controlling shareholders may also pursue aggressive investment strategies or seek private benefits of control, thereby increasing the firm's risk exposure (John et al., 2008). This suggests that the effect of ownership concentration on risk depends on the balance between monitoring incentives and strategic risk-taking behavior.

In asset-heavy industries like property development, the link between governance and risk becomes especially critical. Property developers undertake long-term, capital-intensive projects that are heavily influenced by market cycles. These investments are mostly irreversible and often financed with significant leverage, which heightens companies' vulnerability during market downturns. In such circumstances, governance systems that focus on monitoring and strategic discipline are likely to be essential in minimizing exposure to severe negative outcomes.

Extreme downside risk measures a company's vulnerability to significant losses in the worst-case scenarios of return distribution. Unlike traditional risk measures that capture overall volatility, tail-risk metrics specifically focus on the severity of losses during extreme market declines. For property development firms that depend heavily on illiquid assets and long development cycles, understanding exposure to extreme downside risk is particularly vital for assessing financial stability.

Recent developments in the asset-pricing literature highlight that firm-level risk traits can affect exposure to downside risks priced in capital markets. Specifically, tail-risk measures reflect firms' vulnerability to rare but severe adverse events that are not captured by traditional volatility metrics (Kelly and Jiang, 2014). Related studies show that downside risk is an important determinant of asset prices, as investors require compensation for exposure to adverse return realizations (Post and van Vliet, 2006). Furthermore, investors exhibit preferences over downside risk and higher-order moments of return distributions, implying that assets exposed to negative tail events tend to command risk premia (Ang et al., 2006; Kraus and Litzenberger, 1976).

This suggests that a firm's exposure to extreme downside risk affects not only its internal financial stability but also its valuation in capital markets. By limiting managerial risk-taking and promoting long-term stability, ownership concentration can therefore decrease a firm's exposure to such priced downside risks, ultimately increasing firm value.

Overall, these arguments suggest that monitoring and aligning incentives through ownership control probably outweigh any risks associated with property development firms. As a result, controlling shareholders are likely to limit the company's exposure to major downside risks.

An increasing body of finance research indicates that the ownership structure significantly impacts firm risk. It has been shown that governance mechanisms shape corporate risk-taking behaviors by influencing managerial incentives and the rigor of monitoring (John et al., 2008; Faccio et al., 2011). Evidence from emerging markets further supports this relationship, showing that ownership concentration is closely associated with firms' risk-taking behavior and performance outcomes (Tran and Le, 2020). Additionally, Boubakri et al. (2013) and Paligorova (2010) find that higher ownership concentration tends to lead to more conservative corporate strategies and reduced risk exposure. Building on this, research on tail risk highlights the critical need to analyze extreme downside events, particularly regarding valuation and financial stability (Acharya et al., 2017).

H1: Controlling ownership is negatively associated with extreme downside risk.

Controlling Ownership and Landbanking Intensity

Landbanking involves acquiring and holding undeveloped land for future projects, serving as a strategic move for property developers. Unlike liquid assets, land reserves represent long-term commitments that impact a company's growth prospects, financial health, and response to market fluctuations. Given that land purchases often demand substantial capital and financing, choosing to landbank significantly affects a firm's risk level and strategic positioning in property markets.

From a resource-based view, land reserves are strategic assets that support a company's long-term competitive advantage by enabling the development of future project pipelines (Wernerfelt, 1984; Barney, 1991). Companies with large landbanks may benefit from increased flexibility in project timing and the ability to take advantage of favorable market conditions. However, landbanking also involves significant trade-offs. Holding large land reserves ties up capital in illiquid assets and may increase reliance on external financing, thereby exposing companies to financial constraints and market downturns.

Ownership structure significantly influences these strategic trade-offs. Controlling shareholders usually have considerable influence over capital allocation decisions, such as land acquisition and development plans. From an agency perspective, concentrated ownership can reduce overinvestment by enforcing discipline on managerial choices and preventing the buildup of long-term assets that do not add to the firm's value (Jensen, 1986). Since controlling shareholders often hold large, undiversified stakes, they tend to be more sensitive to downside risk and may prefer more cautious landbanking strategies.

At the same time, controlling shareholders may support landbanking if it enhances long-term strategic positioning. In property markets with regulatory restrictions and limited land supply, early land acquisition can secure important development opportunities. This shows that landbanking decisions

balance growth strategies and financial discipline, shaped by the incentives and risk preferences of controlling owners.

Previous studies suggest that ownership concentration significantly influences firms' investment and asset allocation strategies. Anderson and Reeb (2003) and Villalonga and Amit (2006) show that concentrated ownership affects long-term strategic choices and company performance. La Porta et al. (1999) also highlight the strong control that dominant shareholders have over corporate policies, while Harford (1999) and Richardson (2006) demonstrate that governance structures shape investment behavior and the tendency to overinvest. In asset-heavy sectors like property development, these governance effects are likely to extend to landbanking decisions, where controlling shareholders may restrict excessive land accumulation to lower financial risk.

H2: Controlling ownership is negatively associated with landbanking intensity.

Landbanking and Extreme Downside Risk

Property development typically follows a cyclical pattern, driven by macroeconomic factors such as interest rates, credit availability, and economic growth. When the market is expanding, increasing property prices and high demand usually motivate firms to ramp up development and land acquisition. Conversely, in downturns, declining property values and stricter financing conditions can place substantial financial strain on companies.

Extreme downside risk indicates a company's susceptibility to highly adverse outcomes. Expected Shortfall, recognized as a coherent risk measure, computes the average loss exceeding a certain threshold, aiding in evaluating tail risk exposure (Artzner et al., 1999; Acerbi and Tasche, 2002). By focusing on the worst negative returns, Expected Shortfall provides a more comprehensive view of downside risk than conventional volatility metrics.

The link between landbanking intensity and extreme downside risk can be explained by the interaction between strategic flexibility and financial constraints in asset-heavy companies. From a real options perspective, landbanking enables property developers to choose when to develop properties under uncertain conditions. As Titman (1985) explains, undeveloped land has an option value because firms can delay irreversible investments until market conditions improve. This flexibility helps developers avoid starting projects during tough market conditions, thereby reducing their risk of severe negative outcomes.

However, alternative perspectives argue that excessive landbanking can make firms more vulnerable to severe downside risk. From a corporate finance viewpoint, large investments in long-term assets can create financial rigidity by locking up capital and limiting a firm's ability to adjust its asset base during tough market conditions (Myers, 1977). Additionally, from an agency perspective, accumulating substantial land reserves may indicate overinvestment, as firms allocate excess resources to long-horizon assets that may not necessarily maximize firm value (Jensen, 1986). Such capital commitments can increase leverage and worsen losses when property prices fall.

In addition to real options considerations, real estate assets exhibit distinctive financial characteristics that shape firms' risk exposure. Real estate markets are closely linked to capital markets, and asset values are influenced by broader financial conditions and investor sentiment. Empirical evidence suggests that real estate returns are partially integrated with stock markets, particularly during periods of economic stress, which may amplify firms' exposure to systemic shocks (Ling and Naranjo, 1999). At the same time, the illiquid nature of land and development assets limits firms' ability to rapidly adjust their asset base in response to adverse conditions.

Taken together, these perspectives indicate that landbanking has both flexibility-enhancing and risk-increasing features. While real options theory emphasizes the importance of land reserves for managing uncertainty, corporate finance and agency theories highlight the potential costs of capital commitment and overinvestment. Therefore, the overall impact of landbanking on extreme downside risk remains an empirical question. However, in property development settings where timing flexibility is crucial, the value of landbanking outweighs its associated costs.

From a risk measurement perspective, the implications of landbanking are especially relevant when considering extreme downside outcomes rather than average performance. Unlike traditional risk measures like volatility, extreme downside risk captures a firm's exposure to rare but severe adverse events. In this context, the flexibility that landbanking offers becomes particularly valuable. By enabling firms to delay or reduce development activities during periods of market stress, land reserves can help

mitigate potential losses in worst-case scenarios. However, if landbanking results in excessive capital commitments and financial inflexibility, it may worsen losses precisely when market conditions worsen sharply. Therefore, the impact of landbanking on extreme downside risk reflects how well firms utilize their asset base to withstand low-probability but high-impact shocks.

In real estate markets, the value of the flexibility embedded in landbanking is particularly important given demand uncertainty, regulatory constraints, and cyclical fluctuations in property prices. Developers often face timing decisions about when to initiate, delay, or scale projects, and land reserves provide a mechanism to exercise these options. As a result, landbanking can be viewed not only as a passive asset holding but also as an active strategic tool that enables firms to manage uncertainty and mitigate downside exposure.

Previous studies further show that land and development assets play a critical role in shaping firm risk and valuation (Ling and Ryngaert, 1997; Hartzell et al., 2006). In real estate firms, a substantial portion of firm value is tied to underlying property and land holdings, which are inherently long-term and subject to market cycles. Ling and Ryngaert (1997) demonstrate that valuation uncertainty surrounding real estate assets can significantly influence investor perceptions and pricing, particularly when asset values depend on future development outcomes. Similarly, Hartzell et al. (2006) show that governance and investment decisions in real estate firms directly affect capital allocation across property assets, thereby shaping both firm value and risk exposure.

From a real estate finance perspective, land assets are long-term, capital-heavy investments whose value depends on market timing and development conditions. As highlighted in key real estate analysis frameworks, managing these assets involves balancing growth opportunities with financial risk and liquidity limitations (Geltner et al., 2007). Since land and development assets are usually illiquid and indivisible, firms face constraints on adjusting their asset portfolios during downturns, which can increase their vulnerability to adverse shocks. At the same time, the timing flexibility built into development assets lets firms delay or restructure projects in response to unfavorable market conditions.

Taken together, these characteristics suggest that landbanking plays a dual role in determining firm risk. While excessive land accumulation may increase financial rigidity and exposure to downturns, appropriately managed land reserves can provide strategic flexibility that mitigates exposure to extreme downside outcomes. This reinforces the view that landbanking is not merely a passive holding decision but a strategic choice with direct implications for firms' exposure to extreme downside risk.

H3: Landbanking intensity is negatively associated with extreme downside risk.

The Mediating Role of Landbanking

Governance structures influence firm outcomes both directly and indirectly through strategic decision-making. In property development companies, controlling shareholders often play a key role in shaping long-term investment policies and asset allocation choices. Specifically, landbanking is a crucial strategic decision that impacts a firm's development capacity, financial flexibility, and exposure to market cycles. Therefore, landbanking acts as a natural channel through which governance structures can affect a firm's risk profile.

If ownership concentration influences firms' landbanking choices, and landbanking, in turn, affects firms' vulnerability to extreme downward risk, then landbanking can be seen as a mediating mechanism linking governance structures to tail-risk outcomes. This viewpoint broadens the analysis beyond direct governance–risk relationships by highlighting the strategic pathways through which controlling shareholders influence firms' resilience to adverse market conditions. In this context, landbanking represents a governance-mediated real options mechanism through which firms control development timing and downside exposure.

Previous studies show that governance mechanisms influence firm outcomes through intermediate strategic decisions. Harford et al. (2008) and Chen et al. (2007) demonstrate that governance affects corporate investment and financial policies, while Almeida et al. (2004) highlight the role of financial constraints in shaping investment behavior. Similarly, Biddle et al. (2009) and Francis et al. (2013) show that governance influences resource allocation efficiency and firm risk through multiple channels. Within this framework, landbanking can be viewed as a strategic mechanism through which controlling ownership affects firms' exposure to extreme downside risk.

This mediation framework aligns with previous research highlighting that governance structures affect firm outcomes through strategic decision-making and intermediary mechanisms (Baron and Kenny, 1986; Preacher and Hayes, 2008; Wernerfelt, 1984; Barney, 1991). Consequently, this study proposes the following hypothesis:

H4: Landbanking intensity partially mediates the relationship between controlling ownership and extreme downside risk.

Research Methods

Research Design and Sample

This study uses a quantitative, explanatory approach with panel data analysis to examine how governance, strategy, and risk are interrelated in Indonesian listed property companies. The aim is to assess the direct impact of controlling ownership on extreme downside risk and the indirect impact mediated through landbanking intensity.

The sample includes publicly listed property development companies on the Indonesia Stock Exchange (IDX). A purposive sampling method was used to ensure data consistency and comparability. Firms qualified if they (1) had been continuously listed since 2013, (2) had not been delisted or under extended trading suspension, (3) maintained their industry classification within the property sector, and (4) provided complete financial, ownership, and stock return data.

Using these criteria, 19 firms were selected. From 2013 to 2023, the dataset includes 209 firm-year observations, forming a balanced panel. This period features several phases of the Indonesian property cycle: expansion, regulatory tightening, and the COVID-19 downturn, which allows for an assessment of governance impacts under different market conditions.

Financial and ownership data were collected from annual reports and IDX disclosures, while daily stock returns and macroeconomic data were sourced from publicly available financial databases.

Panel data analysis is especially effective for examining the governance–strategy–risk connection in this research. It combines cross-sectional and time-series data, enabling the study to account for unobserved firm-specific traits that could influence risk exposure but remain consistent over time. These traits might include management practices, corporate culture, or long-term strategic goals, which are difficult to measure using only cross-sectional data. Additionally, panel models allow for the analysis of internal firm changes by tracking how ownership structures and strategic asset allocations evolve over time. This approach improves the reliability of empirical findings by reducing omitted-variable bias and helps distinguish between enduring firm effects and broader market trends.

The use of panel data is particularly appropriate for this study, as it allows for controlling for unobserved firm-specific heterogeneity that may influence both strategic decisions and risk exposure. By exploiting both cross-sectional and time-series variation, panel regression models enable a more robust examination of the relationships among ownership structure, landbanking, and extreme downside risk. This approach also allows the analysis to capture firm-specific dynamics and adjust for time-invariant characteristics that are difficult to observe directly.

The Indonesian property sector provides valuable practical insights for this study. Emerging markets like Indonesia are characterized by relatively concentrated ownership and developing corporate governance systems. In many listed companies, controlling shareholders hold significant influence over strategic and financial decisions, including investment policies and asset allocation. At the same time, the Indonesian property market has experienced notable cyclical shifts driven by macroeconomic factors, regulatory changes, and variations in credit availability. These conditions create an environment in which governance structures and strategic landbanking decisions can significantly affect firms' vulnerability to extreme downside risks.

Variable Measurement

Extreme downside risk is assessed using Expected Shortfall at the 5% tail level (ES5). Consistent with standard tail-risk methods, Value at Risk (VaR) is first defined as the 5th percentile of the annual distribution of daily stock returns. Expected Shortfall is then calculated as the average of returns below this threshold, capturing the severity of losses in the most adverse situations of the return distribution.

Unlike VaR, which only indicates the cutoff point for losses, Expected Shortfall captures the severity of losses beyond that threshold, offering a more comprehensive measure of tail risk. As a

coherent risk measure, it meets key properties such as subadditivity and convexity, making it especially suitable for evaluating firm-level risk (Artzner et al., 1999; Acerbi and Tasche, 2002).

Expected Shortfall is particularly suitable for property development firms, where risk is often characterized by infrequent but severe negative shocks. Unlike traditional volatility measures, ES focuses explicitly on the magnitude of extreme losses, providing a more informative assessment of firms' vulnerability to adverse market conditions. This is especially relevant in real estate markets, where downturns can have prolonged and significant effects on firm performance and asset values.

This measure is especially important for asset-heavy and cyclical sectors like real estate development, where companies face infrequent but severe negative shocks. By emphasizing extreme downside outcomes, ES5 offers a more useful indicator of firms' vulnerability to market downturns than traditional volatility measures.

Controlling ownership (CS) is defined as the percentage share held by the largest shareholder at the end of the fiscal year. This measure reflects the level of ownership concentration within the company and indicates the extent of a dominant shareholder's influence over corporate decisions. In corporate governance research, having a controlling shareholder is seen as a key factor that affects monitoring efforts, managerial incentives, and strategic decision-making (Jensen and Meckling, 1976; Shleifer and Vishny, 1997).

A higher level of controlling ownership means a single shareholder holds significant voting power and can greatly influence the company's strategic and financial decisions. This influence can affect major investment choices, capital allocation, and risk management strategies. Since controlling shareholders often hold large, less diversified stakes, they have strong incentives to closely monitor management and prevent decisions that could expose the company to excessive risk. Additionally, concentrated ownership allows these shareholders to guide long-term strategies, including investment and asset allocation.

In property development firms, where strategic decisions often involve significant, irreversible investments in land and projects, controlling shareholders can play a crucial role in shaping the company's land-acquisition strategies and overall risk profile.

Landbanking intensity (LB) is the proportion of land-related assets to a company's total assets, indicating the extent to which a property developer allocates resources to land reserves. In property development companies, land is a vital strategic asset because it influences the company's ability to pursue future projects and maintain a steady pipeline of real estate investments. As previous research on property development strategies shows, landbanking involves accumulating land resources to support upcoming projects and development opportunities (Ooi and Sirmans, 2004). Therefore, landbanking intensity is defined as the ratio of land-related assets to total assets.

Landbanking consists of two key components reported in companies' financial statements: Land Held for Future Development (LHFD) and Land Under Development (LUD). LHFD refers to undeveloped land parcels purchased and held for potential future projects, enabling developers to begin new developments when market conditions are right. LUD includes land parcels that are currently under development but are not yet fully completed properties. Together, these parts represent the land assets the company controls that support its future development plans.

By dividing total landbanking assets by total firm assets, the landbanking intensity measure indicates the relative importance of land reserves within the firm's asset structure. Higher values of this ratio suggest a stronger strategic focus on land accumulation, which could influence firms' exposure to property market cycles and financial risk.

Both components are based on the firms' year-end balance sheets. The ratio of total landbanking value to total assets shows the level of strategic land accumulation within the firm's asset structure.

To examine the connection between controlling ownership, landbanking intensity, and extreme downside risk, the analysis includes various firm-level financial control variables commonly used in corporate risk and financial behavior studies. These controls help account for differences in firms' financial conditions that could influence both their investment decisions and their susceptibility to market volatility.

Liquidity, measured by the Current Ratio (CR), shows a company's ability to cover short-term liabilities with its current assets. Companies with higher liquidity generally have more financial flexibility and are better prepared to handle short-term market disruptions. In property development, liquidity also

influences land procurement decisions, as firms with stronger short-term financial health are typically better able to invest in strategic land acquisitions.

Profitability, measured by Return on Assets (ROA), shows how efficiently a company earns from its assets. More profitable firms are likely to rely less on external financing and may have different risk profiles than less profitable firms. Additionally, profitability influences investment choices, such as landbanking, since firms with higher earnings may pursue more disciplined capital allocation strategies.

Leverage, as measured by the Debt-to-Equity Ratio (DER), indicates the extent to which firms rely on debt to fund their operations and investments. Higher leverage increases financial obligations and makes a firm more vulnerable to market downturns. This concept is especially important in asset-heavy industries like real estate development, where land purchases and project execution often involve significant debt.

Table I. Definition of Variables

Variable	Definition	Measurement
ES5	Extreme downside risk	Expected Shortfall at the 5% tail level, measuring the average loss beyond the Value-at-Risk threshold
LB	Landbanking intensity	Ratio of land-related assets to total assets
CS	Controlling ownership	Percentage shareholding of the largest shareholder at year-end
CR	Current ratio	Ratio of current assets to current liabilities, measuring short-term liquidity
ROA	Return on assets	Net income divided by total assets, measuring profitability
DER	Debt-to-equity ratio	Total debt divided by total equity, measuring leverage
FOREX	Exchange rate	Annual change in exchange rate, capturing macroeconomic exposure

Model Specification

To analyze the connections between controlling ownership, landbanking intensity, and firms' exposure to extreme downside risk, this study estimates the following panel regression models.

Model A: Controlling Ownership and Extreme Downside Risk

The first model examines the association between controlling ownership and firms' exposure to extreme downside risk:

$$ES5_{it} = \alpha_0 + \alpha_1 CS_{it} + \sum \alpha_k Controls_{it} + \varepsilon_{it}$$

where $ES5_{it}$ represents Expected Shortfall at the 5% tail level for firm *i* in year *t*, CS_{it} denotes controlling ownership, and *Controls* include firm-specific financial characteristics and macroeconomic variables.

Model B: Controlling Ownership And Landbanking Intensity

The second model examines whether controlling ownership is associated with firms' landbanking decisions:

$$LB_{it} = \beta_0 + \beta_1 CS_{it} + \sum \beta_k Controls_{it} + \mu_{it}$$

where LB_{it} represents landbanking intensity, measured as the ratio of land assets to total assets.

Model C: Landbanking, Controlling Ownership, And Extreme Downside Risk

The third model incorporates landbanking intensity into the extreme-risk specification to examine whether landbanking accounts for part of the association between controlling ownership and extreme downside risk:

$$ES5_{it} = \gamma_0 + \gamma_1 CS_{it} + \gamma_2 LB_{it} + \sum \gamma_k Controls_{it} + \eta_{it}$$

In this specification, the coefficient on controlling ownership (γ_1) indicates the direct relationship between ownership concentration and extreme downside risk, while the coefficient on landbanking intensity (γ_2) shows how strategic land accumulation influences tail-risk exposure. tail-risk exposure.

Firm (*i*) and year (*t*) subscripts are used throughout. All models are estimated using panel regression techniques with robust standard errors. Control variables include firm profitability, liquidity, leverage, and foreign exchange rate (forex).

Estimation Strategy and Statistical Mediation Assessment

This study examines whether landbanking intensity mediates the relationship between controlling ownership and firms' exposure to extreme downside risk. The mediation analysis is conducted using a two-equation approach.

First, landbanking intensity is regressed on controlling ownership and control variables to assess whether controlling shareholders influence firms' landbanking decisions:

$$LB_{it} = \beta_0 + \beta_1 CS_{it} + \sum \beta_k Controls_{it} + \mu_{it}$$

Second, Expected Shortfall at the 5% tail level is regressed on controlling ownership, landbanking intensity, and control variables:

$$ES5_{it} = \gamma_0 + \gamma_1 CS_{it} + \gamma_2 LB_{it} + \sum \gamma_k Controls_{it} + \eta_{it}$$

In this specification, the coefficient on controlling ownership (γ_1) captures the direct effect of controlling ownership on extreme downside risk, while the coefficient on landbanking (γ_2) reflects the mediating channel through which controlling ownership may influence risk outcomes.

Mediation analysis follows the steps outlined by Baron and Kenny (1986). To evaluate the significance of the indirect effect, tests such as Sobel (1982), Aroian (1947), and Goodman (1960) are used, along with modern methods like those from Preacher and Hayes (2008). These tests determine whether the product of the controlling ownership coefficient in the landbanking model and the landbanking coefficient in the risk model is significantly different from zero.

Evidence of mediation exists if (i) controlling ownership significantly impacts landbanking intensity, (ii) landbanking intensity is strongly associated with Expected Shortfall, and (iii) the indirect effect of controlling ownership on Expected Shortfall through landbanking is statistically significant.

FOREX is selectively included in various models. In the baseline extreme-risk model (Model A), the exchange rate (FOREX) captures how overall market conditions influence extreme stock returns. It is then excluded in later models to ensure stability in panel estimations.

Results

Descriptive Statistics

Table II presents the descriptive statistics of the variables. Ownership concentration (CS) remains relatively high, averaging 43.60%, reflecting the prevalence of concentrated ownership structures in the property sector. Landbanking intensity (LB) exhibits substantial variation across firms, indicating heterogeneity in strategic asset allocation and development planning.

Extreme downside risk (ES5) has a mean of 6.04 and considerable dispersion, suggesting that firms differ significantly in their exposure to severe adverse market conditions. This variation underscores the importance of focusing on tail-risk measures in asset-intensive and cyclical industries such as property development.

Liquidity (CR) and profitability (ROA) indicate moderate financial performance, while leverage, measured by the debt-to-equity ratio (DER), varies widely across firms, pointing to differences in financing strategies. Exchange rate changes (FOREX) also display notable volatility, highlighting the role of macroeconomic factors in shaping firms' risk profiles.

Table II. Descriptive Statistics

Variable	Mean	Median	Std. Dev.	Min	Max
ES5	6.04	5.56	2.43	1.63	16.11
LB	21.57	16.47	17.17	0.14	71.40
CS	43.60	36.28	21.87	7.48	91.45
CR	2.73	2.20	1.89	0.30	11.90
ROA	3.74	3.50	2.74	-2.80	12.80
DER	28.36	23.80	27.88	0.00	139.46
FOREX	4.54	1.79	7.08	-2.34	22.95

Correlation Analysis

Table III reports the Pearson correlation coefficients among the variables. Controlling ownership (CS) is negatively correlated with landbanking intensity (LB), providing preliminary support for the expected relationship between ownership concentration and strategic asset allocation. Landbanking is also negatively correlated with extreme downside risk (ES5), suggesting that firms with greater land reserves may experience lower exposure to tail-risk outcomes.

The magnitude of all correlation coefficients remains below conventional thresholds, indicating that multicollinearity is unlikely to be a concern in the subsequent regression analysis.

Table III. Correlation Matrix

Regression Results and Hypothesis Tests

Variable	ES5	LB	CS	CR	ROA	DER	FOREX
ES5	1						
LB	-0.073	1					
CS	-0.085	-0.169	1				
CR	0.077	0.471	-0.104	1			
ROA	-0.132	0.016	0.015	-0.222	1		
DER	-0.230	-0.225	-0.380	-0.030	-0.021	1	
FOREX	0.165	0.011	-0.110	-0.046	0.235	-0.007	1

Tables IV–VI report the panel regression results from the three-stage empirical approach. The findings are presented as associations estimated with robust standard errors, and the selected panel specifications are based on standard model-selection criteria.

Table IV reports the relationship between controlling ownership and extreme downside risk. Consistent with H1, controlling ownership (CS) is negatively and significantly associated with ES5, indicating that firms with more concentrated ownership structures exhibit lower exposure to severe downside outcomes. This finding suggests that controlling shareholders may limit exposure to extreme downside risk through more disciplined strategic and financial decisions.

Among the control variables, leverage (DER), measured as the debt-to-equity ratio, is negatively and significantly linked to extreme downside risk. Exchange rate changes (FOREX) are positively and significantly related to ES5, while liquidity (CR) and profitability (ROA) are not statistically significant.

In economic terms, the magnitude of the coefficient suggests that increases in ownership concentration are associated with a meaningful reduction in extreme downside risk. This highlights the

practical relevance of governance structures in shaping firms' exposure to severe adverse outcomes, beyond mere statistical significance.

Table IV. Panel Regression Results: Controlling Ownership and Extreme Downside Risk (ES5)

Variable	Model A
Controlling ownership (CS)	−0.02**
	(0.01)
Current ratio (CR)	0.10
	(0.10)
Return on assets (ROA)	0.02
	(0.08)
Debt-to-equity ratio (DER)	−0.02***
	(0.01)
Exchange rate (FOREX)	0.05***
	(0.02)
Constant	7.10**
Observations	209
R^2	0.10
Estimation method	GLS
Panel model	Random effects

To further examine the mechanism underlying this relationship, Table V reports the regression results for landbanking intensity.

Table V shows that controlling ownership is negatively and significantly associated with landbanking intensity, supporting H2. This indicates that firms with more concentrated ownership structures tend to adopt more conservative land accumulation strategies.

Liquidity (CR) is positively and significantly related to landbanking, and leverage (DER) shows a positive and significant relationship as well. In contrast, profitability (ROA) is negatively associated with landbanking intensity.

Table V. Panel Regression Results: Controlling Ownership and Landbanking Intensity (LB)

Variable	Model B
Controlling ownership (CS)	−0.10***
	(0.02)
Current ratio (CR)	0.38**
	(0.15)
Return on assets (ROA)	−0.18*
	(0.09)
Debt-to-equity ratio (DER)	0.03*
	(0.01)
Constant	24.87***
Observations	209
R^2 (within)	0.97
Estimation method	GLS
Panel model	Fixed effects

To assess the joint effect of ownership concentration and landbanking on tail-risk exposure, Table VI presents the combined regression results.

Table VI reports that landbanking intensity is negatively and significantly associated with extreme downside risk, supporting H3. This suggests that land reserves may function as a risk-buffering mechanism.

Controlling ownership remains significantly and negatively linked to ES5 even after accounting for landbanking, suggesting that ownership concentration's impact on tail-risk exposure is not completely mediated by landbanking choices. This offers preliminary evidence of partial mediation. Additionally, leverage (DER) maintains a negative and significant association with extreme downside risk.

Table VI. Panel Regression Results: Landbanking, Controlling Ownership, And Extreme Downside Risk (ES5)

Variable	Model C
Landbanking intensity (LB)	−0.03**
	(0.01)
Controlling ownership (CS)	−0.03***
	(0.01)
Current ratio (CR)	0.15
	(0.10)
Return on assets (ROA)	0.06
	(0.08)
Debt-to-equity ratio (DER)	−0.03***
	(0.01)
Constant	8.20***
Observations	209
R^2	0.09
Estimation method	GLS
Panel model	Random effects

Table VII presents the mediation analysis results. The indirect effect is positive and statistically significant, as confirmed by the Sobel, Aroian, and Goodman tests.

The positive indirect effect reflects the combined impact of controlling ownership reducing landbanking intensity and landbanking, in turn, reducing extreme downside risk. This provides evidence of partial mediation, indicating that controlling ownership influences tail-risk exposure both directly and indirectly through landbanking decisions.

Table VII. Mediation Test of Landbanking in the Relationship Between Controlling Ownership And Extreme Downside Risk (ES5)

Discussion: Controlling Ownership, Landbanking, and Extreme Downside Risk

The empirical evidence shows that greater ownership concentration is associated with lower exposure to extreme downside risk, indicating that firms with concentrated ownership structures are less vulnerable to severe tail-risk outcomes. From a corporate governance perspective, this finding supports the view that controlling shareholders possess both the incentives and the capacity to closely monitor managerial decisions and constrain risk-taking behavior. Consistent with agency theory (Jensen and Meckling, 1976; Shleifer and Vishny, 1997), ownership concentration can mitigate conflicts between managers and shareholders by aligning strategic decisions with long-term firm stability.

This governance effect is particularly salient in property development firms, where investments are capital-intensive, long-term, and highly sensitive to market cycles. The limited redeployability of assets and the irreversible nature of development projects amplify firms' vulnerability to adverse market conditions. In this context, controlling shareholders—who typically hold large and relatively undiversified stakes—are more likely to prioritize downside protection and financial discipline, thereby enhancing firms' resilience to extreme market shocks.

Beyond direct monitoring effects, the findings highlight the role of governance in shaping firms' strategic asset allocation. Specifically, controlling ownership is negatively associated with landbanking intensity, suggesting that controlling shareholders tend to limit land accumulation. This behavior reflects

an awareness of the trade-off between growth opportunities and financial exposure. While land reserves provide development potential, excessive landbanking can tie up capital and increase vulnerability during downturns. As a result, concentrated ownership appears to promote more disciplined asset allocation strategies.

At the same time, landbanking intensity is negatively associated with extreme downside risk, indicating that land reserves can serve as a strategic buffer. From a real options perspective, land holdings provide firms with flexibility in development timing, allowing them to delay, phase, or expand projects in response to changing market conditions (Titman, 1985). This flexibility can reduce financial pressure during downturns and enable firms to adapt more effectively to market fluctuations. Accordingly, landbanking plays a dual role: while excessive accumulation may create financial rigidity, a balanced level of land reserves can enhance firms' ability to withstand adverse shocks.

The coexistence of these effects highlights an important trade-off between governance and strategy. Controlling shareholders tend to restrain landbanking to maintain financial discipline, yet landbanking itself enhances risk resilience through its flexibility. This tension suggests that the risk implications of landbanking depend on how it is managed within the broader governance framework.

The governance–strategy trade-off observed in this study reflects a broader tension between financial discipline and strategic flexibility in asset-intensive industries. While controlling shareholders appear to restrain landbanking to avoid excessive capital commitment and financial exposure, land reserves simultaneously provide valuable flexibility in managing development timing and project sequencing. This suggests that both under-investment and over-investment in landbanking may be suboptimal. Insufficient land reserves may limit firms' ability to respond to future market opportunities, while excessive land accumulation may increase financial rigidity and vulnerability to downturns. Therefore, the effectiveness of landbanking as a risk management tool depends not only on its scale but also on its governance and strategic deployment.

When landbanking is incorporated into the extreme-risk model, controlling ownership remains statistically significant, confirming that governance influences tail-risk exposure through multiple channels. The mediation analysis further shows that landbanking partially transmits the effect of ownership concentration on extreme downside risk. The positive indirect effect reflects the product of two negative relationships—controlling ownership reduces landbanking, and landbanking reduces tail risk—indicating that the indirect pathway operates alongside the direct effect. This pattern reinforces the interpretation of partial mediation and highlights the strategic role of landbanking in linking governance to risk outcomes.

These findings contribute to the literature by demonstrating that ownership concentration affects firms' exposure to extreme downside risk not only through traditional monitoring mechanisms but also through strategic asset allocation decisions. By conceptualizing landbanking as a governance-mediated real options mechanism, this study extends corporate governance research beyond conventional risk measures and highlights the importance of tail-risk resilience in asset-intensive industries.

More broadly, these findings may extend beyond the property development sector to other asset-intensive industries characterized by long investment horizons and limited asset redeployability, such as infrastructure, energy, and capital goods. In these contexts, firms similarly face trade-offs between committing capital to long-term assets and maintaining flexibility in the face of uncertainty. The interaction between governance structures and strategic asset allocation decisions may therefore play a critical role in shaping firms' resilience to extreme adverse conditions across a wide range of industries.

An additional noteworthy finding is the negative association between leverage and extreme downside risk. While leverage is typically associated with increased financial risk, this result may reflect the disciplining role of debt, which constrains managerial discretion and limits excessive risk-taking. In asset-intensive sectors such as property development, debt financing may impose external monitoring and enforce more structured investment decisions, thereby reducing exposure to extreme downside outcomes. Alternatively, this relationship may capture differences in financing structures across firms, where more established developers with stable project pipelines are better able to utilize debt without increasing tail-risk exposure. This finding highlights the importance of considering institutional and sectoral context when interpreting the risk implications of leverage.

Importantly, tail-risk measures capture firms' exposure to rare but severe adverse states that are not reflected in conventional volatility metrics. By focusing on these extreme outcomes, the findings

highlight how governance structures influence not only overall risk but also firms' vulnerability to economically significant downside events relevant to capital market valuation.

Conclusion and Implications

This study examines how controlling ownership and landbanking intensity jointly influence firms' exposure to extreme downside risk in publicly listed property development companies. Using Expected Shortfall as a measure of tail risk, the results show that higher ownership concentration is associated with lower exposure to severe adverse outcomes, suggesting that controlling shareholders promote financial discipline and constrain risk-taking behavior. The findings further indicate that controlling shareholders tend to adopt more restrained landbanking strategies, while landbanking itself is negatively associated with extreme downside risk. Mediation analysis provides evidence of partial mediation, showing that strategic asset allocation is a key pathway through which governance influences firms' tail-risk exposure.

These findings contribute to both corporate governance and property management research by demonstrating that ownership concentration shapes firms' risk profiles not only through monitoring mechanisms but also through the strategic configuration of long-term assets. In particular, the results position landbanking as a governance-mediated real-options mechanism through which controlling shareholders influence firms' strategic flexibility and resilience in cyclical property markets. By shaping the scale and timing of land accumulation, governance structures indirectly affect firms' capacity to absorb market shocks and manage development pipelines under uncertainty.

From a practical perspective, the results highlight the importance of evaluating ownership structure and landbanking strategies jointly when assessing firms' resilience to extreme market conditions. For investors, ownership concentration and landbanking intensity provide informative signals of firms' vulnerability to severe downside risk. For managers, the findings underscore the importance of aligning land acquisition decisions with long-term financial discipline and risk management objectives. Future research may extend this analysis by examining how governance and strategic asset allocation interact across different institutional settings and property market cycles.

In addition, the study does not fully address potential endogeneity concerns, including reverse causality and omitted-variable bias. For example, firms with lower risk profiles may attract different ownership structures or adopt distinct landbanking strategies, which could influence the observed relationships. While the use of panel data helps mitigate some of these concerns, future research could employ more advanced identification strategies, such as instrumental variable approaches or dynamic panel models, to further strengthen causal inference.

Furthermore, the measurement of landbanking relies on financial statement proxies, which may not fully capture qualitative aspects such as land location, development stage, or strategic value. Future studies could incorporate more granular data on land characteristics to improve construct validity.

Finally, the findings are based on firms operating in a specific institutional context, and the extent to which these results generalize to other markets with different governance environments and regulatory frameworks remains an open question.

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