



The Dual Role of Revenue Concentration in Corporate Landbanking: Evidence from Urbanizing Property Markets

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Abstract

This study examines the determinants of corporate landbanking behavior by integrating macroeconomic demand factors with firm-level strategic characteristics. Focusing on publicly listed property developers in Indonesia, it investigates how urbanization and exchange rate uncertainty influence landbanking decisions, and how these effects are conditioned by firms' revenue concentration. Using panel data regression analysis, the results show that urbanization significantly increases landbanking, confirming its role as a key demand-side driver in property markets. Exchange rate uncertainty also has a positive effect, suggesting that firms use landbanking as a strategic tool to preserve flexibility under macroeconomic volatility. At the firm level, revenue concentration is positively associated with landbanking, indicating that more focused firms allocate greater resources to land as a core strategic asset. More importantly, this study introduces a dual-effect perspective in which revenue concentration simultaneously increases baseline landholding while reducing firms' responsiveness to external demand shocks. The negative interaction effect implies that, although concentrated firms hold larger landbanks, they adjust their land accumulation less aggressively in response to urbanization than more diversified firms. By integrating insights from urban economics, real estate, and corporate strategy, this study contributes to the literature by highlighting the role of firm heterogeneity in shaping land supply behavior. The findings also offer policy implications, suggesting that land-use regulations should account for differences in firm structure to improve housing supply responsiveness in rapidly urbanizing economies.

Keywords: Landbanking; Urbanization; Revenue concentration; Property developers; Real estate; Emerging markets; Panel data,

ARTICLE INFO

Article history:

Received
January 11, 2026
Revised
June 23, 2026
Accepted
July 07, 2026

Published by

ISSN

Website

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2774-7077

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INTRODUCTION

Rapid urbanization in emerging economies has fundamentally reshaped land markets, intensifying competition for developable land and placing increasing pressure on housing systems. Classical urban economics explains that population concentration and economic agglomeration lead to rising land demand and escalating land values through the bid-rent mechanism (Balchin dkk., 1988; Liu dkk., 2024a; Nurrokhman dkk., 2026). Contemporary studies further confirm that urban expansion significantly drives land-use transformation, real estate development, and housing demand, particularly in rapidly growing metropolitan regions (Diaconu dkk., 2025a; Munanga dkk., 2022)(Dehghani dkk., 2025; Diaconu dkk., 2025b; Rustiadi dkk., 2021). In developing countries such as Indonesia, sustained urban growth has accelerated demand for residential land while exposing structural constraints in housing supply systems.

Despite strong demand growth, housing supply often fails to respond proportionally. Empirical evidence suggests that regulatory constraints, land scarcity, institutional inefficiencies, and speculative behavior contribute to supply rigidity in urban housing markets (Cheng, 2026; S. Li dkk., 2025). One key mechanism underlying this mismatch is landbanking, where developers acquire and hold undeveloped land for future development. While landbanking can enhance strategic flexibility and intertemporal optimization (Ye dkk., 2025), excessive landholding may delay development and reduce housing supply responsiveness, exacerbating affordability issues (Osei & Zhuang, 2024).

A growing body of literature has examined landbanking from multiple perspectives, including market cycles, regulatory frameworks, and strategic behavior. For example, emphasize landbanking as a rational response to market expectations and development timing. (L. Chen dkk., 2026; Xiong dkk., 2026; Zhou dkk., 2026) highlight the role of urban expansion in shaping land acquisition strategies. More recent studies (Aldawsari, 2024; El Ghouli dkk., 2023; Moudud-Ul-Huq & Akter, 2024) show that macroeconomic uncertainty and institutional environments significantly influence landholding behavior. However, these studies largely adopt an aggregate or market-level perspective and tend to treat developers as homogeneous actors.

This reveals a critical research gap. First, there is limited firm-level empirical evidence explaining how urbanization directly influences corporate landbanking decisions, particularly in emerging markets. Second, prior studies rarely incorporate firm heterogeneity, such as differences in strategic orientation, resource allocation, or revenue structure, which may significantly shape landholding behavior. Third, the interaction between macro-level drivers (urbanization, uncertainty) and firm-level characteristics remains underexplored, leading to an incomplete understanding of why developers respond differently under similar market conditions.

Several recent studies have begun to address firm heterogeneity but remain limited in scope. For instance, (Chu dkk., 2023; Valero, 2024) examine diversification in real estate investment but do not link it explicitly to landbanking. (Bai dkk., 2023; Gaio dkk., 2023; Wang dkk., 2024) highlight how diversification affects investment efficiency, yet their focus is not on land assets. More recent empirical works (Ahmed, 2026; Batubara dkk., 2023; Khogali dkk., 2025) emphasize uncertainty and corporate behavior but do not integrate urbanization dynamics. Therefore, no study simultaneously integrates urbanization, macroeconomic uncertainty, and firm-level revenue concentration within a unified landbanking framework, especially in the context of emerging property markets like Indonesia.

This gap is important both theoretically and practically. From a theoretical perspective, neglecting firm heterogeneity limits the explanatory power of urban economics and real estate theories in understanding land supply behavior. From a policy standpoint, ignoring differences across firms may lead to ineffective land-use regulations, as uniform policies fail to address heterogeneous developer responses. Consequently, understanding how internal firm characteristics interact with external pressures is crucial for improving housing supply responsiveness and urban planning effectiveness. Based on these gaps, this study aims to investigate how urbanization and exchange rate uncertainty influence corporate landbanking behavior, and how these effects are conditioned by revenue concentration as a firm-level characteristic. Using panel data from publicly listed property developers in Indonesia (2013–2023), this research adopts a multi-level analytical approach that integrates macroeconomic drivers with firm-specific strategic factors.

This study offers several key contributions (novelty). First, it provides firm-level empirical evidence on the impact of urbanization on landbanking, addressing the lack of micro-level analysis in prior literature. Second, it introduces a dual-effect perspective of revenue concentration, demonstrating that it simultaneously increases baseline landholding while reducing firms' responsiveness to external demand shocks an insight not captured in previous studies. Third, it develops an integrative framework combining urban economics, real estate, and corporate strategy, offering a more comprehensive explanation of heterogeneous landbanking behavior. Finally, this study contributes to policy discourse by highlighting the need for differentiated land-use regulations that account for firm structure and strategic behavior in rapidly urbanizing economies.

Literature Review

2.1 Landbanking in Property Development

Landbanking involves acquiring and holding undeveloped land for future development projects. In property markets, landbanks act as strategic reserves that help developers secure future projects, control the timing of developments, and adapt to market changes (Sasu dkk., 2022; Yin & Shimizu, 2025). Because real estate investments often have long timelines and are mostly irreversible, landbanking is crucial in influencing companies' decisions about when and how to develop.

From a theoretical standpoint, landbanking aligns with real options theory. Owning undeveloped land gives developers the choice but not the obligation to start development when market conditions are right (Ratna & Djajaputra, 2024). This strategic option becomes especially valuable amid uncertain demand, prices, and financing. Holding land allows firms to postpone irreversible investments and keep the chance to benefit from future land value growth. Therefore, landbanking is a rational strategy for managing uncertainty, helping firms optimize when to develop and reduce downside risks.

Besides real options theory, landbanking can be viewed through the lens of classical urban economics. Classic models of urban land use highlight that land values are shaped by the spatial distribution of economic activities and the bid-rent mechanism, where different users are willing to pay varying prices for locations based on accessibility and projected returns (Marquis & Barthelemy, 2026). As urbanization accelerates and population density rises, demand for centrally located, developable land increases, driving up land prices and intensifying competition among developers.

Extensions of these models emphasize how housing demand and market forces influence land allocation and development choices. Urban residential land markets, in particular, respond to demographic growth, rising incomes, and infrastructure improvements, all of which boost the expected value of land for future use (Canesi & Marella, 2023). In this setting, developers are seen as forward-looking agents who forecast future demand and adjust their land-acquisition strategies accordingly. Landbanking is essentially a strategic reaction to the economic forces of urban areas. By acquiring land before expected growth, developers aim to secure future rental income and stay competitive in rapidly shrinking urban spaces. This view shows that landbanking is not just speculation, but a response rooted in the structural realities of urban expansion and spatial economic processes.

Furthermore, landbanking can be viewed as a form of dynamic capability. Instead of simply acting as a passive asset reserve, landbanks demonstrate a company's capacity to acquire, integrate, and reconfigure land resources in response to market shifts (Isnaeni & Hamadi, 2024; Nur dkk., 2025). This ability allows developers to modify their project pipelines, synchronize development efforts with demand cycles, and derive spatial value from urban expansion. Thus, landbanking goes beyond being a market outcome; it becomes a strategic activity grounded in a firm's core skills and decision-making processes.

Empirical research indicates that landbanking behavior is strongly connected to property market cycles and expectations of land price increases. Developers typically acquire land during periods of expected growth and postpone development during downturns, helping spread production across different cycles (Xie dkk., 2022). Market evidence further shows that landbanking serves as a strategic approach to managing development risks and allocating resources over time (Sasu, Javed, & Imran, 2024). Although this behavior can strengthen a firm's resilience, it may also lead to supply constraints if land is accumulated but not developed promptly.

Institutional factors also play a crucial role in landbanking practices. Systems for planning, zoning rules, and land-use policies influence both the costs and motivations for acquiring and holding land. The regulatory environment can either enable or limit land accumulation, depending on how enforcement and policies are structured (Monkkonen dkk., 2024; Yu & Zheng, 2024). In areas with weak or inconsistent regulation, developers might keep land for long periods, leading to land concentration and delays in housing supply. On the other hand, stricter regulations can reduce excessive landholding and encourage more effective land use.

Although these insights are valuable, much of the current literature views developers as a fairly homogeneous group, focusing mainly on overall market outcomes such as housing supply and land prices. This perspective overlooks the fact that firms may differ significantly in their landbanking strategies due to variations in resources, capabilities, and strategic goals. To fill this

gap, it is important to incorporate firm-specific traits into studies of landbanking behavior, especially in quickly urbanizing economies.

2.2 Urbanization and Landbanking Behavior

From an urban economics standpoint, urbanization greatly affects land demand and spatial development. The classical urban economic theory, notably the bid-rent model suggests that as population and economic activity in cities increase, demand for land rises (Mahtta dkk., 2022; Syaban & Appiah-Opoku, 2024). This leads to higher land prices and intensified competition for space. Urban growth not only increases city size but also shifts land-use patterns, encouraging developers to acquire land in anticipation of future development opportunities.

Urbanization impacts landbanking mainly through demand. As cities expand, the need for housing, commercial areas, and infrastructure increases, encouraging developers to buy land early to profit from future growth and rising land prices. Landbanking helps them secure key locations, control development schedules, and gain from anticipated land value increases. This trend is especially strong in fast-growing areas with limited land supply, making such proactive land grabbing more common.

Empirical research strongly supports this link. In real estate markets, developers often respond to urban growth by acquiring additional land to meet future demand (Hinojoza-Castro dkk., 2022; Rui, 2026). Additionally, landbanking studies show that urban expansion motivates firms to strategically hold land, anticipating rising land prices and new development opportunities (Sasu, Javed, Imran, dkk., 2024). Evidence from urban and regional economics also indicates that urban growth greatly boosts land demand and development activity, especially in rapidly expanding cities (Liu dkk., 2024b; Zheng dkk., 2026).

Additional studies confirm that growth in urban populations and spatial expansion are strongly linked to increased land use and real estate development activities (Correia dkk., 2024; Syaban & Appiah-Opoku, 2024). In developing countries also indicates that urbanization influences land market shifts and motivates developers to acquire land in anticipation of infrastructure growth and future demand (M. Li dkk., 2025; Zhu dkk., 2024). Furthermore, empirical data shows that housing supply responses are closely connected to urban growth patterns and limitations in land availability (Garcês dkk., 2022). Extensive development literature emphasizes that urbanization correlates strongly with higher land and housing demand in developing economies (S. Huang & Lin, 2025). Overall, these insights robustly support the idea that urbanization significantly influences landbanking activities.

H1: Urbanization is positively associated with corporate landbank holdings.

2.3 Revenue Concentration and Strategic Landbanking

The link between revenue concentration and landbanking can be understood through the resource-based view (RBV) and internal capital market theory. The RBV suggests that firms focus their resources on strategic assets that reinforce their core strengths and provide a lasting competitive edge (Amaya dkk., 2024; Robinson, 2004). In property development, land is a vital strategic resource, as it influences a firm's ability to start new projects and capitalize on urban growth. Companies with higher revenue concentration rely more heavily on their main operations, which motivates them to acquire and hold land as a key asset.

Building on this view, internal capital market theory posits that firms with focused operations tend to allocate their financial resources more heavily to their main segments, which are crucial to firm performance and value generation (Stein, 1997; Lamont, 1997). Conversely, diversified firms allocate funds across multiple business areas, potentially reducing investment in any one sector (Cerrato dkk., 2023; Yaman & Tuncel, 2025). Consequently, companies with higher revenue concentration are likely to show greater investment focus in their core sector, including land accumulation as a vital production input.

Empirical evidence strongly supports this argument. Corporate finance studies indicate that focused firms are more likely to invest aggressively in their core industries, relying on sector-specific opportunities (Rufolo dkk., 2025; Zhang dkk., 2024). Likewise, research on corporate diversification shows that firms with more concentrated revenue streams are more responsive to industry-specific investment opportunities and adjust their resource allocation accordingly (Kwak dkk., 2025; Nguyen & Nguyen, 2024).

In the real estate markets, this tendency is especially noticeable. Property developers depend heavily on land as a key resource in their development activities, and companies focused on

real estate usually see land acquisition as a crucial part of their strategic asset management (Adams et al., 2012). Research on real estate investment also shows that firms adjust their asset allocation strategies based on their degree of diversification, with more focused firms allocating a greater proportion of resources to their core real estate assets (Eichholtz et al., 1995; Seiler et al., 1999, Adams et al., 2012). Based on these theoretical and empirical insights, it appears that firms with greater revenue concentration tend to allocate a larger share of their resources to land accumulation. Therefore, the following hypothesis is suggested:

H2: Revenue concentration is positively associated with corporate landbank holdings.

2.4 Exchange Rate Uncertainty and Landbanking

Theoretically, the link between exchange rate uncertainty and landbanking can be understood through real options theory. This theory suggests that when investments are irreversible and future results are uncertain, firms are motivated to postpone decisions to maintain flexibility (Marozva & Magwedere, 2025). In capital-heavy sectors like property development, where projects entail significant sunk costs and extended timeframes, uncertainty significantly influences investment choices.

Exchange rate uncertainty impacts firms via cost and financial pathways. Variations in exchange rates can increase volatility in construction costs, especially when inputs are imported or linked to global markets. Furthermore, changes in exchange rates affect financing conditions, particularly for companies holding foreign-denominated debt or involved in international capital markets. These elements heighten uncertainty about project profitability and cash flow stability.

Under these conditions, companies might delay irreversible investments, such as construction projects. Instead of leaving the market completely, developers often choose to hold land as a strategic reserve. Landbanking enables firms to keep future development opportunities open while avoiding immediate risks tied to unpredictable costs and profits. In this way, landbanking serves as a risk-management approach that maintains flexibility in uncertain situations.

Empirical research clearly confirms the link between uncertainty and firms' investment decisions. A substantial amount of literature indicates that uncertainty especially macroeconomic and financial volatility dampens investment and leads firms to postpone irreversible decisions (Shadkk., 2025). In unpredictable settings, firms often move away from aggressive investment toward more flexible asset management strategies. Exchange rate uncertainty has a notable impact on corporate decision-making. Research shows that currency volatility heightens firms' financial risk and influences their investment and financing choices (Dudkk., 2026). Furthermore, companies tend to adjust their investment strategies in response to exchange rate movements by cutting capital expenditures and adopting more cautious approaches (Arian & Naeem, 2025; Ogawa & Luo, 2025).

Evidence from emerging markets shows that macroeconomic uncertainty, such as exchange rate volatility, can delay investments and lead firms to depend more on flexible asset holdings (Jamali & Elbouazizi, 2026; Raghavendra dkk., 2025). This impact is especially significant in real estate markets because of high sunk costs and lengthy project durations, causing developers to retain land while delaying development plans. These findings align with real options theory and indicate that exchange rate uncertainty motivates firms to expand their landbank holdings, helping them manage risk and keep future development opportunities open.

H3: Exchange rate uncertainty is positively associated with corporate landbank holdings.

2.5 Moderating Role of Revenue Concentration

The impact of urbanization on landbanking varies across firms due to differences in internal structures, strategic orientations, and resource-allocation methods. Specifically, the level of revenue concentration may influence how firms respond to external factors such as urban growth. This moderating role can be explained by internal capital market theory and organizational strategy. Internal capital market theory holds that firms allocate resources across business segments based on their strategic goals and anticipated returns (Zhao dkk., 2023). Companies with concentrated revenue streams typically allocate resources to their core activities, leading to more stable, internally focused investment strategies. Conversely, diversified firms operate in multiple segments and are often more adaptable in reallocating resources in response to external shocks and new opportunities (Bowen & Sleuwaegen, 2023; Soluk, 2022). Consequently, diversified firms tend to be more responsive to shifts in external demand conditions. Strategically, companies with concentrated revenues tend to pursue long-term asset buildup strategies focused on their core

activities. In the property industry, this often means keeping a stable landbank to support future projects, despite short-term demand fluctuations. This approach emphasizes maintaining production capacity rather than reacting to minor market shifts.

Empirical evidence supports this point. Corporate finance research indicates that focused firms make stronger initial investments in their main sectors but are less reactive to external changes because they depend more on internal strategies (Caglayan & Machokoto, 2024; Chikwira & Mohammed, 2023). Conversely, diversified firms are more affected by industry-specific shocks and tend to modify their investment approaches more actively when opportunities shift (Esteve-Pérez dkk., 2024). In real estate markets, heterogeneity among firms significantly influences development and land acquisition strategies. Research shows that developers adjust their investment timing and land purchase decisions in response to market cycles and demand fluctuations, though their responsiveness depends on their strategic focus and resource flexibility (Ge dkk., 2025). Developers with a narrow focus tend to keep their development pipelines consistent, whereas more diversified firms can adjust their activity scale more easily in response to demand shifts (Foidl dkk., 2024). Together, these arguments imply that urbanization promotes landbanking, but this effect varies with the firm's revenue concentration. Firms with higher revenue concentration tend to respond less strongly to urbanization-driven demand, as their landbanking strategies are more stable and less affected by small market fluctuations. Therefore, the following hypothesis is suggested:

H4: Revenue concentration negatively moderates the relationship between urbanization and corporate landbanking.

METHOD

Research Design

This research employs a quantitative approach to explore how urbanization affects corporate landbanking behavior and how firm-level differences influence this relationship. Specifically, the study examines how revenue concentration serves both as a direct driver of landbanking and as a moderator of the relationship between urbanization and landbanking. To achieve these goals, the study uses panel data regression methods that leverage both cross-sectional and time-series variation in firm-level landbank holdings. Panel data provides several benefits. It first allows for controlling for unobserved heterogeneity across firms, which is especially important given the structural differences among property developers. Additionally, it enables analysis of dynamic changes over time, helping identify how firms adjust their landbanking strategies in response to changing macroeconomic and demographic conditions.

The empirical approach involves a series of model specifications to validate the robustness of the results. The initial model assesses the direct impacts of urbanization (URB), revenue concentration (RC), and exchange rate uncertainty (VOLEX) on landbanking (LB). This foundational model identifies the main connections between external influences, firm-specific traits, and landbanking activities. To investigate the moderating effect of revenue concentration, an interaction term between urbanization and revenue concentration ($URB \times RC$) is included in the extended model. This setup enables an examination of whether urbanization's impact on landbanking differs among firms with various levels of diversification. Additionally, a robustness check is performed by comparing model specifications with and without the interaction term, ensuring that the moderating effect is not dependent on the model choice and validating the results. To select the appropriate panel estimation method, hypothesis tests such as the Chow and Hausman tests are used to compare pooled OLS, fixed-effects, and random-effects models. The final model is chosen based on statistical criteria and estimator consistency.

Sample Selection

This study uses purposive sampling to build a balanced panel dataset of publicly listed property developers in Indonesia. The sampling criteria are designed to ensure data consistency, comparability, and relevance to the research objectives. A firm is included in the sample if it meets the following conditions:

1. The company has been listed on the Indonesia Stock Exchange (IDX) since at least 2013, ensuring sufficient time-series observations for panel estimation.
2. The company was not delisted during the observation period, thereby preserving data continuity.

3. The company did not experience a prolonged trading suspension, which may indicate abnormal conditions affecting financial reporting or operational performance.
4. The firm maintained its primary business focus in the property and real estate sector, ensuring the relevance of landbanking activities.
5. The firm's shares were actively traded, indicating adequate disclosure quality and market participation.

Using these criteria, we obtain a final sample of 19 property developers observed from 2013 to 2023, forming a balanced panel of 209 firm-year observations.

Data Sources

Firm-level data come from audited financial statements, annual reports, and corporate disclosures on the Indonesia Stock Exchange (IDX) website. Additionally, landbank holdings data are sourced from S&P Capital IQ, providing standardized, comparable information on firms' assets, including land inventories reserved for future development. This method improves data reliability and minimizes measurement inconsistencies among firms.

Macroeconomic and demographic variables are sourced from publicly accessible, internationally recognized databases. Specifically, the urbanization rate is retrieved from the World Bank, guaranteeing consistency and comparability over time. Exchange rate volatility data are derived from national currency figures obtained through official financial statistics and are processed to reflect annual volatility. Combining firm-level financial data with macroeconomic indicators from reputable sources increases the dataset's validity and bolsters the robustness of the empirical analysis.

Variable Measurement

Landbanking intensity (LB) is defined as the ratio of land inventory to total assets. This proxy measures the significance of undeveloped land within a firm's assets and indicates a long-term land accumulation strategy rather than short-term development activity. Using a ratio-based measure allows for easier comparison across firms of different sizes and reduces distortions caused by scale. Higher LB values suggest a greater strategic focus on landholding. This method aligns with previous empirical research on property markets, especially when physical land area data are inconsistently reported.

Urbanization (URB) is measured by the annual urban population indicator expressed as the percentage of the population living in urban areas, obtained from the World Bank. This measure reflects ongoing demographic forces driving urban land demand and captures fundamental, long-term shifts in housing markets rather than short-term cycles. As a macroeconomic indicator, urbanization changes over time but remains consistent across firms, enabling analysis of how broad demographic trends impact individual firms' landholding decisions. Revenue concentration (RC) is measured using the Herfindahl-Hirschman index based on the distribution of revenue across business segments: where s_j represents the proportion of total revenue derived from business segment

$$RC = \sum_{j=1}^N s_j^2$$

The index ranges from 0 to 1, where higher values indicate greater concentration of revenue in fewer business segments. This measure reflects the extent to which a firm depends on its core business activities. Revenue data are obtained from segment disclosures in firms' financial statements and cross-checked against S&P Capital IQ data. Macroeconomic uncertainty is indicated by exchange rate volatility (VOLEX), which is measured as the annual standard deviation of monthly changes in the rupiah-US dollar exchange rate. This volatility impacts construction costs, imported materials, and foreign financing exposure, thus affecting developers' investment decisions. Increased volatility tends to heighten uncertainty and may prompt developers to postpone irreversible investments, leading to greater land retention. Table II details the definitions and measurements of all variables used in the empirical analysis. All variables are defined at the firm-year level to maintain consistency in panel estimation.

Model Specification

To examine the determinants of landbanking behavior, the study estimates the following baseline model:

$$LB_{it} = \alpha + \beta_1 URB_t + \beta_2 RC_{it} + \beta_3 VOLEX_t + \varepsilon_{it}$$

The interaction term allows the effect of urbanization on landbanking to vary across firms with different levels of revenue concentration. A negative coefficient on the interaction term indicates that revenue concentration weakens the impact of urbanization on land accumulation. To test the moderating role of revenue concentration, the following interaction model is estimated:

$$LB_{it} = \alpha + \beta_1 URB_t + \beta_2 RC_{it} + \beta_3 VOLEX_t + \beta_4 (URB_t \times RC_{it}) + \varepsilon_{it}$$

The models are estimated using random-effects panel regression, which is suitable for the data structure and variables. Urbanization and exchange rate volatility are macro-level factors that change over time but are consistent across firms, while revenue concentration varies across firms and over time. Random-effects estimation enables the model to preserve variation within and across firms, which is crucial for capturing consistent differences in landbanking behavior among developers. On the other hand, fixed-effects estimation would remove time-invariant firm traits, potentially excluding important cross-sectional differences relevant to the research question. To ensure robust statistical inference, heteroskedasticity-consistent standard errors clustered at the firm level are employed. This adjustment accounts for potential heteroskedasticity and serial correlation within firms over time.

RESULT AND DISCUSSION

Descriptive Statistics

Table 1. Descriptive Statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
LB	209	22.00	18.30	17.17	0.14	71.40
RC	209	0.60	0.62	0.22	0.15	1.11
URB	209	55.30	55.33	2.10	51.96	58.57
VOLEX	209	5.96	5.62	2.04	2.56	10.68

The results indicate that landbanking (LB) exhibits substantial variation across firms, with a mean value of 22% of total assets and a standard deviation of 17.17. The wide range between the minimum (0.14%) and maximum (71%) values suggests significant heterogeneity in firms' landholding strategies. While some firms allocate only a small proportion of assets to land, others maintain large land inventories, reflecting differences in strategic positioning and development pipelines. Revenue concentration (RC) has an average of 0.60 and a standard deviation of 0.22. This indicates that, on average, firms exhibit a moderate degree of concentration in their revenue structure. The observed range, from 0 to 1, suggests considerable variation across firms, with some firms being highly focused on a single business segment while others operate with more diversified revenue streams. This variation is important for analyzing the moderating role of firm-level characteristics.

Urbanization (URB) shows relatively low variability, with a mean of 55.3% and a standard deviation of 2.10. The narrow range between the minimum (52%) and maximum (59%) values reflects the gradual and structural nature of urban population growth. This suggests that urbanization acts as a stable macro-level driver of demand rather than a short-term fluctuating factor. In contrast, exchange rate uncertainty (VOLEX) exhibits greater variability, with a mean value of 5.96 and a standard deviation of 2.04. The range from 2.56 to 11 indicates periods of heightened volatility, capturing fluctuations in macroeconomic conditions that may influence firms' investment and landholding decisions. Overall, the descriptive statistics indicate sufficient variation in both firm-level and macroeconomic variables, supporting the suitability of the dataset for panel regression analysis.

Correlation Analysis

Table 2. Correlation Analysis

Variable	LB	RC	URB	VOLEX
LB	1.000			
RC	-0.127	1.000		
URB	0.034	0.112	1.000	
VOLEX	0.007	0.054	-0.221	1.000

These low pairwise correlations suggest that the relationships among the variables are not purely linear and may involve interaction effects. In particular, the absence of strong direct correlations supports the inclusion of moderating variables in the empirical model to capture conditional relationships. Exchange rate volatility (VOLEX) shows a near-zero correlation with landbanking (0.0073), indicating that its effect may not be evident in simple bivariate analysis. However, its role as a proxy for macroeconomic uncertainty warrants further examination in a multivariate framework. Importantly, the correlation matrix indicates no severe multicollinearity among the independent variables, as all correlation coefficients remain relatively low. This suggests that the regression estimates are unlikely to be distorted by collinearity issues.

Analysis of Results

This section interprets the regression results reported in Table V by linking the empirical findings to the proposed hypotheses.

Table 3. Panel Regression Results (Baseline Model)

Variable	Coefficient	Std. Error	t-Statistic	Sig
URB	0.120	0.085	1.41	ns
RC	8.540***	2.310	3.69	0.000
VOLEX	0.670**	0.290	2.31	0.021
Constant	-45.200	28.100	-1.61	ns

Table 3 presents the baseline regression results examining the direct effects of urbanization, revenue concentration, and exchange rate uncertainty on corporate landbanking. The findings show that revenue concentration (RC) has a positive and statistically significant effect at the 1% level, indicating that firms with more concentrated revenue structures tend to maintain larger landbanks. Exchange rate uncertainty (VOLEX) also has a positive and significant effect, suggesting that firms increase landholding as a strategic response to macroeconomic volatility. In contrast, urbanization (URB) does not show a statistically significant effect in this model, implying that its influence on landbanking is not uniform when firm-level heterogeneity is not explicitly considered. Overall, the baseline model highlights the importance of firm-level characteristics and macroeconomic uncertainty in shaping landbanking behavior.

Table 4. Panel Regression Results (Interaction Model)

Variable	Coefficient	Std. Error	t-Statistic	Sig
URB	0.980**	0.420	2.33	0.020
RC	10.210***	2.850	3.58	0.000
VOLEX	0.710**	0.300	2.36	0.018
URB × RC	-0.155**	0.070	-2.21	0.028
Constant	-92.400**	45.600	-2.02	0.044

Table 4 reports the regression results incorporating the interaction term between urbanization and revenue concentration. The results reveal that urbanization (URB) becomes positive and statistically significant when the interaction is included, indicating that its effect on landbanking is conditional upon firm characteristics. Revenue concentration (RC) remains positively significant, reinforcing its role as a key determinant of landholding strategies. Importantly, the interaction term (URB × RC) is negative and statistically significant, suggesting that higher revenue concentration weakens the positive impact of urbanization on landbanking. This finding indicates that firms with more concentrated revenue structures, although holding larger landbanks, tend to be less responsive to increases in urban demand compared to more diversified firms. The inclusion of the interaction term provides a more nuanced understanding of heterogeneous firm behavior.

Table 5. Model Summary Statistics

Model	R ²	Adj R ²	F-stat	Prob
(1)	0.18	0.16	12.45	0.000
(2)	0.24	0.21	14.88	0.000

Table VIII presents the summary statistics of the regression models. The results show that Model (2), which includes the interaction term, has a higher explanatory power compared to the baseline model, as reflected by the increase in R-squared from 0.18 to 0.24 and adjusted R-squared from 0.16 to 0.21. The F-statistics for both models are statistically significant, indicating that the models are jointly significant and well-specified. These results suggest that incorporating the moderating effect of revenue concentration improves the model's ability to explain variations in landbanking behavior.

The results provide strong support for H1 in the extended model. Urbanization (URB) has a positive and statistically significant effect on landbanking when the interaction term is included. This indicates that urban expansion plays a key role in shaping developers' land acquisition strategies. The positive coefficient suggests that as the urban population increases, firms tend to allocate more funds to land-related assets. This finding is consistent with urban economics theory, which posits that population concentration increases demand for land and drives up land values. In response, developers accumulate land to secure future development opportunities and benefit from expected price appreciation.

Interestingly, urbanization is not statistically significant in the baseline model but becomes significant after the inclusion of the interaction term. This suggests that the effect of urbanization on landbanking is conditional on firm characteristics, particularly revenue concentration. Therefore, H1 is supported, but its effect is contingent upon firm-level heterogeneity. The coefficient on revenue concentration (RC) is positive and statistically significant in the interaction model, supporting H2. This finding indicates that firms with more concentrated revenue structures tend to maintain larger landbanks.

This finding indicates that companies primarily engaged in property development tend to devote more resources to land acquisition. Since land is essential for property projects, firms with a higher focus on this area are more motivated to secure land to sustain their operations. This aligns with the idea that specialized firms tend to accumulate more assets in their main sector. In the property market context, landbanking becomes a strategic move driven by companies' reliance on real estate activities.

Exchange rate uncertainty (VOLEX) has a positive, statistically significant effect on landbanking across model specifications, providing support for H3. This finding indicates that firms increase landholding in response to macroeconomic volatility. From a real options perspective, higher uncertainty increases the value of waiting and discourages immediate investment in irreversible projects. Instead of initiating development, firms may choose to hold land as a flexible asset that preserves future investment opportunities. Thus, landbanking functions as a risk management strategy, allowing firms to maintain strategic positioning while avoiding exposure to uncertain costs and returns. The interaction term between urbanization and revenue concentration ($URB \times RC$) is negative and statistically significant, indicating that revenue concentration weakens the positive effect of urbanization on landbanking. This result supports H4. The relatively low R-squared is expected, given the use of firm-level panel data and the focus on structural relationships rather than predictive accuracy.

This finding highlights a key nuance in firm behavior. Although firms with higher revenue concentration tend to have larger landbanks, they are less responsive to gradual increases in urbanization. In essence, these concentrated firms follow a more stable and less reactive landholding approach. One possible explanation is that companies with highly concentrated revenue streams focus on maintaining a stable land inventory to support their long-term development plans. Consequently, their landbanking choices are less affected by short-term fluctuations in urban demand. Conversely, companies with more diversified revenues tend to respond more readily to urbanization trends. They may modify their land-acquisition strategies more dynamically in response to shifts in demand, thereby demonstrating greater adaptability in resource management. This result emphasizes the dual role of revenue concentration. It, on one hand, boosts baseline landbank holdings, and on the other, diminishes firms' sensitivity to external demand pressures. This distinction offers a more nuanced understanding of landbanking behavior and underscores the need to account for firm-level heterogeneity in the analysis.

DISCUSSION

The findings of this study provide important insights into the determinants of landbanking behavior in the property sector, particularly in rapidly urbanizing economies. By integrating macro-

level dynamics with firm-level characteristics, the results offer a more comprehensive understanding of how developers respond to urban expansion. Overall, this study confirms that landbanking is not solely driven by external demand pressures but is significantly shaped by internal firm structures, leading to heterogeneous strategic responses across firms.

The positive impact of urbanization on landbanking reinforces the fundamental argument of urban economics that population growth and spatial expansion increase land demand and incentivize developers to secure land in anticipation of future development opportunities (Jedi, 2024; Vitriana dkk., 2026). This finding is consistent with previous empirical studies showing that developers accumulate land during periods of urban growth to benefit from expected price appreciation and future project pipelines (H. Chen dkk., 2026; Geltner dkk., 2023). However, unlike prior studies that generally report a direct and uniform relationship, this study finds that the significance of urbanization emerges only after accounting for firm-level heterogeneity. This difference suggests that earlier research may have overgeneralized developer behavior by relying on aggregate or market-level analyses, whereas the present study demonstrates that the effect of urbanization is conditional upon internal firm characteristics. This discrepancy may be attributed to differences in methodology, particularly the use of firm-level panel data and interaction models, as well as the specific context of emerging markets where institutional and strategic diversity among firms is more pronounced.

The positive relationship between revenue concentration and landbanking further supports the resource-based view and internal capital market theory, which argue that firms allocate resources toward their core activities to sustain competitive advantage (Mailani dkk., 2024). This finding aligns with earlier studies in corporate finance and real estate that show focused firms tend to invest more intensively in their primary business sectors (Biehl dkk., 2024; Intara & Suwansin, 2024). However, this study extends the literature by explicitly linking revenue concentration to landbanking behavior, rather than general investment patterns. The consistency with prior findings suggests that strategic focus plays a crucial role in asset allocation decisions, particularly in asset-intensive industries such as real estate. At the same time, the stronger effect observed in this study may reflect the unique importance of land as a production input in property development, which makes land accumulation more sensitive to firm specialization compared to other industries.

The positive effect of exchange rate uncertainty on landbanking is consistent with real options theory, which posits that firms delay irreversible investments under uncertainty and shift toward more flexible asset strategies (He, 2024). This finding is also in line with empirical evidence showing that macroeconomic volatility influences corporate investment behavior and encourages precautionary asset holding (Fakhfakh, 2026; Y. Huang dkk., 2026; Ibrahim & Khaled, 2026). However, while prior studies generally focus on reduced capital expenditure under uncertainty, this study highlights a complementary mechanism in which firms increase landbank holdings as a form of strategic flexibility. This difference suggests that, in the real estate sector, uncertainty does not necessarily reduce asset accumulation but instead alters the composition of assets toward more flexible and option-like resources such as land. This insight contributes to the literature by extending the application of real options theory to landbanking as a specific strategic response.

A key contribution of this study lies in identifying the moderating role of revenue concentration in shaping the relationship between urbanization and landbanking. The findings show that higher revenue concentration weakens the positive effect of urbanization, indicating that concentrated firms, although holding larger landbanks, are less responsive to incremental changes in urban demand. This result is partially consistent with prior research suggesting that focused firms adopt more stable and less reactive investment strategies (Addo dkk., 2025; Wang dkk., 2026), while diversified firms exhibit greater responsiveness to external (Bui dkk., 2026; Gorodnyi dkk., 2025). However, the explicit identification of this moderating effect represents a novel contribution, as previous studies have not directly examined how firm structure conditions the impact of urbanization on landholding behavior. The observed difference may be explained by the strategic orientation of concentrated firms, which prioritize long-term asset stability over short-term responsiveness, whereas diversified firms possess greater flexibility to adjust investment decisions in response to changing market conditions.

This study offers a significant novelty by introducing a dual-effect perspective of revenue concentration, in which it simultaneously increases baseline landbank holdings while reducing firms' responsiveness to external demand drivers such as urbanization. This dual mechanism has not been explicitly articulated in previous literature, which typically treats firm characteristics as

either direct determinants or control variables rather than interactive forces. By distinguishing between baseline asset accumulation and demand responsiveness, this study provides a more nuanced understanding of landbanking behavior and advances the integration of urban economics, real estate, and corporate strategy.

The findings have important implications for theory, practice, and policy. From a theoretical perspective, this study contributes to the literature by demonstrating that landbanking behavior is shaped by the interaction between macroeconomic forces and firm-level characteristics, thereby challenging the assumption of homogeneous developer behavior in urban economics. From a practical standpoint, the results suggest that property developers should consider both external market conditions and internal strategic alignment when making land acquisition decisions. From a policy perspective, the findings highlight that uniform land-use regulations may be insufficient to address land supply issues, as firms respond differently based on their structural characteristics. Policymakers should therefore design more targeted interventions, such as differentiated land-use policies, development incentives, or regulatory frameworks that account for firm heterogeneity to improve housing supply responsiveness.

Finally, this study opens several avenues for future research. Further studies could explore additional firm-level characteristics, such as ownership structure, corporate governance, or financial constraints, to better understand the sources of heterogeneity in landbanking behavior. Comparative cross-country analyses would also be valuable in assessing how institutional contexts influence the interaction between urbanization and firm strategy. Moreover, future research could employ alternative measures of landbanking, such as physical land area or project pipeline data, to provide a more comprehensive understanding of landholding dynamics. By extending the analysis across different contexts and methodological approaches, future studies can further refine the theoretical and empirical understanding of landbanking in rapidly urbanizing economies.

CONCLUSION

This research explores the factors influencing corporate landbanking actions by combining macroeconomic drivers and firm-specific traits within a single empirical model. Analyzing panel data from publicly listed property developers in Indonesia, the results show that urbanization, currency exchange rate volatility, and revenue concentration significantly affect landbanking choices. The results indicate that urbanization has a positive impact on landbanking, reaffirming its function as a major demand-side driver in property markets. Additionally, exchange rate uncertainty is shown to promote landbanking, suggesting that companies treat land as a strategic asset to maintain flexibility during macroeconomic fluctuations. At the firm level, higher revenue concentration is positively associated with landbanking, suggesting that firms more heavily focused on property development allocate more resources to land assets. This study also reveals that revenue concentration influences how urbanization affects landbanking. The negative interaction suggests that firms with higher revenue concentration respond less to demand pressures driven by urbanization. Although these firms typically hold larger landbanks, their strategies tend to be more stable and less affected by small market shifts. This emphasizes the need to differentiate between landholding size and firms' responsiveness in their landbanking behaviors.

This study makes several contributions to the literature. First, this study introduces a dual-effect perspective in which revenue concentration simultaneously increases baseline landholding while reducing firms' responsiveness to external demand shocks, offering a more refined explanation of heterogeneous landbanking behavior. Instead of having a single impact, revenue concentration both boosts baseline landbank holdings and decreases firms' responsiveness to external demand factors. This dual effect helps better explain how firm characteristics influence strategic asset allocation in property markets. Second, the study combines insights from urban economics, real estate, and corporate strategy by linking external demand factors to firm-level differences. While earlier research mostly concentrated on overall market trends, this study highlights that developers are not all the same and that their reactions to urbanization depend systematically on their internal structures. Third, the study broadens the use of real options theory in real estate by demonstrating that landbanking serves not only to manage uncertainty but also as a strategic tool shaped by firm-specific factors. This enhances the understanding of landbanking as being driven by both market and firm considerations.

Despite these contributions, this study faces several limitations. First, landbanking is assessed using financial data that reflect the value of land-related assets relative to total assets.

While this method ensures data availability and comparability, it may not accurately represent the physical size of landholdings. Future research could enhance measurement accuracy by including data on land area (e.g., hectares), thereby providing a more direct measure of landbanking. Second, the analysis focuses on publicly listed property developers in Indonesia, which may limit the generalizability of the findings to other institutional contexts. Differences in land regulation, market structure, and governance across countries may influence landbanking behavior in ways not captured in this study. Third, revenue concentration measurement depends on segment disclosure data, which can differ in quality and completeness among firms. While efforts are made to maintain consistency, some measurement errors may still occur.

Building on these limitations, several directions for future research emerge. First, studies could explore landbanking behavior using different metrics, such as land area or project pipeline data, to better capture the operational aspects of landholding. Second, comparative studies across countries would enhance understanding of how institutional contexts influence the links among urbanization, firm traits, and landbanking. Third, further research might include additional firm-level factors, such as ownership structure, corporate governance, and financial constraints, to better understand the variability in landbanking strategies.

In conclusion, future studies could examine dynamic modeling methods to better understand how landbanking decisions evolve over time, especially in reaction to shifts in macroeconomic and market environments. This research emphasizes that landbanking is influenced not just by external demand pressures but also by strategic choices made at the firm level. By considering both macroeconomic factors and differences among firms, the study presents a more complete understanding of landbanking behaviors and provides useful insights for academic research and policy development in property markets.

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