

THE DETERMINANTS OF PBR AND THE ROLE OF OWNERSHIP CONCENTRATION: A SHAPLEY DECOMPOSITION APPROACH

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ABSTRACT

This study examines how ownership concentration influences firm valuation by decomposing the price-to-book ratio (PBR) into four financial components: market valuation (P/E ratio), profitability (net income/total revenue), operational efficiency (total revenue/total assets), and leverage (total assets/total equity). Using Shapley value decomposition and firm-level panel data from Korean listed companies (2014–2023), we evaluate the relative explanatory power of each component and analyze how the impact of ownership concentration on firm value varies by chaebol affiliation. The results show that PER and REV/ASSET account for a greater share of PBR variance than profitability or leverage, particularly in non-chaebol firms. Ownership concentration enhances profitability but diminishes asset efficiency, leading to a net adverse effect on firm value. These effects are more pronounced in non-chaebol firms, whereas chaebol-affiliated companies exhibit no significant relationship between ownership and firm value. By combining structural decomposition with corporate governance analysis, this study provides new insights into the drivers of firm value and the persistence of the Korea discount.

Keywords: Chaebol, Korea discount, Ownership concentration, PBR, Shapley decomposition

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1. INTRODUCTION

As of February 2024, the average price-to-book ratio (PBR) of Korean listed firms is approximately 1.1, significantly lower than the corresponding figures for major global markets such as the United States (4.5), the Eurozone (1.7), and Japan (1.6) (Refinitiv; Shinhan Investment Corp., 2024). This persistent valuation gap, widely referred to as the “Korea discount,” has gathered growing attention from both investors and scholars.

The relationship between ownership concentration and firm value has been widely examined within the framework of agency theory (Jensen & Meckling, 1976). From the alignment perspective, concentrated ownership mitigates agency conflicts by strengthening monitoring and aligning the interests of controlling shareholders and managers, thereby enhancing firm performance and market valuation. In contrast, the entrenchment view argues that controlling shareholders may extract private benefits at the expense of minority shareholders, particularly in environments with weak investor protection (Shleifer & Vishny, 1997; La Porta et al., 1999). However, much of the existing literature adopts an aggregate approach, treating firm value as a singular outcome—typically proxied by valuation multiples such as PBR or Tobin’s Q (e.g., Saravia et al., 2025). Consequently, little is known about how ownership structures influence the specific drivers that shape market valuation. As Demsetz and Lehn (1985) emphasize, ownership concentration is an endogenous outcome shaped by firm-specific factors. In non-chaebol firms, it often reflects intentional governance choices, making its effect on valuation more direct. In contrast, in chaebol firms, it typically arises from structural mechanisms such as pyramidal ownership and cross-shareholdings (Claessens et al., 2000; Kim, 2003). In such institutional contexts, ownership concentration may have different implications for how investors interpret firm performance, monitor managerial behavior, and assign value. To address this gap, this study aims to uncover how the Korea discount arises from differential performance across key financial dimensions and how ownership concentration interacts with these components. First, we decompose the PBR into four fundamental drivers—(1) market valuation (PER), (2) profitability (net income/total revenue), (3) asset efficiency (total revenue/total assets), and (4) financial leverage (total assets/total equity)—and evaluate their respective contributions to firm value using a Shapley value regression framework. Second, we analyze the impact of ownership concentration on each component to identify the channels through which governance structures affect valuation. Finally, we assess whether these relationships differ between chaebol and non-chaebol firms.

This study uses panel data on publicly listed Korean firms from 2014 to 2022 and employs fixed-effects regressions. Our main findings are as follows. First, the explanatory power of each PBR component differs significantly. In non-chaebol firms, PER and REV/ASSET account for a larger share of PBR. The explanatory power of these indicators is substantially diminished in chaebol firms. Second, ownership concentration is associated with a lower PBR. Specifically, while ownership concentration is positively related to NI/REV, it significantly reduces REV/ASSET. This indicates that concentrated ownership may hinder operational flexibility or reduce resource efficiency, thereby weakening market valuation despite improvements in profitability. Third, the impact of ownership concentration varies significantly depending on chaebol affiliation. In non-

chaebol firms, higher ownership concentration improves profitability but impairs asset efficiency. In contrast, chaebol-affiliated firms show no significant relationship between ownership concentration and any PBR component, suggesting that additional ownership stakes may not materially affect firm value. These findings demonstrate that ownership structures influence firm value through distinct financial channels and that their effects depend on corporate governance.

This study contributes several points to the literature. First, while prior studies largely rely on aggregate measures of firm value, we introduce a Shapley value regression approach to assess the relative explanatory power of financial fundamentals within the PBR framework. By decomposing firm value into its underlying components, this method enables us to identify the distinct channels through which market expectations, profitability, efficiency, and leverage contribute to valuation, thereby overcoming the limitations of aggregate approaches. These implications for investors and managers are that they identify which firm fundamentals are most strongly reflected in firm value. These findings offer insights into addressing the Korea discount, as reflected in Korean firms' lower PBRs relative to those of firms in other countries. Second, we document that ownership concentration affects firm value differently in chaebol and non-chaebol firms because it is formed through different mechanisms. While ownership concentration in non-chaebol firms mainly serves as a mechanism for firm-level monitoring, in chaebol firms, it is more closely tied to maintaining group control and coordinating affiliated firms. Also, internal capital markets within chaebol groups may mitigate firm-level risk through resource reallocation and cross-subsidization, thereby weakening the impact of ownership concentration on firm risk. Consequently, the same degree of ownership concentration has different valuation implications across the two organizational contexts. This distinction is particularly significant in the Korean context, where large business groups uniquely shape corporate governance structures.

The remainder of this paper is organized as follows. Section 2 provides an overview of the theoretical and empirical background. Section 3 develops the research hypotheses. Section 4 describes the data and methodology. Section 5 presents the empirical results. Section 6 concludes with a discussion of the study's contributions and policy implications.

2. BACKGROUND

2.1. PBR decomposition and explanatory power

Market value can be expressed as book value plus the present value of expected abnormal earnings (Ohlson, 1995; Feltham and Ohlson, 1995). Under this framework, PBR reflects the market's assessment of the firm's ability to generate returns in excess of the cost of capital relative to its recorded net assets. In this framework, abnormal earnings are generated when return on equity (ROE) exceeds the required return on equity, implying that firm value depends critically on the level and persistence of ROE. Based on this, PBR can be expressed as the product of the price-to-earnings ratio (PER) and ROE, as shown in Equation (1). PER reflects investor expectations regarding future earnings and risk, while ROE measures the firm's ability to generate returns on shareholders' equity.

$$PBR_{i,t} = PER_{i,t} * ROE_{i,t} \quad (1)$$

Following DuPont analysis, ROE can be further decomposed into return on assets (ROA) and asset efficiency (AE), where AE is defined as the ratio of total assets to equity. This allows PBR to be expressed as:

$$PBR_{i,t} = PER_{i,t} * ROA_{i,t} * AE_{i,t} \quad (2)$$

This study extends the decomposition further by substituting ROA into its more granular components—profitability (NI/Revenue) and asset turnover (Revenue/Assets), in line with Soliman (2008). This yields four interpretable components: market sentiment (PER), operational profitability (NI/REV), asset utilization (REV/ASSET), and financial leverage (ASSET/EQUITY). Understanding the individual contribution of each element to PBR enables a deeper examination of how firm value is formed.

$$PBR_{i,t} = PER_{i,t} * NI/REV_{i,t} * REV/ASSET_{i,t} * AE_{i,t} \quad (3)$$

To facilitate empirical estimation and regression-based analysis, Equation (3) is log-linearized. Taking the natural logarithm of both sides leads to Equation (4):

$$LNPBR_{i,t} = LNPER_{i,t} + LNNIREV_{i,t} + LNREVASSET_{i,t} + LNAE_{i,t} \quad (4)$$

LNPBR is defined as the natural logarithm of the price-to-book ratio, calculated as market capitalization divided by the book value of equity. LNPER is measured as the natural logarithm of the price-to-earnings ratio, computed as the market price per share divided by earnings per share. These market-based variables are calculated using year-end closing stock prices. LNNIREV represents the natural logarithm of net income divided by total revenue. LNREVASSET is defined as the natural logarithm of total revenue divided by total assets, indicating the asset turnover ratio. LNAE is measured as the natural logarithm of financial leverage, defined as total assets divided by total equity.

To assess the relative importance of these financial components in explaining firm valuation, this study adopts the Shapley R^2 decomposition framework. Traditional approaches, such as standardized regression coefficients or stepwise regressions, are often sensitive to variable ordering and do not account for overlapping explanatory power. In contrast, Shapley R^2 —rooted in cooperative game theory—allocates the overall R^2 across predictors by calculating their average marginal contributions across all possible combinations of variable inclusion (Lipovetsky & Conklin, 2001; Grömping, 2007). This method allows us to identify which components of the decomposed PBR are most influential in shaping firm valuation and whether these relationships differ by chaebol affiliation.

2.2. KOREA Discount and Chaebol

The term "Korea discount" first emerged in the aftermath of the 1997 Asian financial crisis, referring to the persistent undervaluation of Korean firms relative to their global peers. This phenomenon gained broader international recognition in the early 2000s when Korea liberalized its capital markets and opened its stock market to foreign investors, thus increasing global interest in Korean equities (OECD, 2018; Ducret & Isakov, 2020). The Korea discount typically manifests as structurally lower price-earnings (P/E) or price-to-book (P/B) ratios compared to firms in other advanced economies. Specifically, as of February 2024, the average P/B ratio of Korean listed firms is approximately 1.1, markedly lower than those observed in the United States (4.5), the Eurozone (1.7), and Japan (1.6) (Refinitiv; Shinhan Investment Corp., 2024). Based on this background, this study examines the impact of ownership concentration on corporate valuation in the Korean context. It explicitly investigates which fundamentals are more susceptible to undervaluation as a function of variations in ownership structure and how these patterns contribute to the persistence of the Korea discount. Chaebol affiliation is typically identified by the Korea Fair Trade Commission (KFTC), which annually publishes a list of large business groups that meet specific criteria. These include total asset size thresholds (usually exceeding 10 trillion Korean won) and the presence of intra-group shareholding relationships. Firms designated by the KFTC as belonging to a "large business group" are considered chaebol-affiliated in this study. Chaebol affiliation represents a distinct institutional feature of the Korean corporate landscape. These groups are characterized by high ownership concentration, complex pyramidal ownership structures, and a frequent divergence between control rights and cash flow rights (Claessens et al., 2000; La Porta et al., 1999; Kim, 2003).

In this regard, this study conducts a comparative analysis of chaebol-affiliated and non-chaebol firms to better understand how ownership concentration interacts with firm fundamentals in shaping valuation outcomes. By incorporating institutional heterogeneity into the analysis, the study contributes to a more comprehensive understanding of the structural causes behind the Korea discount and the mediating role of corporate governance.

3. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

3.1. PBR decomposition

PBR is a widely used indicator of firm valuation, providing insights into how market participants evaluate a company's value relative to its accounting book value. However, the PBR is not a simple measure; it is shaped by several key factors, including expected future growth, profitability, and accounting conservatism (Nezlobin et al., 2016). Prior research emphasizes the importance of breaking down valuation multiples to reveal the underlying drivers of firm value. In particular, Penman (1996) explains the theoretical connection between PER and PBR, showing that these metrics capture different but related aspects of market valuation. He suggests that while PER mainly reflects investors' expectations of future earnings growth, PBR considers both current profitability and how efficiently equity capital is used. Building on this idea, later studies such as

Nissim and Penman (2001) and Soliman (2008) have used ratio decomposition to better understand how various financial fundamentals influence valuation. These studies highlight that combining valuation ratios can hide the specific importance of their components, implying that breaking them apart can improve both predictive and interpretive accuracy in empirical analysis. Following this approach, this study breaks down PBR into four multiplicative parts that together represent financial and market features: each part plays a distinct role in reflecting firm value.

- **Price-to-Earnings Ratio (PER):** Captures investor sentiment and market expectations about future earnings.
- **Profit Margin (NI/REV):** This metric reflects a firm's ability to convert revenue into profit, thereby measuring operational profitability.
- **Asset Turnover (REV/ASSET):** Indicates how efficiently a firm utilizes its assets to generate revenue.
- **Financial Leverage (ASSET/EQUITY):** Represents the firm's capital structure and exposure to financial risk.

Given these considerations, it is theoretically and empirically unlikely that these components contribute equally to firm valuation. Assessing the relative explanatory power of each component is essential for understanding how market participants form valuation judgments. To address this, we adopt the Shapley value regression framework (Lipovetsky & Conklin, 2001), which allows for a robust allocation of R^2 across predictors.

Based on these theoretical and methodological foundations, we propose the following hypothesis:

H1: The explanatory power of each component in the PBR decomposition—PER, NI/REV, REV/ASSET, and ASSET/EQUITY—differs in magnitude.

3.2. Ownership Concentration and Firm Value

The relationship between ownership concentration and firm value has long been a subject of theoretical debate, centered around two competing views: the alignment hypothesis and the entrenchment hypothesis. According to Jensen and Meckling (1976), higher ownership concentration aligns the interests of controlling shareholders and managers, encouraging more efficient decision-making and improved resource utilization. Similarly, Mavruk and Carlsson (2015) suggest that concentrated ownership reduces information asymmetry and enhances monitoring, thereby improving profitability and asset efficiency. As controlling shareholders' incentives are better aligned with those of minority investors, equity sales and new share issuances are associated with lower agency costs, leading to higher market valuation and stronger investment performance (Saravia et al., 2025). The presence of controlling shareholders has a significant

positive effect on firm value, suggesting that ownership concentration mitigates agency conflicts and enhances monitoring (Valencia, 2025). In contrast, the entrenchment hypothesis argues that concentrated ownership may grant controlling shareholders excessive power, enabling them to extract private benefits at the expense of minority shareholders (Shleifer & Vishny, 1997; La Porta et al., 1999). In such cases, controlling shareholders may prefer to appoint family members or loyal insiders to key management positions rather than more qualified external professionals (Fan et al., 2007), which can lead to inefficient operations. Empirical evidence also shows that ownership concentration is often negatively associated with firm performance, particularly in environments with weak investor protection (Wang & Shailer, 2015). Moreover, the largest shareholders may act in their interests even when monitoring managers, especially in countries with underdeveloped legal and institutional frameworks (La Porta et al., 1999; Hansmann & Kraakman, 2004). In emerging markets like Korea, where corporate control structures are complex and legal enforcement is weaker, the dual nature of ownership concentration — both as a monitoring mechanism and a potential source of minority expropriation — warrants a more nuanced analysis.

These competing forces suggest that the net effect of ownership concentration on firm value is unlikely to be uniform. Compared to prior studies, we expect that ownership concentration influences components of firm value in different ways—for example, enhancing profitability through improved monitoring while simultaneously affecting leverage choices or market expectations through risk-taking or entrenchment incentives. This study expects that the association between ownership concentration and firm value may be heterogeneous across its determinants and suggests the following hypothesis.

H2: Ownership concentration has heterogeneous effects on the underlying components of firm value.

3.3. Ownership Concentration and Firm Value by Chaebol Affiliation.

The effect of ownership concentration on firm value can be both positive and negative, depending on the underlying mechanisms and institutional context. On the positive side, concentrated ownership may enhance firm value by aligning shareholders' and managers' interests, facilitating long-term strategic planning, and improving monitoring efficiency (Jensen & Meckling, 1976; Mavruk & Carlsson, 2015). Conversely, it may also reduce firm value by entrenching controlling shareholders, limiting managerial accountability, and enabling the extraction of private benefits (Shleifer & Vishny, 1997; La Porta et al., 1999).

As noted by Demsetz and Lehn (1985), ownership concentration should not be viewed as an exogenous determinant of firm performance. Instead, it is an endogenous outcome that reflects the firm's specific characteristics. They argue that rational managerial choices shape ownership structures. Building on this perspective, the relationship between ownership concentration and firm value is unlikely to be uniform across institutional contexts.

Farooq and Zarouali (2016) argue that firms located in financial centers derive fewer governance benefits from concentrated ownership, which suggests ownership concentration is value-relevant primarily when information asymmetry is high. In non-chaebol firms, ownership concentration often results from deliberate governance decisions, such as founder retention or performance-driven alignment, making its impact on valuation more interpretable and direct. In contrast, in chaebol-affiliated firms, ownership concentration is often a structural artifact—a byproduct of pyramidal ownership schemes, circular shareholding, and internal capital markets designed to preserve family control (Claessens et al., 2000; Kim, 2003). In these cases, ownership concentration may indicate an inherited or institutionalized feature of group control. In addition, Lee et al. (2025) suggest that, during financial crises, Korean chaebols reallocate resources across affiliates through internal capital markets, thereby stabilizing investment and reducing firm-level default risk. This implies that internal capital markets may attenuate the marginal effect of ownership concentration on firm value.

Therefore, the relationship between ownership concentration and firm value in chaebol firms may be less pronounced or statistically insignificant, as ownership concentration may not carry governance-related intent. In addition, in chaebol-affiliated firms, group-level characteristics play a dominant role in determining firm value, potentially attenuating the impact of controlling shareholders' ownership on firm valuation. Taken together, these findings suggest that while ownership concentration can influence firm value in both directions, the strength and nature of that influence vary depending on how the concentration is formed.

Accordingly, the functional meaning of ownership concentration differs between chaebol and non-chaebol firms, and its effect on firm value does as well. Thus, this study proposes the following hypothesis:

H3: The effect of ownership concentration on the components of the PBR differs between chaebol-affiliated and non-chaebol firms.

4. RESEARCH DESIGN

4.1. Data and Sample Selection

This study uses financial data from TS2000 (the Korean equivalent of Compustat) for firms listed in Korea. The initial sample includes 17,984 firm-year observations of firms with a December fiscal year-end from 2014 to 2022. This period allows us to capture two major institutional and economic events relevant to corporate governance in Korea: the implementation of the revised External Audit Act, which enhanced external monitoring and financial reporting transparency, and the COVID-19 pandemic. We exclude financial firms, firm-year observations with missing financial data, and firms reporting negative net income. After applying these screening criteria, the final sample comprises 10,367 firm-year observations. All continuous variables, except dummy variables, are winsorized at the top and bottom 1% levels to reduce the impact of outliers.

4.2. Research method

To analyze the relative contribution of each financial component to firm value (H1), this study uses the Shapley value regression method as proposed by Lipovetsky and Conklin (2001). Unlike traditional regression coefficients, which can be affected by multicollinearity or the order of variables, the Shapley approach calculates each predictor's average marginal contribution to R^2 across all possible permutations. This provides fair, order-independent importance scores, making it ideal for our context, where PER, NI/REV, REV/ASSET, and ASSET/EQUITY are structurally interconnected components of the PBR identity. The analysis relies on the equation (5).

$$LNPR_{i,t} = LNPER_{i,t} + LNNI/REV_{i,t} + LNREV/ASSET_{i,t} + LNAE_{i,t} \quad (5)$$

Shapley R^2 values are calculated for each component using the LMG decomposition algorithm (Grömping, 2007). We then perform bootstrap resampling (500 iterations) to create confidence intervals for the differences between variables. This allows for formal testing of whether the explanatory power of financial components varies significantly across groups.

To test Hypotheses 2 and 3, which explore the influence of ownership concentration on firm valuation and its financial components, we use a firm-level fixed-effects panel regression model. This method accounts for unobserved, time-invariant firm-specific differences. Standard errors are clustered at the firm level to address serial correlation and heteroscedasticity. The Hausman test verifies that the fixed-effects model is appropriate.

Equation (6) is used to estimate these relationships. The dependent variable, LNVALUE, is measured as the natural logarithm of firm value. Firm value is proxied by LNPR, LNPER, LNNIREV, LNREVASSET and LNAE. The variable of interest is OWNER, representing the equity stake held by the largest shareholder and related parties. To assess whether the effects of ownership concentration vary by chaebol affiliation, we estimate Equation (6) separately for chaebol and non-chaebol firms.

$$LNVALUE_{i,t} = \beta_0 + \beta_1 OWNER_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 FOREIGN_{i,t} + \beta_4 GROW_{i,t} + \beta_5 DIV_{i,t} + \beta_6 LEV_{i,t} \quad (6)$$

Let i denote the firm and t denote the year.

$LNPR_{i,t}$: Natural logarithm of the price-to-book ratio, defined as the sum of market price per share and dividend per share divided by book value per share;

$LNPER_{i,t}$: Natural logarithm of the price-to-earnings ratio, defined as the sum of market price per share and dividend per share divided by earnings per share;

$LNNIREV_{i,t}$: Natural logarithm of profitability, measured as net income divided by total revenue;

$LNREVASSET_{i,t}$: Natural logarithm of asset efficiency, calculated as total revenue divided by total assets;

$LNAE_{i,t}$: Natural logarithm of asset-to-equity ratio (financial leverage), computed as total assets divided by total equity;
 $OWNER_{i,t}$: Ownership ratio of the largest shareholders and related parties;
 $SIZE_{i,t}$: Natural logarithmic of total assets ;
 $FOREIGN_{i,t}$: Percentage of shares held by foreign investors;
 $GROW_{i,t}$: Annual sales growth rate ;
 $\varepsilon_{i,t}$: The residual term.

5. RESULT

5.1. Descriptive Statistics and Correlation Matrix

Table 1, Panel A reports the descriptive statistics for the key variables used in the analysis. The mean of PBR_DIV is 1.827, indicating that the combined value of stock price and dividend payments is approximately 1.83 times the book value of equity. The average PER, reflecting the dispersion in market expectations regarding earnings, is 39.463. NI_REV has a mean of 0.118, suggesting that, on average, net income accounts for 11.8% of revenue. The variable REV_ASSET averages 0.880, indicating that 88% of assets are converted into revenue, a proxy for operational efficiency. The mean ASSET_EQUITY is 1.73, implying that total assets are 1.73 times shareholders' equity. OWNER, defined as the ownership share of the largest shareholder, has an average value of 42.86%, suggesting a high concentration of ownership typical of the Korean corporate structure. The average firm SIZE, measured as the natural logarithm of total assets, is 19.324. The mean FOREIGN ownership is 8.067%, and the average annual sales growth rate (GROW) is 0.124. The average dividend-to-net-income ratio (DIV_INCLINE) is 26.872, and the mean debt ratio (LEV_RATIO) is 0.333, indicating that approximately one-third of assets are financed by debt.

Table 1. <Panel A>

Panel B of Table 1 categorizes the sample into terciles based on ownership concentration and presents the corresponding group means. Interestingly, firms with the lowest ownership concentration (Q1) exhibit the highest PBR_DIV (2.262), while those with medium and high concentration display lower ratios (1.61 and 1.62, respectively). PER also tends to be higher in the low ownership group, suggesting that markets may assign premium valuations to firms with more dispersed ownership structures. Additionally, NI_REV and GROW are somewhat elevated in the low-ownership group. Foreign ownership (FOREIGN) decreases as ownership concentration increases, potentially indicating a negative relationship between external investor participation and the dominance of controlling shareholders.

Table 1. <Panel B>

Panel C of Table 1 presents descriptive statistics segmented by both chaebol affiliation and ownership concentration, offering insights into how firm characteristics vary across these dimensions. Among chaebol-affiliated firms, PBR_DIV exhibits a U-shaped pattern, with the highest value in the low-ownership group (2.003), the lowest in the mid-ownership group (1.275), and a rise again in the high-ownership group (1.858). This suggests that neither low nor high ownership concentration alone determines firm value in chaebol firms; rather, intermediate concentration may signal governance inefficiencies or diminished market confidence. In contrast, non-chaebol firms show a monotonic decline in PBR_DIV as ownership concentration increases, from 2.298 (low) to 1.582 (high), implying that markets may view higher concentration negatively, potentially due to concerns about managerial entrenchment or reduced transparency.

Non-chaebol firms consistently outperform chaebol firms across all ownership groups in PER, ROA, and GROW, suggesting stronger profitability and a more favorable market outlook. For instance, non-chaebol PER ranges from 36.879 to 49.378, significantly exceeding the chaebol range of 23.894 to 34.878. In terms of asset efficiency, REV_ASSET increases with ownership concentration among chaebol firms (from 0.844 to 1.037), whereas it declines slightly in non-chaebol firms (from 0.885 to 0.852). This may reflect better internal capital utilization within chaebol groups as ownership rises. Regarding capital structure, chaebol firms consistently exhibit higher ASSET_EQUITY ratios than non-chaebol firms, particularly at the mid-ownership level (2.032 vs. 1.706), possibly due to group-level financial strategies or access to internal funding channels. Finally, DIV_INCLINE, representing a firm's dividend propensity, increases with ownership among non-chaebol firms, peaking at 33.599 in the high-ownership group. In contrast, chaebol firms show relatively stable dividend policies, with less variation across ownership levels.

Table 1. <Panel C>

Table 2 presents the Pearson correlation matrix for the main variables. PBR exhibits the strongest positive correlation with PER (0.623), highlighting the significant role of earnings-based valuation in explaining market value. It also shows modest positive associations with NI/REV, REV/ASSET, and ASSET/EQUITY, indicating that accounting fundamentals contribute to firm valuation, though to a lesser degree. The OWNER variable is negatively correlated with PBR, suggesting that higher ownership may be linked to lower market valuations, potentially due to perceived agency risks. SIZE is negatively correlated with PBR (−0.269) and PER (−0.194), indicating that larger firms typically trade at lower relative valuation multiples. FOREIGN is positively correlated with SIZE (0.477) and NI/REV (0.122), but negatively associated with DIV_INCLINE (−0.084) and OWNER (−0.125). DIV_INCLINE has positive correlations with PER (0.253) and OWNER (0.162), but negative correlations with NI/REV (−0.254), REV/ASSET (−0.156), and ASSET/EQUITY (−0.108).

Table 2

5.2. Shapley value decomposition of the PBR regression models

Table 3 presents the Shapley value decomposition of the PBR regression models, depicting the relative contributions of each component—PER, NI/REV, REV/ASSET, and ASSET/EQUITY—to the total R^2 across the entire sample and subsamples categorized by Chaebol affiliation. In the full sample, PER demonstrates the highest explanatory power ($R^2 = 0.068$), followed by REV/ASSET (0.048), NI/REV (0.043), and ASSET/EQUITY (0.002). Also, Table 3, Panel D, reports that PER's explanatory power is significantly higher than that of the other components. These findings confirm that the explanatory power of each PBR component varies substantially, supporting Hypothesis 1.

Striking contrasts emerge between chaebol-affiliated and non-chaebol firms. For non-chaebol firms, the explanatory contribution of PER rises markedly to 0.079, compared to just 0.018 in chaebol firms. Table 3, Panel D, shows that the explanatory contribution of PER does not differ significantly from those of other components among chaebol-affiliated firms. In contrast, PER contributes significantly more than other components among non-chaebol firms. This indicates that PER plays a considerably more prominent role in shaping firm value for non-chaebol firms. This disparity can be attributed to differences in the information environment. Chaebol-affiliated firms operate in relatively information-rich settings, which allow firm value to be largely explained by financial performance. In contrast, non-chaebol firms operate under more limited information conditions, leading investors to place greater weight on forward-looking valuation metrics such as PER, which capture expectations of future growth.

The contributions of NI/REV (0.047) and REV/ASSET (0.053) are notably higher in non-chaebol firms than in their chaebol counterparts (0.026 and 0.023, respectively), suggesting that profitability and asset utilization are more critical determinants of firm value. In contrast, ASSET/EQUITY contributes minimally across both groups, implying that financial leverage has limited influence on PBR, regardless of ownership concentration or group affiliation.

These differences in Shapley value contributions across PBR components reinforce the importance of decomposing PBR into its underlying elements, rather than treating it as a monolithic indicator. Collectively, these results provide empirical support for H1, demonstrating that different components of firm fundamentals exert varying degrees of influence on valuation, depending on the firm's characteristics.

Table 3

5.3. Multivariate analysis

5.3.1. The Impact of Ownership Concentration on Firm Value and Its Components

Table 4, Panel A, presents regression results examining the relationship between ownership concentration and firm value, along with its decomposed components: PER, NI/REV, REV/ASSET, and ASSET/EQUITY. In the full sample (Panel A), ownership concentration (OWNER) is significantly and negatively associated with overall firm value (PBR_DIV), indicating that higher ownership concentration is, on average, linked to lower market valuations. This result is consistent with the entrenchment hypothesis, suggesting that controlling shareholders may expropriate minority investors, thereby reducing firm valuation. However, a detailed examination of the underlying components reveals more nuanced effects. OWNER shows a significant positive association with profitability (NI/REV), suggesting that concentrated ownership may incentivize operational performance improvements. Simultaneously, OWNER is negatively associated with REV/ASSET, implying potential inefficiencies in asset utilization under high ownership concentration. Notably, no significant effect is observed on PER or ASSET/EQUITY, indicating that ownership structure does not systematically influence market sentiment or capital structure in the overall sample.

Overall, these findings provide strong support for Hypothesis 2, confirming that ownership concentration does not uniformly influence firm value but operates through distinct financial channels, particularly profitability and asset utilization. This highlights the heterogeneous nature of ownership effects across various dimensions of firm performance, aligning with the theoretical expectation that ownership structure influences specific value components rather than overall firm value.

Table 4. <Panel A>

5.3.2. Heterogeneity by Chaebol Affiliation

Table 4, Panels B and C present regression results examining the relationship between ownership concentration and firm value across chaebol and non-chaebol firms. In non-chaebol firms (Panel B), ownership concentration has a significant adverse effect on the PBR, indicating that higher ownership stakes are associated with lower market valuation. However, a decomposition of the PBR reveals a more nuanced pattern: ownership concentration is positively associated with NI/REV, but negatively associated with REV/ASSET. This suggests that declines in operational efficiency may primarily drive the overall adverse effect on PBR. Moreover, given that REV/ASSET has greater explanatory power for firm value than NI/REV in non-chaebol firms, as indicated by the Shapley R^2 analysis, the negative association with asset turnover appears to dominate the positive effect on profitability.

In contrast, in chaebol-affiliated firms (Panel C), ownership concentration shows no statistically significant effect on PBR. Although the coefficient of OWNER on REV/ASSET is marginally significant, its magnitude and significance are significantly weaker than those in non-chaebol firms.

This suggests that the meaning and implications of ownership concentration vary by chaebol affiliation. In chaebol structures, where control is often exercised through pyramidal ownership and cross-shareholdings, a high level of formal ownership concentration may not necessarily carry the same implications as in non-chaebol firms. This suggests that the meaning and governance role of ownership structure can vary by chaebol affiliation, highlighting the importance of interpreting ownership concentration in its institutional and organizational context. Also, these suggest that internal capital markets and group-level monitoring mitigate agency conflicts and weaken the marginal impact of ownership concentration on firm value. The results provide strong support for Hypothesis 3, confirming that the impact of ownership concentration is not uniform across firms but instead depends critically on chaebol affiliation.

Table 4. <Panel B>

Table 4. <Panel C>

5.3.3. The direct effect of ownership concentration on firm value

To examine the direct impact of ownership concentration on firm value, we estimate a multivariate regression using the PBR as the dependent variable. Table 5 presents the results for the full sample (Column 1), as well as for subsamples of chaebol-affiliated (Column 2) and non-chaebol firms (Column 3). This specification enables us to isolate the marginal contribution of ownership concentration (OWNER), while controlling for the financial drivers of PBR—PER, NI/REV, REV/ASSET, and ASSET/EQUITY, as well as firm characteristics including size, growth, foreign ownership, dividend policy, and leverage.

In the full sample, ownership concentration is negatively and significantly associated with PBR, suggesting that larger ownership stakes by controlling shareholders are linked to lower market valuations. This relationship persists in the non-chaebol sample, indicating that concentrated ownership in these firms may raise concerns among investors regarding governance or resource allocation. In contrast, in chaebol firms, the coefficient on OWNER is negative but statistically insignificant, suggesting that the effect of ownership concentration is less direct or discernible in these firms, possibly due to the prevalence of pyramidal control or internal capital markets, which may decouple formal ownership from actual control.

Other financial drivers demonstrate consistent results across subsamples. PER, NI/REV, and REV/ASSET are all positively and significantly related to PBR, confirming their central role in shaping valuation. Notably, REV/ASSET shows the most significant coefficient magnitude across all models, reinforcing the importance of operational efficiency in market-based valuation. ASSET/EQUITY, representing financial leverage, does not show a significant association in most cases, aligning with prior evidence.

Overall, these findings reinforce the notion that ownership concentration can directly diminish firm value, particularly in non-chaebol firms, where ownership stakes more accurately reflect managerial incentives. In contrast, in chaebol firms, the impact of ownership concentration may be

less pronounced or complicated by structural and institutional factors.

Table 5.

6. CONCLUSION

This study examines the impact of ownership concentration on firm value by analyzing the PBR through four key components: PER, NI/REV, REV/ASSET and ASSET/EQUITY. Using a Shapley decomposition framework, this measure assesses the relative impact of each component while evaluating the influence of ownership concentration in chaebol-affiliated firms.

The key findings are as follows. First, the explanatory power of PBR components is notably uneven, with PER and REV/ASSET being the most significant contributors. This suggests that both investor sentiment and operational efficiency play crucial roles in determining a firm's value. Second, ownership concentration does not have a consistent effect on firm value; it boosts profitability but detracts from asset efficiency, ultimately harming firm value. Third, these impacts vary based on chaebol affiliation. In non-chaebol firms, ownership concentration is negatively correlated with firm value, reinforcing the notion that concentrated control may hinder operational efficiency and investor confidence. In contrast, chaebol-affiliated firms show no significant relationship between ownership concentration and the key financial metrics that drive market valuation. These findings are particularly significant in the Korean context, where ownership percentages may not accurately reflect actual control rights due to complex ownership structures, such as pyramids and cross-shareholdings. Therefore, assessments of governance-related risk should extend beyond formal ownership levels to consider structural and institutional nuances. Furthermore, our results suggest that enhancing market-based monitoring and transparency, particularly for non-chaebol firms, could facilitate the realization of efficiency benefits associated with concentrated ownership by aligning it more closely with performance incentives. These findings also provide implications for corporate governance reform in Korea. The results suggest that governance policies should consider these structural differences when designing mechanisms to improve market valuation and protect minority shareholders.

This study has several limitations. Because our decomposition framework of firm value (e.g., $PBR = PER \times ROE$) requires positive net income for meaningful interpretation and logarithmic transformation, firm-year observations with negative earnings are excluded. While this restriction ensures analytical consistency, it may limit the generalizability of the findings to profitable firms. Future research could extend the analysis by employing alternative analyses.

Table 1: Descriptive Statistics

Panel A: All firms

Variable	N	Mean	SD	P25	P50	P75
PBR_DIV	10367	1.827	1.905	0.753	1.231	2.142
PER	10367	39.463	67.441	10.048	17.819	35.239
NI_REV	10367	0.118	0.175	0.029	0.062	0.127
REV_ASSET	10367	0.88	0.558	0.516	0.786	1.134
ASSET_EQUITY	10367	1.73	0.808	1.228	1.503	1.946
OWNER	10367	42.859	15.789	31.26	42.37	53.57
SIZE	10367	19.324	1.371	18.376	19.075	19.95
GROW	10367	0.124	0.381	-0.035	0.059	0.186
FOREIGN	10367	8.067	11.565	1.24	3.25	9.81
DIV_INCLINE	10367	26.872	39.432	0	16.03	33.09
LEV_RATIO	10367	0.333	0.184	0.179	0.321	0.469

Panel B: < Descriptive Statistics by Ownership Concentration>

Variable	Low Ownership (Q1)	Mid Ownership (Q2)	High Ownership (Q3)
PBR_DIV	2.262	1.61	1.62
PER	46.343	35.602	36.611
NI_REV	0.111	0.117	0.125
REV_ASSET	0.881	0.883	0.878
ASSET_EQUITY	1.778	1.745	1.668
OWNER	25.396	42.197	60.471
SIZE	19.203	19.343	19.422
GROW	0.153	0.111	0.109
FOREIGN	9.54	8.277	6.428
DIV_INCLINE	19.52	27.626	33.26
LEV_RATIO	0.347	0.336	0.316

Panel C: <Descriptive statistics by chaebol and ownership concentration>

Group	CHAEBOL=1			CHAEBOL=0		
	OWNER=1	OWNER=2	OWNER=3	OWNER=1	OWNER=2	OWNER=3
Variable						
PBR_DIV	2.003	1.275	1.858	2.298	1.656	1.582
PER	23.894	32.491	34.878	49.378	36.092	36.879
ROA	0.065	0.046	0.046	0.068	0.064	0.060
NI_REV	0.131	0.127	0.115	0.109	0.116	0.126
REV_ASSET	0.844	0.929	1.037	0.885	0.876	0.852
ASSET_EQUITY	1.956	2.032	1.899	1.753	1.706	1.631
GROW	0.099	0.089	0.140	0.160	0.114	0.104
SIZE	22.041	21.344	20.774	18.811	19.066	19.205
DIV_INCLINE	31.086	34.966	31.075	17.926	26.596	33.599

Table 2: Correlation matrix

	PBR	PER	NI/ Rev	Rev/ Asset	Asset/ Equity	Owner	Size	Grow	Foreign	Div Incl.
PBR	1.000									
PER	0.623	1.000								
NI/REV	0.127	-0.362	1.000							
REV/ ASSET	0.140	-0.094	-0.499	1.000						
ASSET/ Equity	0.011	-0.065	-0.378	0.309	1.000					
Owner	-0.119	-0.048	0.029	-0.088	-0.066	1.000				
Size	-0.269	-0.194	-0.003	-0.101	0.178	0.065	1.000			
Grow	0.140	-0.009	0.103	0.105	0.024	-0.048	-0.017	1.000		
Foreign	0.026	-0.084	0.122	-0.005	-0.084	-0.125	0.477	-0.013	1.000	
Div Incl.	-0.097	0.253	-0.254	-0.156	-0.108	0.162	0.120	-0.099	0.065	1.000

Note: Pearson correlation coefficients are reported. * p < 0.05, ** p < 0.01 (two-tailed).

Table 3: Contributions of PBR components to the R-square of the regression

Panel A: <All>

Contribution	PER	NI REV	REV ASSET	ASSET EQUITY	Total
Absolute Contribution	0.068	0.043	0.048	0.002	0.161
Relative Contribution (in %)	42%	27%	30%	1%	100%

Panel B: <Chaebol>

Contribution	PER	NI REV	REV ASSET	ASSET EQUITY	Total
Absolute Contribution	0.018	0.026	0.023	0.001	0.068
Relative Contribution (in %)	26%	38%	34%	2%	100%

Panel C: <Non-Chaebol>

Contribution	PER	NI REV	REV ASSET	ASSET EQUITY	Total
Absolute Contribution	0.079	0.047	0.053	0.003	0.182
Relative Contribution (in %)	43%	26%	29%	2%	100%

Panel D: <Significance Difference>

	All	Chaebol	Non-Chaebol
PER	0.025	-0.008	0.031
– NI_REV	(0.000)	(0.338)	(0.000)
PER	0.020	-0.005	0.025
– REV_ASSET	(0.033)	(0.638)	(0.024)
PER	0.066	0.017	0.076
– ASSET_EQUITY	(0.000)	(0.138)	(0.000)
NI_REV	-0.005	0.003	-0.006
– REV_ASSET	(0.531)	(0.790)	(0.544)
NI_REV	0.041	0.025	0.045
– ASSET_EQUITY	(0.000)	(0.057)	(0.000)
REV_ASSET	0.046	0.022	0.051
– ASSET_EQUITY	(0.000)	(0.061)	(0.000)

NOTE: The numbers in parentheses are p-values.

Table 4: The impact of ownership concentration on firm value

Panel A: All firms					
	(1) PBR_DIV	(2) PER	(3) NI_REV	(4) REV_ASSET	(5) ASSET_EQUITY
OWNER	-0.007*** (-3.87)	-0.004 (-1.12)	0.010*** (3.48)	-0.009*** (-3.43)	0.000 (0.49)
SIZE	-0.329*** (-9.30)	-0.412*** (-5.29)	0.247*** (3.80)	-0.048 (-0.87)	-0.058*** (-4.52)
GROW	0.105*** (6.63)	-0.038 (-0.92)	0.042 (1.47)	0.336*** (15.67)	-0.015* (-1.92)
FOREIGN	0.017*** (8.14)	-0.001 (-0.43)	0.005* (1.81)	0.012*** (4.76)	-0.001 (-1.09)
DIV_INCLINE	0.000 (0.25)	0.014*** (37.75)	-0.013*** (-35.74)	-0.001*** (-6.05)	-0.000*** (-9.17)
LEV_RATIO	1.026*** (10.36)	1.144*** (5.29)	-2.359*** (-12.27)	0.947*** (5.94)	1.143*** (27.22)
<i>N</i>	10367	10367	10367	10367	10367
adj. <i>R</i> ²	0.17106	0.16901	0.31282	0.22221	0.27811
<i>F</i>	103.056	125.742	122.679	41.576	70.456

NOTE: The numbers in parentheses are t-statistics. *R*² denotes the *R*² square value. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel B: Non-Chaebol

	(1)	(2)	(3)	(4)	(5)
	PBR_DIV	PER	NI_REV	REV_ASSET	ASSET_EQUITY
OWNER	-0.007*** (-3.71)	-0.003 (-0.95)	0.009*** (3.11)	-0.008*** (-3.04)	0.001 (0.94)
SIZE	-0.332*** (-8.71)	-0.443*** (-5.22)	0.323*** (4.79)	-0.098* (-1.71)	-0.064*** (-4.46)
GROW	0.105*** (6.09)	-0.071 (-1.55)	0.061* (1.92)	0.334*** (13.88)	-0.015* (-1.77)
FOREIGN	0.016*** (6.87)	-0.000 (-0.12)	0.006** (2.07)	0.011*** (4.34)	-0.000 (-0.66)
DIV_INCLINE	0.000 (0.28)	0.013*** (35.75)	-0.013*** (-31.80)	-0.001*** (-5.41)	-0.000*** (-8.41)
LEV_RATIO	1.067*** (9.86)	1.224*** (5.39)	-2.391*** (-11.62)	0.870*** (5.02)	1.117*** (24.92)
<i>N</i>	9053	9053	9053	9053	9053
adj. <i>R</i> ²	0.17214	0.16752	0.30543	0.22150	0.26211
<i>F</i>	92.668	113.670	99.386	36.997	60.438

NOTE: The numbers in parentheses are t-statistics. *R*² denotes the *R*² square value. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel C: Chaebol

	(1)	(2)	(3)	(4)	(5)
	PBR_DIV	PER	NI_REV	REV_ASSET	ASSET_EQUITY
OWNER	-0.005 (-0.74)	-0.003 (-0.16)	0.016 (1.19)	-0.015* (-1.84)	-0.003 (-0.96)
SIZE	-0.318*** (-3.48)	-0.229 (-1.01)	-0.269 (-1.39)	0.285* (1.77)	-0.039 (-1.36)
GROW	0.091** (2.13)	0.215** (2.58)	-0.115** (-1.98)	0.371*** (7.97)	-0.017 (-0.94)
FOREIGN	0.018*** (4.67)	-0.009 (-0.84)	0.004 (0.40)	0.016** (2.28)	-0.002 (-1.51)
DIV_INCLINE	-0.000 (-0.04)	0.016*** (12.32)	-0.014*** (-17.47)	-0.001** (-2.36)	-0.001*** (-4.05)
LEV_RATIO	0.764*** (3.27)	0.700 (1.00)	-2.290*** (-4.18)	1.614*** (4.20)	1.351*** (10.81)
<i>N</i>	1314	1314	1314	1314	1314
adj. R^2	0.20646	0.19374	0.38770	0.30531	0.41144
F	12.987	18.144	30.423	9.144	16.640

NOTE: The numbers in parentheses are t-statistics. R^2 denotes the R^2 square value. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5: Direct effect of Ownership concentration on firm value

	(1)All PBR_DIV	(2)Chaebol PBR_DIV	(3)Non-Chaebol PBR_DIV
PER	0.164*** (7.47)	0.067*** (2.76)	0.182*** (6.64)
NI_REV	0.211*** (10.67)	0.163*** (4.92)	0.224*** (9.30)
REV_ASSET	0.223*** (11.35)	0.129*** (2.89)	0.240*** (10.98)
ASSET_EQUITY	-0.032 (-0.76)	-0.240* (-1.82)	-0.021 (-0.47)
OWNER	-0.003*** (-3.73)	-0.002 (-0.53)	-0.003*** (-3.67)
SIZE	-0.146*** (-11.63)	-0.122*** (-4.01)	-0.175*** (-11.23)
GROW	0.047*** (3.00)	0.052 (1.37)	0.043** (2.54)
FOREIGN	0.012*** (9.20)	0.017*** (5.33)	0.011*** (7.85)
DIV_INCLINE	0.001*** (3.42)	0.001** (2.42)	0.001*** (3.21)
LEV_RATIO	1.090*** (13.03)	1.087*** (4.24)	1.144*** (12.96)
N	10367	1314	9053
adj. R2	0.4809	0.4838	0.5020
F	125.732	21.514	121.091

NOTE: The numbers in parentheses are t-statistics. R2 denotes the R2 square value. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

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