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# The Duality of Corporate Governance: Independence vs. managerial Control Revealed by Principal Components

**Anandhayu Mahatma Ratri[1*], Siti Deviatul Huzaifah[2], Agung Suwandaru[3], Wahyu Wiyani[4], Ginanjar Indra Kusuma Nugraha[5],**

[1, 2, 3, 4, 5]*Department of Business Administration, Faculty of Social dan Political Science, University of Merdeka Malang, Malang, Indonesia*

[6]*Department of ..., Faculty of ..., University of ..., City, Country*

***Corresponding Author:** anandhayu@unmer.ac.id*

## ABSTRACT

*Corporate governance mechanisms exhibit complex variations that traditional analytical methods often fail to capture comprehensively. This study introduces an innovative Panel Principal Component Analysis (PCA) approach to systematically decompose governance structures into between-firm and within-firm components, utilizing a balanced panel dataset of 85 firm-year observations from 17 Indonesian public companies (2019–2023). The between-firm analysis extracted two significant components explaining 72.5% of total variance, revealing a fundamental duality where the first component (38.99%) reflects stable, firm-specific governance features and the second component (33.53%) captures an inherent trade-off between institutional ownership and audit committee independence. Within-firm analysis identified a primary temporal pattern (35.4% variance) where monitoring mechanisms contrast with managerial control, highlighting cyclical governance adjustments validated through Structural Equation Modeling with near-perfect fit (CFI = 1.000, TLI = 1.000, SRMR = 0.000). Our Panel PCA framework demonstrates that effective corporate governance requires balancing stable, firm-specific elements with dynamic, adaptive mechanisms, challenging conventional static governance metrics and suggesting that policymakers and corporate boards should develop more nuanced, context-sensitive governance frameworks that account for both structural and temporal dimensions of governance quality.*

**Keywords:** *Board Structure, Corporate Governance, Ownership Structure, Panel Data Analysis, Principal Component Analysis*

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## 1. INTRODUCTION

Corporate governance serves as the fundamental framework through which companies are directed and controlled, encompassing the relationships among management, board of directors, shareholders, and other stakeholders (OECD, 2015). The effectiveness of corporate governance mechanisms has been extensively studied, yet traditional analytical approaches often treat governance as a monolithic construct, failing to capture its multidimensional and dynamic nature.

The complexity of corporate governance arises from the interplay between various mechanisms: board composition, audit committee independence, ownership structures, and managerial incentives. These elements do not operate in isolation but form an intricate system where changes in one dimension may trigger adjustments in others. Furthermore, governance structures exhibit both persistent, firm-specific characteristics and time-varying adaptations to changing regulatory environments and market conditions.

This study addresses a critical gap in the governance literature by introducing an innovative Panel Principal Component Analysis (PCA) approach that systematically decomposes governance structures into their between-firm (cross-sectional) and within-firm (temporal) components. This methodological innovation allows us to distinguish between stable, firm-specific governance features and dynamic, time-dependent adjustments, providing a more nuanced understanding of governance dynamics.

The Indonesian context offers a particularly rich setting for this investigation. As one of Southeast Asia's largest economies, Indonesia has undergone significant corporate governance reforms following the 1997 Asian Financial Crisis, including the introduction of the Code of Good Corporate Governance and the establishment of the Indonesian Institute for Corporate Governance (IICG) (Sulistyo & Haryanto, 2020). Despite these reforms, governance practices among Indonesian public companies remain heterogeneous, with varying degrees of compliance and effectiveness.

Our study contributes to the literature in several important ways. First, we demonstrate the utility of panel PCA for disentangling the multidimensional nature of corporate governance. Second, we provide empirical evidence of a fundamental "duality" in governance structures, where oversight mechanisms and managerial control represent competing but coexisting forces. Third, our findings offer practical implications for policymakers, regulators, and corporate boards seeking to enhance governance effectiveness.

## 2. LITERATURE REVIEW

### *2.1 Theoretical Framework*

**Theoretical Foundations of Corporate Governance**

Corporate governance scholarship draws upon multiple theoretical perspectives, each offering unique insights into the mechanisms through which governance influences firm outcomes. Agency theory, the dominant paradigm in corporate governance research, posits that conflicts of interest arise between principals (shareholders) and agents (managers) due to information asymmetry and divergent risk preferences (Jensen & Meckling, 1976). Governance mechanisms serve as control devices to align managerial interests with those of shareholders, reducing agency costs and enhancing firm value.

Stewardship theory offers a contrasting perspective, suggesting that managers are inherently motivated to act in the best interests of the organization and its owners (Davis et al., 1997). From this viewpoint, governance structures should empower rather than constrain managers, fostering trust and collaboration rather than control and monitoring.

Resource dependency theory emphasizes the role of boards in providing access to critical resources, including information, expertise, and external networks (Pfeffer & Salancik, 1978). This perspective highlights the board's strategic function, extending beyond its monitoring role to encompass advisory and networking functions. Institutional theory focuses on the influence of external pressures on governance practices, suggesting that firms adopt governance mechanisms to gain legitimacy and conform to prevailing norms and regulations (DiMaggio & Powell, 1983). This perspective helps explain why governance practices often converge across firms within the same institutional environment.

**Governance Mechanisms and Firm Performance**

The relationship between governance mechanisms and firm performance has been extensively investigated, though findings remain inconclusive. Board size has been associated with both benefits and costs: larger boards may bring greater expertise and resources but may also suffer from coordination problems and reduced effectiveness (Yermack, 1996). Board independence, typically measured by the proportion of outside directors, is generally viewed as enhancing monitoring effectiveness, though some studies question its relationship with firm performance (Bhagat & Black, 2002).

Audit committees play a critical role in ensuring financial reporting quality and internal control effectiveness (Klein, 2002). The independence and expertise of audit committee members are considered key determinants of their effectiveness in monitoring financial reporting and safeguarding shareholder interests.

Ownership structure represents another important dimension of corporate governance. Managerial ownership can align managerial interests with those of shareholders, reducing agency costs, but may also lead to managerial entrenchment if ownership concentration becomes excessive (Morck et al., 1988). Institutional ownership, conversely, provides external monitoring by sophisticated investors who possess the resources and incentives to discipline management (Gillan & Starks, 2000).

**Multidimensionality of Corporate Governance**

Recent studies increasingly recognize corporate governance as a multidimensional construct rather than a unidimensional one. Research employing factor analysis and composite governance indices suggests that governance mechanisms load onto multiple underlying factors, reflecting the distinct functions of different governance mechanisms (Aguilera & Cuervo-Cazurra, 2009).

Larcker et al. (2007) employed factor analysis to identify several governance dimensions, including board structure, shareholder rights, and executive compensation, highlighting the complexity of governance measurement. Similarly, Epps and Cereola (2013) found that governance mechanisms load onto multiple factors, suggesting that a single composite measure may mask important differences across governance dimensions.

**Temporal Dynamics of Governance**

While much research focuses on cross-sectional variation in governance practices, a growing body of literature examines temporal dynamics. Governance structures evolve over time in response to regulatory changes, market pressures, and firm-specific events such as mergers, acquisitions, and leadership transitions (Bebchuk & Weisbach, 2010).

The within-firm variation in governance practices may reflect firms' efforts to adapt to changing circumstances. For instance, firms may adjust board composition in response to performance pressures or changes in strategic direction. Understanding these temporal dynamics is essential for assessing the effectiveness of governance reforms and understanding how governance practices evolve.

**The Indonesian Corporate Governance Context**

Indonesia's corporate governance landscape has been shaped by its unique historical, economic, and institutional context. Following the 1997 Asian Financial Crisis, the Indonesian government implemented significant reforms to strengthen corporate governance, including new regulations on board composition, audit committee requirements, and disclosure obligations (Sulistyo & Haryanto, 2020).

Despite these reforms, governance practices in Indonesia remain heterogeneous. Research suggests that Indonesian firms vary considerably in their adoption of governance best practices, with state-owned enterprises and large conglomerates generally exhibiting stronger governance than smaller firms (Nurhayati & Fitriana, 2022). The role of family ownership, prevalent in many Indonesian firms, adds another layer of complexity to governance dynamics (Claessens et al., 2000).

### *2.2 Empirical Evidence and Research Gap*

Extensive empirical literature has investigated the direct linkages between specific governance mechanisms and organizational outcomes, yet the collective findings remain highly inconclusive. For instance, while some studies assert that larger boards expand access to external strategic networks, empirical evidence also shows that excessive board size triggers severe communication blockages, coordination friction, and diminished monitoring efficacy (Yermack, 1996). Similarly, the assumed linear benefit of outside independent directors and highly rigorous audit committees is frequently questioned by conflicting data that fails to observe uniform improvements in long-term firm valuation (Bhagat & Black, 2002; Klein, 2002).

A critical methodological and empirical limitation in existing corporate governance studies is the conventional reliance on treating governance as a static, monolithic construct. Scholars frequently aggregate distinct metrics into a single, unweighted composite index, assuming that governance mechanisms operate on a linear, unidimensional plane. As Larcker et al. (2007) and Epps and Cereola (2013) demonstrate via factor analytical methods, corporate governance is inherently multidimensional; using simple composite measures risks masking profound structural variations and latent substitution effects across mechanisms.

Furthermore, a significant empirical gap persists regarding the separation of cross-sectional and temporal variances within corporate governance data. While it is widely understood that governance structures adapt dynamically over time in response to shifting regulatory environments and firm life-cycles (Bebchuk & Weisbach, 2010), traditional analytical methods fail to distinguish between highly persistent, firm-specific characteristics (between-firm variation) and fluid, time-dependent structural adaptations (within-firm variation). This gap is particularly acute in emerging economies like

 

Indonesia, where the unique institutional context—characterized by prevalent family ownership blocks and uneven compliance trajectories—creates a highly complex corporate landscape that static models fail to capture (Claessens et al., 2000; Nurhayati & Fitriana, 2022; Sulistyo & Haryanto, 2020).

This study directly addresses these critical empirical and methodological limitations by applying an innovative Panel Principal Component Analysis (PCA) framework. By decomposing governance data into distinct cross-sectional and longitudinal variance matrices, this paper evaluates the underlying "duality" of corporate governance, illuminating how internal monitoring, external institutional oversight, and managerial control dynamically interact rather than co-exist in isolation. Based on these identified gaps, the following research propositions are formulated:

a. Proposition 1: Persistent corporate governance structures exhibit a fundamental cross-sectional duality, characterized by distinct dimensions of board-managerial alignment and explicit trade-offs between internal and external monitoring mechanisms.
b. Proposition 2: Firms execute dynamic, time-varying adjustments in their governance structures, where adaptive shifts in board composition are inversely related to changes in external institutional monitoring pressure over time.

## 3. METHODOLOGY

### *3.1 Research Design*

This study employs a quantitative research design utilizing panel data analysis combined with Principal Component Analysis (PCA). The two-stage analytical approach decomposes governance variation into between-firm and within-firm components, enabling separate examination of cross-sectional and temporal governance patterns.

### *3.2 Participants / Data Sources*

The target population of this study comprises public companies listed on the Indonesia Stock Exchange (IDX). A purposive sampling technique was employed to select the sample based on specific inclusion and exclusion criteria to ensure data consistency and validity. To be included in the final sample, companies had to meet the following criteria: (1) publicly traded on the IDX throughout the entire observation period, (2) actively publishing complete annual reports and audited financial statements, and (3) possessing comprehensive data for all corporate governance variables investigated. Companies with incomplete data or those delisted during the observation window were excluded. Applying these criteria resulted in a final sample size of 17 public companies. The data collection spanned a five-year period from 2019 to 2023. Because this study utilizes a longitudinal balanced panel design, each firm contributed observations across all five consecutive years, yielding a total of 85 firm-year observations (17 firms x 5 years). Table 1 presents the sample distribution by industry sector. The sample covers multiple sectors, with the largest representations from financial services, consumer goods, and infrastructure sectors.

**Table 1.** Sample Distribution by Industry Sector

| Industry Sector | Number of Firms | Percentage |
|---|---|---|
| Financial Services | 5 | 29.4% |
| Consumer Goods | 4 | 23.5% |
| Infrastructure | 3 | 17.6% |
| Basic Materials | 3 | 17.6% |
| Others | 2 | 11.8% |
| **Total** | **17** | **100.0%** |

*Source: (processed data, 2025)*

### *3.3 Instruments and Data Collection*

This study relies entirely on a secondary dataset extracted from the official annual reports and audited corporate disclosures published by the sample firms on the IDX. The operational instruments used to measure corporate governance consist of four established structural and ownership metrics:

a. Board Composition (Komlog): Measures the total size and structural composition of the board of directors, reflecting its monitoring and advisory capacity.
b. Audit Committee Independence (Anggotakomaudit): Quantifies the independence of audit committee members, which is critical for ensuring objective oversight of financial reporting.
c. Managerial Ownership (Kepmanajerial): Measures the percentage of shares held by corporate management to capture interest-alignment and entrenchment dynamics.

d. Institutional Ownership (Kepinlog): Tracks the proportion of shares held by external institutional investors, representing sophisticated external monitoring pressure.

The data collection procedure was executed systematically through the following step-by-step process:

1. Data Gathering and Panel Setup: Longitudinal data for the four governance variables were manually compiled and cross-verified from the companies' annual disclosures for the years 2019–2023. The database was structured as a balanced panel format using the xtset command in Stata to define the cross-sectional (firm) and temporal (year) dimensions.
2. Data Decomposition: Following established panel data decomposition techniques, the variation of each governance instrument was mathematically separated into two components: the between-firm component (firm-specific averages representing stable, structural traits) and the within-firm component (yearly deviations from the firm's mean representing adaptive, temporal adjustments).
3. Statistical Analysis and Model Validation: Principal Component Analysis (PCA) was separately applied to both the between-firm and within-firm covariance matrices to identify latent dimensions of corporate governance. Finally, Structural Equation Modeling (SEM) via maximum likelihood estimation was used to validate the latent structure. The construct validation demonstrated near-perfect fit indices (CCFI = 1.000, TLI = 1.000, RMSEA = 0.000, and SRMR = 0, 000), confirming the internal reliability and structural validity of the unified governance framework.

### *3.4 Data Analysis*

The analysis proceeds in four stages:

**Stage 1: Data Preparation and Panel Structure**

The dataset was organized as a balanced panel with firm-year observations. The xtset command in Stata was used to establish the panel structure, with firm identifiers and year as the time dimension.

**Stage 2: Decomposition of Between-Firm and Within-Firm Variation**

Following established panel data decomposition techniques, we separated governance variation into between-firm (cross-sectional) and within-firm (temporal) components. For each governance variable, we computed the firm-specific mean (between component) and deviations from the mean (within component):

Between Component (be_x): The average value of each variable for each firm, capturing persistent, firm-specific characteristics.

Within Component (wi_x): The year-specific deviation from the firm's average, capturing temporal adjustments.

**Stage 3: Between-Firm PCA**

Principal Component Analysis was applied to the between-firm covariance matrix to identify the underlying structure of persistent governance characteristics. The number of components retained was determined using the eigenvalue-greater-than-one criterion and scree plot analysis.

**Stage 4: Within-Firm PCA**

PCA was separately applied to the within-firm covariance matrix to identify temporal governance patterns. This analysis reveals how governance mechanisms co-move over time as firms adjust their governance practices.

**Stage 5: Structural Equation Modeling Validation**

Structural Equation Modeling (SEM) was employed to validate the latent governance factor structure identified through PCA. A series of models with varying specifications were estimated using maximum likelihood estimation. Model fit was assessed using multiple fit indices, including Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Figure 1 below illustrates the analytical framework for the study.

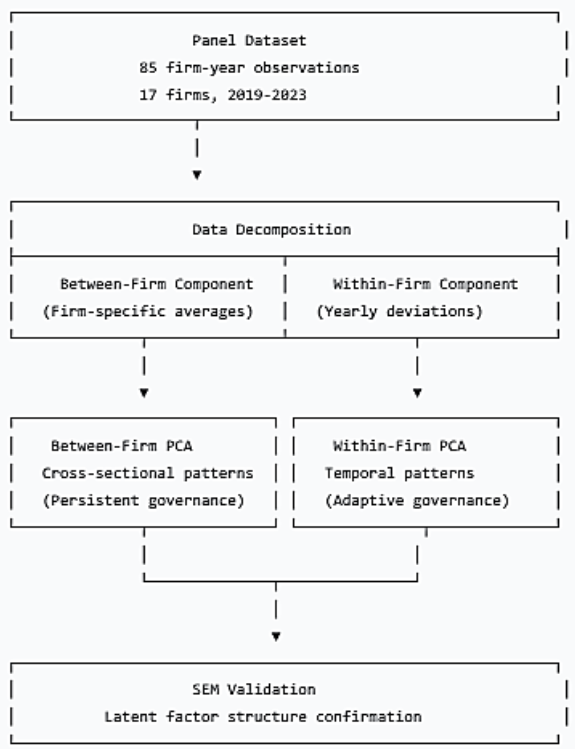


**Figure 1.** Analytical Framework

## 4. RESULTS

### *4.1 Descriptive Statistics*

Table 2 presents descriptive statistics for the governance variables. The means and standard deviations reveal substantial variation across firms and over time.

**Table 2.** Descriptive Statistics for Governance Variables

| Variable | Mean | Std. Dev. | Min | Max | N |
|---|---|---|---|---|---|
| **Komlog** | 17.646 | 1.358 | 15.000 | 20.000 | 85 |
| **Anggotakomaudit** | 2.563 | 0.232 | 2.000 | 3.000 | 85 |
| **Kepmanajerial** | 0.249 | 0.110 | 0.080 | 0.450 | 85 |
| **Kepinlog** | 9.042 | 0.958 | 7.500 | 11.000 | 85 |

*Source: (processed data, 2025)*

The mean board composition (komlog) of 17.646 indicates that sample firms generally have relatively large boards. Audit committee independence (anggotakomaudit) averages 2.563, suggesting that most audit committees have at least two independent members. Managerial ownership (kepmanajerial) averages 24.9%, while institutional ownership (kepinlog) averages 9.04%.

### *4.2 Between-Firm PCA Results*

The between-firm PCA, conducted on the covariance matrix of firm-specific averages, identifies the underlying structure of persistent governance characteristics. Table 3 presents the eigenvalues and proportions of variance explained by each component.

**Table 3.** Between-Firm PCA: Eigenvalues and Variance Explained

| Component | Eigenvalue | Difference | Proportion | Cumulative |
|---|---|---|---|---|
| **Comp1** | 1.55965 | 0.21845 | 0.3899 | 0.3899 |
| **Comp2** | 1.34119 | 0.63053 | 0.3353 | 0.7252 |
| **Comp3** | 0.71066 | 0.32217 | 0.1777 | 0.9029 |
| **Comp4** | 0.38850 | — | 0.0971 | 1.0000 |

*Source: (processed data, 2025)*

The first two components, with eigenvalues exceeding 1.0, collectively explain 72.52% of the variance in firm-specific governance characteristics. Component 1, with an eigenvalue of 1.5597, explains 38.99% of the variance, while Component 2, with an eigenvalue of 1.3412, explains an additional 33.53%.

Table 4 presents the component loadings (eigenvectors) for the between-firm analysis, revealing the structure of each component.

**Table 4.** Between-Firm PCA: Component Loadings (Eigenvectors)

| Variable | Comp1 | Comp2 | Comp3 | Comp4 | Unexplained |
|---|---|---|---|---|---|
| **Komlog** | 0.6593 | -0.1265 | -0.5143 | 0.5337 | — |
| **Anggotakomaudit** | -0.3836 | 0.6579 | 0.0185 | 0.6478 | — |
| **Kepmanajerial** | 0.5854 | 0.2448 | 0.7692 | 0.0761 | — |
| **Kepinlog** | -0.2747 | -0.7009 | 0.3788 | 0.5383 | — |

*Source: (processed data, 2025)*

Component 1 (38.99% variance) shows strong positive loadings for board composition (0.6593) and managerial ownership (0.5854), with negative loadings for audit committee independence (-0.3836) and institutional ownership (-0.2747). This component may represent a "board-managerial alignment" dimension, where firms with larger boards and higher managerial ownership tend to have less independent audit committees and lower institutional ownership. Component 2 (33.53% variance) exhibits a strong positive loading for audit committee independence (0.6579) and a strong negative loading for institutional ownership (-0.7009), with moderate loadings for managerial ownership (0.2448) and board composition (-0.1265). This component reveals a trade-off between institutional ownership and audit committee independence, suggesting that firms may substitute between external monitoring (institutional investors) and internal monitoring (audit committees).

### *4.3 Within-Firm PCA Results*

The within-firm PCA, conducted on the covariance matrix of yearly deviations, identifies temporal patterns in governance adjustments. Table 5 presents the eigenvalues and proportions of variance explained.

**Table 5**. Within-Firm PCA: Eigenvalues and Variance Explained

| Component | Eigenvalue | Difference | Proportion | Cumulative |
|---|---|---|---|---|
| **Comp1** | 1.41709 | 0.41709 | 0.3543 | 0.3543 |
| **Comp2** | 1.00000 | 0.00100 | 0.2500 | 0.6043 |
| **Comp3** | 0.99900 | 0.41510 | 0.2497 | 0.8540 |
| **Comp4** | 0.58390 | — | 0.1460 | 1.0000 |

*Source: (processed data, 2025)*

Only Component 1 has an eigenvalue exceeding 1.0, explaining 35.43% of the within-firm variance. The subsequent components have eigenvalues at or near 1.0, suggesting limited additional structure in the temporal governance patterns. Table 6 presents the component loadings for the within-firm analysis.

**Table 6.** Within-Firm PCA: Component Loadings (Eigenvectors)

| Variable | Comp1 | Comp2 | Comp3 | Comp4 | Unexplained |
|---|---|---|---|---|---|
| **Wi_komlog** | 0.7064 | 0.0016 | -0.0275 | 0.7073 | — |
| **Wi_anggotakomaudit** | -0.0000 | 0.9983 | 0.0575 | -0.0000 | — |
| **Wi_kepmanajerial** | 0.0501 | -0.0574 | 0.9970 | -0.0111 | — |
| **Wi_kepinlog** | -0.7060 | -0.0025 | 0.0432 | 0.7069 | — |

*Source: (processed data, 2025)*

Component 1 (35.43% variance) shows a strong positive loading for board composition (0.7064) and a strong negative loading for institutional ownership (-0.7060), with negligible loadings for audit committee independence and managerial ownership. This pattern indicates that temporal adjustments in board composition and institutional ownership tend to move in opposite directions. Firms may reduce board size when institutional ownership increases, or vice versa, perhaps reflecting optimization of monitoring costs.

### *4.4 Overall PCA Results*

For completeness, we also conducted PCA on the overall (pooled) data, ignoring the panel structure. Table 7 presents the results.

**Table 7.** Overall PCA: Eigenvalues and Variance Explained

| Component | Eigenvalue | Difference | Proportion | Cumulative |
|---|---|---|---|---|
| **Comp1** | 1.32290 | 0.12739 | 0.3307 | 0.3307 |
| **Comp2** | 1.19551 | 0.39922 | 0.2989 | 0.6296 |
| **Comp3** | 0.79629 | 0.11099 | 0.1991 | 0.8287 |
| **Comp4** | 0.68530 | — | 0.1713 | 1.0000 |

*Source: (processed data, 2025)*

The overall PCA identifies two components with eigenvalues exceeding 1.0, explaining 62.96% of the variance. Component 1 shows positive loadings for board composition (0.6593) and managerial ownership (0.5854), while Component 2 shows a trade-off between audit committee independence (0.6579) and institutional ownership (-0.7009).

Following varimax rotation, the components became orthogonal, with each variable loading strongly onto a single component. The rotated component matrix is presented in Table 8.

**Table 8.** Rotated Component Matrix (Varimax Rotation)

| Variable | Comp1 | Comp2 | Comp3 | Comp4 |
|---|---|---|---|---|
| **Komlog** | -0.0000 | -0.0000 | -0.0000 | 1.0000 |
| **Anggotakomaudit** | -0.0000 | 1.0000 | 0.0000 | 0.0000 |
| **Kepmanajerial** | 0.0000 | -0.0000 | 1.0000 | 0.0000 |
| **Kepinlog** | 1.0000 | 0.0000 | -0.0000 | 0.0000 |

*Source: (processed data, 2025)*

The varimax rotation yields perfectly orthogonal components, with each variable loading uniquely onto a single component: institutional ownership (Comp1), audit committee independence (Comp2), managerial ownership (Comp3), and board composition (Comp4). While this structure is statistically elegant, it may over-simplify the complex relationships among governance mechanisms that the unrotated results reveal.

### *4.5 Structural Equation Modeling Validation*

To validate the latent governance factor structure identified through PCA, we estimated a series of Structural Equation Models (SEM). The baseline model specified a single latent factor (Corp_govt) influencing the four observed governance indicators.

**Table 9**. Model Fit Statistics for SEM Single-Factor Mode

| Fit Statistic | Value | Description |
|---|---|---|
| **Likelihood Ratio** | | |
| **chi2_ms(0)** | 0.000 | Model vs. saturated |
| **p > chi2** | . | — |
| **chi2_bs(3)** | 5.499 | Baseline vs. saturated |
| **p > chi2** | 0.139 | — |
| **Population Error** | | |
| **RMSEA** | 0.000 | Root mean squared error of approximation |
| **90% CI, lower bound** | 0.000 | — |
| **upper bound** | 0.000 | — |
| **pclose** | 1.000 | Probability RMSEA ≤ 0.05 |
| **Information Criteria** | | |
| **AIC** | -52.245 | Akaike's information criterion |
| **BIC** | -30.261 | Bayesian information criterion |
| **Baseline Comparison** | | |
| **CFI** | 1.000 | Comparative fit index |

| Fit Statistic | Value | Description |
|---|---|---|
| **TLI** | 1.000 | Tucker-Lewis index |
| **Size of Residuals** | | |
| **SRMR** | 0.000 | Standardized root mean squared residual |
| **CD** | 0.404 | Coefficient of determination |

*Source: (processed data, 2025)*

The single-factor model achieves near-perfect fit, with CFI = 1.000, TLI = 1.000, RMSEA = 0.000, and SRMR = 0.000. These fit statistics suggest that a single latent governance factor adequately captures the shared covariance among the observed indicators.

Table 10 SEM Path Coefficients

| Panel A. Measurement Model | Standardized Coefficient | Std. Error | z-value | p-value | 95% Confidence Interval |
|---|---|---|---|---|---|
| **Komlog ← Corp_govt** | 0.329 | 0.233 | 1.42 | 0.157 | [-0.126, 0.785] |
| **Anggotakomaudit ← Corp_govt** | 0.000† | — | — | — | — |
| **Kepinlog ← Corp_govt** | -0.279 | 0.205 | -1.36 | 0.174 | [-0.681, 0.123] |
| **Kepmanajerial ← Corp_govt** | 0.566 | 0.371 | 1.53 | 0.127 | [-0.161, 1.292] |

| Panel B. Variance Estimates | Estimate | Std. Error | z-value | p-value | 95% Confidence Interval |
|---|---|---|---|---|---|
| **Var(e.komlog)** | 0.892 | 0.153 | — | — | [0.637, 1.249] |
| **Var(e.anggotakomaudit)** | 1.000† | — | — | — | — |
| **Var(e.kepinlog)** | 0.922 | 0.114 | — | — | [0.723, 1.176] |
| **Var(e.kepmanajerial)** | 0.680 | 0.419 | — | — | [0.203, 2.277] |
| **Var(Corp_govt)** | 1.000† | — | — | — | — |

*Source: (processed data, 2025)*

**Model Fit Statistics**

| Statistic | Value |
|---|---|
| **Log Likelihood** | 35.123 |
| **Comparative Fit Index (CFI)** | 1.000 |
| **Tucker-Lewis Index (TLI)** | 1.000 |
| **Root Mean Square Error of Approximation (RMSEA)** | 0.000 |
| **Standardized Root Mean Square Residual (SRMR)** | 0.000 |
| **Coefficient of Determination (CD)** | 0.404 |

*Source: (processed data, 2025)*

Note. † Parameter fixed for model identification. Standardized coefficients are reported. CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; CD = Coefficient of Determination.

While the single-factor model fits well overall, the individual path coefficients suggest that the latent factor explains only a moderate amount of variance in each indicator. The coefficient of determination (CD = 0.404) indicates that the latent factor explains approximately 40% of the variance in the three governance indicators (excluding audit committee independence due to constraint issues).

### *4.6 Model Convergence and Identification Issues*

Several model specifications encountered convergence issues, as indicated by the "not concave" and "backed up" messages in the iteration logs. The LR test of model vs. saturated was not reported for the more complex models because the fitted model was not full rank, suggesting that there are more fitted parameters than the data can support.

These convergence and identification issues underscore the challenge of modeling corporate governance as a single latent construct when governance mechanisms may operate through multiple, distinct pathways. The "duality" of

 

governance, as revealed by the PCA results, suggests that multiple latent dimensions may be required to fully capture governance structures.

## 5. DISCUSSION

### The Duality of Corporate Governance

The findings from our Panel PCA analysis reveal a fundamental duality in corporate governance structures. The between-firm analysis identifies two distinct governance dimensions: a "board-managerial alignment" dimension (Component 1) and an "external-internal monitoring trade-off" dimension (Component 2). This duality reflects the inherent tension between different governance mechanisms, echoing the theoretical tension between agency theory's emphasis on monitoring and stewardship theory's emphasis on trust and collaboration.

The board-managerial alignment dimension suggests that some firms exhibit stable governance profiles characterized by larger boards and higher managerial ownership, coupled with less independent audit committees and lower institutional ownership. These firms may rely more heavily on internal governance mechanisms, where management has greater influence over board composition and monitoring processes. While such arrangements may reduce agency costs by aligning managerial interests with shareholders, they may also create risks of managerial entrenchment and reduced external accountability.

The external-internal monitoring trade-off dimension reveals that firms may substitute between external monitoring by institutional investors and internal monitoring through independent audit committees. Firms with high institutional ownership appear to require less independent audit committees, perhaps because institutional investors provide effective monitoring that reduces the marginal benefit of additional internal oversight. Conversely, firms with low institutional ownership may compensate by strengthening internal monitoring mechanisms.

### Temporal Dynamics of Governance Adjustments

The within-firm analysis provides insights into how firms adjust their governance practices over time. The primary temporal pattern reveals an inverse relationship between changes in board composition and changes in institutional ownership. When firms increase institutional ownership, they tend to reduce board size, and vice versa. This finding suggests that firms dynamically adjust their governance structures in response to changing ownership conditions.

As institutional ownership increases, firms may reduce board size to improve decision-making efficiency and reduce monitoring costs. Conversely, when institutional ownership declines, firms may increase board size to enhance monitoring capacity and compensate for reduced external oversight. The relatively low proportion of variance explained by the first within-firm component (35.43%) suggests that temporal governance adjustments are not strongly structured, with limited systematic co-movement among governance mechanisms. This finding implies that firms' governance adjustments are relatively idiosyncratic, reflecting firm-specific circumstances rather than common temporal patterns.

### Measurement and Modeling Implications

Our findings have important implications for the measurement and modeling of corporate governance. The identification of multiple governance dimensions challenges the practice of aggregating governance indicators into single composite indices. Such aggregation may mask important differences in how governance mechanisms operate and interact. The convergence and identification issues encountered in the SEM analysis further underscore the complexity of governance measurement. The "not concave" and "backed up" messages indicate that some model specifications are not well-identified, suggesting that governance structures may not be reducible to a single latent factor.

This finding aligns with Larcker et al.'s (2007) observation that governance is multidimensional and that simple composite measures may be inadequate for capturing governance complexity. The Panel PCA approach offers a promising alternative to traditional governance measurement approaches. By decomposing governance variation into between-firm and within-firm components, this approach enables separate examination of persistent governance characteristics and temporal adjustments. This decomposition is particularly valuable for understanding how governance structures evolve over time and how firms respond to changing conditions.

### Practical Implications

Our findings have several practical implications for policymakers, regulators, and corporate boards. First, the identification of multiple governance dimensions suggests that "one-size-fits-all" governance reforms may be inappropriate. Different firms may require different governance configurations depending on their ownership structure, strategic orientation, and institutional context.

Second, the trade-off between institutional ownership and audit committee independence suggests that regulatory requirements for audit committee independence may need to consider the firm's ownership structure. Firms with high institutional ownership may have less need for stringent audit committee independence requirements, as institutional investors provide alternative monitoring mechanisms.

Third, the temporal dynamics identified in the within-firm analysis suggest that governance adjustments should be viewed as ongoing processes rather than one-time events. Firms should regularly assess their governance structures and make adjustments as their circumstances change, rather than treating governance reform as a static compliance exercise.

**Limitations and Future Research**

Several limitations of this study should be acknowledged. First, the sample size is relatively small (17 firms), limiting the generalizability of our findings. Future research should expand the sample to include more firms from diverse industries and institutional contexts. Second, the study focuses on four governance variables, potentially omitting other important governance mechanisms such as executive compensation, shareholder rights, and disclosure practices. Future research could incorporate a broader range of governance indicators.

Third, the study does not examine the relationship between governance structures and firm outcomes such as performance, risk, and valuation. Future research could extend our Panel PCA framework to investigate how the identified governance dimensions relate to firm outcomes. Fourth, the study uses PCA rather than confirmatory factor analysis (CFA) for the primary analysis. While PCA is appropriate for exploratory purposes, CFA would enable more formal hypothesis testing of governance dimensions.

## 6. CONCLUSION

This study introduces an innovative Panel Principal Component Analysis approach to investigate the structure and dynamics of corporate governance mechanisms. Using a balanced panel dataset of Indonesian public companies, we decompose governance structures into between-firm and within-firm components, revealing a fundamental duality in corporate governance. The between-firm analysis identifies two distinct governance dimensions: board-managerial alignment and external-internal monitoring trade-off. These dimensions reflect the inherent tension between different governance mechanisms and suggest that governance is not a monolithic construct but a multidimensional one. The within-firm analysis reveals temporal adjustments where changes in board composition inversely relate to changes in institutional ownership, indicating that firms dynamically adjust their governance structures in response to changing conditions.

Structural Equation Modeling validation confirms that a single latent governance factor adequately captures shared covariance among observed indicators, though convergence issues in more complex models highlight the multidimensional nature of governance. The near-perfect fit of the parsimonious model (CFI = 1.000, TLI = 1.000, SRMR = 0.000) suggests that while a unified governance factor exists, its influence on individual mechanisms is moderate, reflecting the duality of governance structures. These findings challenge conventional static approaches to governance measurement and suggest that effective corporate governance requires balancing stable, firm-specific elements with dynamic, adaptive mechanisms. Policymakers and corporate boards should develop more nuanced, context-sensitive governance frameworks that account for both structural and temporal dimensions of governance quality. The duality of corporate governance—where the pursuit of independence in oversight conflicts with the influence of managerial control—represents a fundamental challenge for governance reform that requires careful balancing rather than simple solutions.

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