DETERMINANTS OF INCOME SMOOTHING: THE ROLE OF LEVERAGE, FIRM VALUE, AND CASH HOLDING

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Abstrak

Perataan laba merupakan praktik akuntansi yang dilakukan perusahaan untuk meredam fluktuasi laba agar laporan keuangan tampak lebih stabil dan dapat meningkatkan kepercayaan investor. Penelitian ini bertujuan untuk menganalisis pengaruh cash holding, price to book value (PBV), dan debt to equity ratio (DER) terhadap income smoothing pada perusahaan sektor properti dan real estat yang terdaftar di Bursa Efek Indonesia (BEI) selama periode 2019–2023. Dengan menggunakan teknik purposive sampling, diperoleh 105 perusahaan sebagai sampel. Pendekatan Generalized Method of Moments (GMM) digunakan untuk mengatasi isu endogenitas dan heterogenitas individu dalam data panel. Hasil menunjukkan bahwa DER berpengaruh positif dan signifikan terhadap income smoothing, sedangkan cash holding dan PBV tidak berpengaruh signifikan. Uji simultan mengonfirmasi bahwa ketiga variabel secara bersama-sama berpengaruh signifikan terhadap income smoothing. Validitas model diperkuat melalui Hansen-J Test dan AR(2) Test. Robustness test dan validasi machine learning melalui Quantile Regression, BMA, XGBoost, dan Random Forest juga menegaskan DER sebagai determinan utama. Temuan ini menyiratkan bahwa leverage memainkan peran krusial dalam praktik perataan laba, yang perlu menjadi perhatian bagi investor dan regulator dalam mengevaluasi kualitas laporan keuangan di sektor properti.

Kata Kunci: Perataan Laba, Kepemilikan Kas, PBV, DER, GMM.

Abstract

Income smoothing is an accounting practice used by companies to reduce earnings fluctuations, thereby presenting more stable financial statements and enhancing investor confidence. This study aims to analyze the effect of cash holding, price-to-book value (PBV), and debt-to-equity ratio (DER) on income smoothing among property and real estate companies listed on the Indonesia Stock Exchange (IDX) during the period 2019–2023. Using a purposive sampling technique, a total of 105 companies were selected as the research sample. The Generalized Method of Moments (GMM) approach was employed to address issues of endogeneity and individual heterogeneity in panel data analysis. The results show that DER has a positive and significant effect on income smoothing, while cash holding and PBV have no significant effect. The simultaneous F-test confirms that the three variables collectively have a significant influence on income smoothing. Model validity was supported by the Hansen-J test and the AR(2) test. Robustness testing and machine learning validation using Quantile Regression, Bayesian Model Averaging (BMA), XGBoost, and Random Forest further confirmed DER as the primary determinant. These findings suggest that leverage plays a critical role in income smoothing practices and should be carefully considered by investors and regulators when evaluating financial reporting quality in the property sector.

Keywords: Income Smoothing, Cash Holding, PBV, DER, GMM

INTRODUCTION

Income smoothing has emerged as a pervasive and complex practice in financial reporting, often reflecting managerial attempts to portray consistent earnings performance amidst economic volatility. Grounded in agency theory (Jensen & Meckling, 1976), this practice arises from inherent conflicts of interest and information asymmetry between managers and shareholders. Managers, acting as agents, may engage in smoothing behaviors to reduce perceived risk, sustain investor confidence, and secure contractual or reputational benefits. However, such actions, while seemingly stabilizing, risk distorting the firm's true economic performance and undermining the transparency essential to efficient capital markets.

A common tool used in income smoothing is deferred tax accounting, which stems from temporary differences between financial reporting and taxable income. This mechanism provides flexibility in earnings manipulation, allowing firms to shift profits across periods to meet internal or market expectations (Görlitz & Dobler, 2021). Another prominent driver is capital structure, particularly the use of debt financing. Firms with high leverage often face strict debt covenants and intense scrutiny from creditors. In such contexts, smoothing earnings becomes a defensive strategy to avoid covenant breaches and signal creditworthiness (Ujah & Okafor, 2019; Trueman & Titman, 1988). These dynamics highlight the dual nature of income smoothing: while it may enhance perceived stability, it simultaneously obscures underlying financial risks and introduces agency costs.

Beyond financial factors, managerial characteristics play a critical role in shaping a firm's propensity to engage in income smoothing. Rashidi (2024) finds that overconfident managers are more likely to adopt aggressive earnings manipulation strategies, particularly in environments characterized by low information transparency. Conversely, high accounting competence acts as a protective factor, as technically proficient managers tend to be more aware of the ethical and legal implications associated with earnings management. Furthermore, managerial entrenchment adds another layer to this dynamic, wherein managers with substantial control over the firm may utilize income smoothing as a strategic tool to secure their long-term positions (García-Sánchez et al., 2020).

Interestingly, in the context of contemporary corporate governance, income smoothing practices are often accompanied by selective Corporate Social Responsibility (CSR) disclosures. These disclosures are strategically employed to shape favorable perceptions among investors and regulators, while simultaneously diverting attention from underlying earnings manipulation that might otherwise be detected in financial statements. This phenomenon illustrates that income smoothing is not merely a technical reporting practice, but rather a reflection of the complex interplay between managerial behavior and adaptive governance mechanisms in response to external pressures. Accordingly, both behavioral and institutional dimensions warrant closer examination in understanding the motives and mechanisms of income smoothing, particularly in sectors with high levels of information asymmetry.

Although leverage has been consistently identified as a primary driver of income smoothing practices (Ali et al., 2025; Al Amosh et al., 2024), empirical evidence regarding the influence of other financial determinants, such as cash holding and firm value, remains contradictory. On one hand, high levels of cash reserves may reduce managerial incentives to engage in income smoothing, as they enhance financial flexibility in responding to external pressures (Setiawan & Rachmansyah, 2019). On the other hand, firms with substantial liquidity might instead be compelled to maintain market expectations by stabilizing reported earnings, particularly under conditions of economic uncertainty or reputational risk (Kumar & Symss, 2024). These conflicting findings suggest that the effect of cash holding on income

smoothing is context-dependent and may be shaped by factors such as ownership structure or capital market pressures.

Similarly, the relationship between firm value, typically measured by the Price-to-Book Value (PBV) ratio, and income smoothing practices remains inconclusive. Some studies argue that firms with high PBV are more likely to smooth earnings in order to sustain positive investor perceptions (Penman & Reggiani, 2018). In contrast, other research highlights that PBV may exert no significant effect, as its influence could be overshadowed by more fundamental variables such as profitability and ownership concentration (Duarte et al., 2024). This inconsistency highlights the need for further investigation into the interplay among these financial factors, particularly through a simultaneous approach that accounts for sector-specific and geographic contexts.

The research gap becomes particularly critical when examined within the property and real estate sector, a domain inherently characterized by revenue volatility due to cyclical economic patterns, asset price fluctuations, and sensitivity to interest rate dynamics (Mustafa et al., 2024; Hu & Tiwari, 2021). In emerging markets like Indonesia, these structural vulnerabilities are further exacerbated by institutional frictions such as regulatory delays, financing constraints, and information asymmetry, which amplify managerial incentives to engage in income smoothing. The COVID-19 pandemic intensified these pressures by triggering sharp asset revaluations, rising vacancy rates, and overhang inventory, thereby elevating the strategic imperative for firms to maintain artificially stable financial disclosures (Chai et al., 2024). Despite the heightened risk profile, empirical research exploring the determinants of income smoothing within Indonesia's property sector remains sparse, limiting theoretical development and policy insight in this critical area. This paucity of context-specific evidence underscores the need for a nuanced investigation into how financial variables, such as leverage, cash holding, and firm value, shape income smoothing behavior under sector-specific volatility and institutional constraints.

Therefore, this study specifically aims to examine the effects of cash holding, firm value (represented by the Price-to-Book Value ratio/PBV), and leverage (measured by the Debt-to-Equity Ratio/DER) on income smoothing practices among property and real estate companies listed on the Indonesia Stock Exchange (IDX) during the period 2019–2023. This sector was selected due to its high revenue volatility and business cycle sensitivity to macroeconomic dynamics, making it an ideal context for investigating the incentives and determinants of earnings manipulation. To address the complexity of simultaneous relationships and potential endogeneity among variables, this study employs the Generalized Method of Moments (GMM) approach, which is empirically more robust than conventional panel regressions in dealing with issues such as unobserved heterogeneity and autoregressive structures. Theoretically, this research contributes to a deeper understanding of income smoothing within the frameworks of agency theory and signaling theory, particularly in the context of emerging markets characterized by less mature financial transparency. Practically, the findings are expected to offer strategic insights for investors, regulators, and auditors in assessing earnings quality and detecting potential earnings management, especially in sectors vulnerable to market pressure, such as property and real estate.

LITERATURE REVIEW

Theoretical Foundations of Income Smoothing and Earnings Management
Agency Theory and Income Smoothing

One of the primary theories underpinning income smoothing and earnings management is Agency Theory, as proposed by Jensen & Meckling (1976). This theory highlights the relationship between managers (*agents*) and shareholders (*principals*), which is often

characterized by conflicts of interest due to information asymmetry. In this context, managers have greater access to a company's financial information and may be incentivized to manipulate financial reports to increase their compensation, avoid strict shareholder scrutiny, or maintain the firm's reputation in capital markets. Income smoothing is a commonly employed strategy to reduce earnings volatility and create the perception of financial stability. Görlitz & Dobler (2021) argue that this practice can be executed through deferred taxes, discretionary accruals, and changes in accounting policies, allowing firms to align reported earnings with desired targets. However, Demaline (2024) warns that excessive financial reporting manipulation can undermine corporate credibility and distort market efficiency, particularly when used to mislead investors. Nevertheless, not all income smoothing practices are inherently detrimental. In some cases, they serve to foster long-term relationships with investors and creditors, ultimately enhancing firm value over time. Therefore, a comprehensive understanding of the drivers of income smoothing and its implications for capital markets and corporate governance is essential.

Signaling Theory and the Relevance of Income Smoothing

In addition to Agency Theory, the practice of income smoothing can also be explained through Signaling Theory, as developed by Jensen & Meckling, (1976). This theory posits that firms utilize financial reports as a means of conveying signals to investors and other stakeholders regarding their business stability and future prospects. In this context, firms experiencing significant earnings fluctuations may engage in income smoothing to signal financial stability and reduce investor uncertainty (Ujah & Okafor, 2019). García-Sánchez et al. (2020) highlight that managers with entrenched decision-making power often employ income smoothing to safeguard their positions within the firm. This is sometimes achieved through strategic disclosures, such as corporate social responsibility (CSR) reporting, which may not fully reflect the firm's actual financial performance. Consequently, income smoothing can serve as a signaling mechanism that helps firms maintain credibility in capital markets. However, the effectiveness of such signals is highly contingent on several factors, including corporate governance quality, disclosure transparency, and the extent of oversight by institutional investors.

Corporate Governance Theory and Its Role in Controlling Income Smoothing

Corporate Governance Theory plays a crucial role in mitigating excessive earnings management practices. Strong corporate governance mechanisms can limit managerial discretion in income smoothing, thereby protecting shareholder interests. Several key governance mechanisms have been identified as effective in controlling income smoothing, including:

1. Independent Board of Directors.
   Research by Wang et al. (2020) highlights that the presence of independent directors significantly restricts financial statement manipulation. Their oversight function enhances the integrity of managerial decisions and ensures greater financial transparency.
2. Institutional Investor Influence.
   Institutional investors often exert considerable influence in curbing earnings management, as they have a long-term interest in corporate stability (Goyal, 2020). Their active monitoring discourages opportunistic financial reporting and promotes sustainable corporate practices.
3. Audit Quality and Regulatory Oversight.
   García-Sánchez et al. (2020) found that firms with high-quality audits are less likely to engage in earnings management. Stringent audit processes and regulatory scrutiny serve as

deterrents against financial misreporting, reinforcing compliance with accounting standards.

Effective corporate governance enhances financial transparency and reduces the likelihood of earnings manipulation, ultimately fostering capital market efficiency. Strengthening these governance mechanisms is essential for ensuring reliable financial reporting and safeguarding stakeholder confidence.

Factors Influencing Income Smoothing
The Impact of Leverage and Capital Structure

Previous studies have shown that a company's capital structure significantly influences its income smoothing practices. Firms with high leverage, measured by the Debt-to-Equity Ratio (DER), often have stronger incentives to smooth earnings to maintain favorable relationships with creditors and avoid covenant violations (Trueman & Titman, 1988). In this context, Ujah & Okafor (2019) found that companies tend to report more aggressive earnings when their prior debt costs are high, whereas firms with greater equity financing exhibit more transparent financial stability. Furthermore, Al Amosh et al. (2024) highlighted that a company's capital structure not only impacts profitability but also affects its Environmental, Social, and Governance (ESG) performance. Highly leveraged firms may engage in income smoothing not solely for financial reasons but also as part of their broader strategy to sustain their ESG reputation. However, the impact of leverage on income smoothing may vary depending on firm size and industry characteristics, suggesting that the relationship is not uniform across different corporate environments.

The Role of Cash Holdings in Income Smoothing

In addition to leverage, cash holdings play a crucial role in income smoothing practices. Firms with substantial cash reserves possess greater financial flexibility to navigate economic uncertainty, thereby reducing the necessity for aggressive income smoothing (Setiawan & Rachmansyah, 2019). However, contrasting evidence suggests that firms with high cash holdings may still engage in income smoothing to meet investor expectations and project an image of financial stability (Kumar & Symss, 2024). According to Akhtar et al. (2018), corporate governance plays a pivotal role in determining the extent to which cash holdings are utilized in income smoothing strategies. In emerging markets, where agency problems are more prevalent, cash holdings are often leveraged to support earnings management policies rather than being allocated for long-term investment purposes.

Hypothesis Development

Income smoothing has long been a focal point in financial accounting research, particularly regarding managerial incentives to create perceived financial stability for investors (Jensen & Meckling, 1976). Several factors influence this practice, including cash holdings, firm value (PBV), and leverage (DER). Prior studies suggest that firms with debt-dependent capital structures are more likely to engage in income smoothing to maintain financial stability and avoid debt covenant violations (Ujah & Okafor, 2019; Trueman & Titman, 1988). Additionally, industry characteristics play a crucial role, as the properties and real estate sector is known for its high revenue volatility due to economic cycles, interest rate fluctuations, and shifts in property demand and supply (Mustafa et al., 2024). Given these considerations, this study aims to examine the impact of both internal and external factors on income smoothing within this sector.

The Influence of Cash Holding on Income Smoothing

Cash holding reflects a company's liquidity, which can be utilized to finance operations and investments without relying on external funding. According to signaling theory, firms with excess cash reserves can convey a positive signal to investors regarding their financial stability, thereby reducing the need for income smoothing (Setiawan & Rachmansyah, 2019). Prior research suggests that firms with high cash holdings exhibit greater financial flexibility, making them less inclined to engage in income smoothing, as they do not need to create an illusion of financial stability (Setiawan & Rachmansyah, 2019). However, contrasting evidence indicates that firms with high cash holdings may, in fact, be more likely to engage in income smoothing to maintain shareholder expectations and manage market perceptions (Kumar & Symss, 2024). This tendency is particularly evident in industries highly dependent on investor sentiment, such as the real estate sector, where management seeks to preserve stock price stability. Despite these mixed findings, financial theory suggests that higher liquidity reduces incentives for earnings manipulation. Therefore, the following hypothesis is proposed:

H_1: Cash holding negatively influences income smoothing.

The Influence of Firm Value (PBV) on Income Smoothing

Firm value, as measured by the Price-to-Book Value (PBV) ratio, reflects the extent to which the market values a company relative to its book value. A high PBV ratio indicates stronger market confidence in the firm's future prospects (Penman & Reggiani, 2018). Firms with high PBV are less likely to engage in income smoothing, as investors already hold positive expectations regarding their growth (Duarte et al., 2024). Conversely, firms with low PBV may be more incentivized to engage in income smoothing to enhance their investment appeal. Previous studies have shown that in highly competitive industries vulnerable to macroeconomic fluctuations such as the real estate sector firms with low PBV are more prone to earnings management to maintain a favorable perception among investors and creditors (Mustafa et al., 2024). Thus, the following hypothesis is formulated:

H_2: Price-to-Book Value (PBV) negatively influences income smoothing.

The Influence of Leverage (DER) on Income Smoothing

Leverage, as proxied by the Debt-to-Equity Ratio (DER), reflects the extent to which a company relies on debt in its capital structure. Prior studies have established that firms with high DER are more likely to engage in income smoothing to maintain cash flow stability and comply with debt covenants (Trueman & Titman, 1988; Ujah & Okafor, 2019). From an agency theory perspective, managers with significant debt obligations have stronger incentives to stabilize earnings to sustain investor and creditor confidence (Ali et al., 2025). Additionally, in the context of Environmental, Social, and Governance (ESG) considerations, Al Amosh et al. (2024) found that highly leveraged firms engage in income smoothing not only for financial stability but also to uphold their ESG reputation. In the real estate industry, characterized by long investment cycles and high revenue fluctuations, creditor pressure further amplifies the tendency toward income smoothing (Hu & Tiwari, 2021). Based on these findings, the following hypothesis is proposed:

H_3: Debt-to-Equity Ratio (DER) has a positive influence on income smoothing.

The Simultaneous Influence of Cash Holding, PBV, and DER on Income Smoothing

Extensive research suggests that Cash Holding, Price-to-Book Value (PBV), and DER collectively impact income smoothing, particularly in industries with high volatility, such as real estate. Hu & Tiwari (2021) found that firms in this sector must balance cash availability, market expectations, and debt pressure, all of which influence managerial decisions regarding income smoothing. Furthermore, Mustafa et al. (2024) highlighted that in periods of economic instability, real estate companies are more inclined to adopt a combination of financial strategies, including cash management, capital structure optimization, and income smoothing, to mitigate market volatility. Given these considerations, this study examines the simultaneous relationship among these factors, leading to the following hypothesis:

H_4: Cash Holding, Price-to-Book Value (PBV), and Debt-to-Equity Ratio (DER) simultaneously have a positive and significant influence on income smoothing.

METHODS

Research Design

This study employs a quantitative approach with a causal-comparative method to examine the relationship between Cash Holding (CH), Price to Book Value (PBV), and Debt to Equity Ratio (DER) on Income Smoothing (IS) within the Properties and Real Estate sector. This approach was selected to empirically assess the influence among variables using secondary data from published financial statements. To capture the temporal and cross-sectional dynamics of the variables, panel data regression analysis is applied, allowing for a more robust estimation of variations over time and across firms.

Population and Sampling Technique

The population of this study includes all Properties and Real Estate firms listed on the Indonesia Stock Exchange (IDX) from 2019 to 2023. This sector was chosen due to its relatively high earnings volatility compared to other industries and its significant contribution to the national economy. The extended study period enables the detection of long-term trends in income smoothing practices and the identification of key determinants influencing these practices. A purposive sampling technique was employed to ensure the selection of the most relevant firms, resulting in a final sample of 105 companies. The inclusion criteria for the sample selection were as follows:

1. Firms that remained actively operating in the Properties and Real Estate sector throughout the study period.
2. Firms that consistently published audited annual financial statements during the observation period.
3. Firms with complete financial data related to the study variables, including CH, PBV, DER, and IS.
4. Firms that were not in financial distress and had not been delisted from the stock exchange during the observation period.

To ensure the statistical power of the sample, a power analysis was conducted following Cohen's (1988) recommendations. Assuming a statistical power of ≥ 0.80 and a significance level (α) of 5%, the optimal sample size was determined to minimize the risk of Type II errors. This rigorous sampling approach enhances the inferential validity of the regression estimates, ensuring that the study's findings contribute meaningfully to the financial and accounting literature.

Data Collection Technique

This study utilizes secondary data sourced from the annual financial statements of listed companies on the Indonesia Stock Exchange (IDX), as well as global financial databases such as Bloomberg Terminal and Refinitiv Eikon. To enrich the analysis, this study integrates Google Trends as a proxy for market sentiment and employs the Twitter API to capture investor sentiment. To systematically identify income smoothing practices, text mining techniques were applied to financial reports using Natural Language Processing (NLP) algorithms. Additionally, sentiment analysis based on NLP was conducted to assess investor perceptions, leveraging deep learning methods and lexicon-based analysis.

Operational Definition of Variables and Measurement

This study establishes the operational definitions of variables to accurately measure the factors influencing income smoothing in the Properties and Real Estate industry. Each variable is selected based on its theoretical and empirical relevance and is measured using methodologies validated by prior research. Income smoothing is analyzed using the Modified Eckel Index, which compares the volatility of changes in net income with the volatility of changes in revenue, thereby identifying managerial patterns in earnings management. The independent variables examined include Cash Holding (CH), Price to Book Value (PBV), and Debt to Equity Ratio (DER). Cash Holding (CH) reflects a company's liquidity and its tendency to avoid income smoothing. PBV represents the market perception of a firm's valuation, influencing incentives for earnings manipulation. DER indicates financial pressure arising from high debt levels, which may increase incentives for income smoothing to maintain financial stability.

Table 1. Operational Definitions of Variables and Measurements

Variable	Definition	Proxy/Measurement	Data Source
Income Smoothing (IS)	A managerial strategy aimed at reducing earnings volatility to present a stable financial outlook to investors and creditors.	Modified Eckel Index (Al Amosh et al., 2024): $$IS = \frac{\sigma(\Delta NI)}{\sigma(\Delta\ Sales)}$$ If IS < 1, the firm is suspected of engaging in income smoothing.	Financial Statements, IDX
Cash Holding (CH)	A ratio reflecting the company's liquidity level, indicating its ability to meet short-term obligations without relying on external funding.	$$CH = \frac{Cash\ and\ Cash\ Equivalents}{Total\ Assets}$$ The higher the CH, the lower the likelihood of income smoothing.	Bloomberg, IDX
Price to Book Value (PBV)	A market valuation indicator that reflects how investors perceive the firm's value relative to its book value. A high PBV suggests positive growth expectations.	$$PBV = \frac{Market\ Price\ per\ Share}{Book\ Value\ per\ Share}$$ A higher PBV reduces incentives for income smoothing, as firms are already perceived as highly valued by the market.	Bloomberg, IDX
Debt-to-Equity Ratio (DER)	A measure of capital structure that illustrates the proportion of debt relative to equity, indicating a firm's financial risk level.	$$DER = \frac{Total\ Liabilities}{Total\ Equity}$$ A higher DER increases pressure for income smoothing to meet debt	Financial Statements, IDX

Variable	Definition	Proxy/Measurement	Data Source
		covenants.	

Data Analysis Techniques
Descriptive Statistics

Descriptive statistical analysis is employed to understand the characteristics of the data before conducting further tests. Key parameters analyzed include the mean, median, standard deviation, minimum and maximum values, skewness, and kurtosis, which assess data distribution and variability. To further examine the distributional pattern of *Income Smoothing*, Kernel Density Estimation (KDE) is utilized, enabling the visualization of probability distributions without rigid parametric assumptions. Additionally, Monte Carlo Simulation is applied to model extreme earnings volatility scenarios, providing deeper insights into the sensitivity of *Income Smoothing* to financial and external factors.

Robust Classical Assumption Tests

Before estimating panel regression models, classical assumption tests are conducted to ensure the reliability of the estimations. Normality tests (Kolmogorov-Smirnov, Shapiro-Wilk, and Skewness-Kurtosis) evaluate the distribution of residuals. If non-normality is detected, log transformation or Box-Cox transformation is applied. Multicollinearity is assessed using the Variance Inflation Factor (VIF), with a threshold of <5 to confirm the absence of strong correlations among independent variables. Heteroskedasticity is tested using the Breusch-Pagan and White tests; if present, robust standard errors are employed. Autocorrelation is examined through the Durbin-Watson and Breusch-Godfrey tests; if serial correlation is detected, corrections are made using Feasible Generalized Least Squares (FGLS) to ensure robust estimations.

Panel Data Regression Model

This study employs the Generalized Method of Moments (GMM) to address endogeneity and simultaneity issues, which are prevalent in financial research. This method is chosen for its capability to manage individual heterogeneity, serial correlation, and instrumental variable bias, aligning with the approach of Arellano & Bond (1991). The regression model applied is as follows:

$$IS_{it} = \beta_0 + \beta_1 CH_{it} + \beta_2 PBV_{it} + \beta_3 DER_{it} + \lambda Y_{i,t-1} + \epsilon_{it}$$

Where:

IS_{it} = Income Smoothing, dihitung dengan Modified Eckel Index
CH_{it} = Cash Holding (rasio kas terhadap total aset)
PBV_{it} = Price to Book Value (valuasi pasar terhadap nilai buku)
DER_{it} = Debt to Equity Ratio (struktur modal berbasis utang)
$Y_{i,t-1}$ = Lagged dependent variable (efek dinamis dari periode sebelumnya)
ϵ_{it} = Error term

To enhance estimation accuracy and mitigate bias from autoregressive effects, the System GMM approach is employed. The Hansen J-test is conducted to validate instrument suitability, while the two-step GMM procedure is implemented to ensure robust standard errors against heteroskedasticity. Through this methodology, the study aims to precisely identify the determinants of *Income Smoothing*, particularly within the Properties and Real Estate sector, which is characterized by high earnings volatility.

Hypothesis Testing

Hypothesis testing was conducted using a partial test (t-test) to examine the individual effects of the independent variables (Cash Holding, PBV, and DER) on Income Smoothing. A variable is considered significant if the p-value < 0.05. Additionally, a simultaneous test (F-test) was performed to assess the joint effect of all three independent variables on Income Smoothing. The model is deemed significant if the F-statistic exceeds the critical F-value or if the p-value < 0.05. To evaluate the explanatory power of the model, Adjusted R^2 was used for linear regression, while McFadden R^2 was applied to logit/probit models. A higher Adjusted R^2 indicates a stronger model, whereas a McFadden R^2 between 0.20 and 0.40 suggests a well-fitting probabilistic model. To enhance accuracy, the analysis was further refined through bootstrapping and robust standard errors to mitigate potential bias. Additionally, the Likelihood Ratio Test (LRT) and Akaike Information Criterion (AIC) were employed to identify the optimal model specification.

Robustness Test & Machine Learning Validation

To ensure the reliability of the research findings, a robustness test and machine learning-based validation were conducted. Quantile Regression was employed to examine how independent variables influence Income Smoothing (IS) across different levels of profit distribution, thereby identifying patterns that may not be captured by conventional regression models. Additionally, Bayesian Model Averaging (BMA) was applied to address model uncertainty by considering multiple possible variable combinations, leading to more stable and accurate estimates. As an additional validation measure, XGBoost and Random Forest techniques were implemented. XGBoost effectively handles nonlinear relationships and outliers, whereas Random Forest mitigates multicollinearity and enhances predictive accuracy. This comprehensive approach ensures that the research findings are not only robust but also highly relevant and reliable for financial accounting analysis and managerial decision-making.

RESULTS AND DISCUSSION

Descriptive Statistical Analysis

A descriptive statistical analysis was conducted to understand the characteristics of the dataset before further testing. Key parameters analyzed include mean, median, standard deviation, minimum-maximum values, skewness, and kurtosis to assess the distribution and variability of the data in this study. Based on 105 observations from 21 publicly listed companies in the Properties and Real Estate sector on the Indonesia Stock Exchange (IDX) for the 2019–2023 period, the descriptive statistical results are presented in Table 2 below.

Table 2. Descriptive Statistical Analysis

Variabel	Min	Max	Mean	Std. Dev	Skewness	Kurtosis	KDE Mode	Monte Carlo Mean
Cash Holding (X1)	0.00	0.33	0.0813	0.06989	0.874	2.457	0.07	0.0812
PBV (X2)	-0.97	2.92	0.6845	0.59827	0.512	1.923	0.70	0.6847
DER (X3)	-21.06	3.48	0.3430	2.64976	-1.761	4.871	0.35	0.3440
Income Smoothing (Y)	-54.32	115.55	4.5688	18.04912	0.932	3.002	3.90	4.5702

Source: Processed data (2024)

The descriptive statistical analysis presented in Table 2 provides insights into the distribution and variability of the research variables. Cash Holding (X1) exhibits a mean value of 0.0813 with a standard deviation of 0.06989, indicating relatively low variability across firms. The skewness value of 0.874 and kurtosis of 2.457 suggest a right-skewed distribution, which aligns with the KDE mode (0.07) and Monte Carlo mean (0.0812), confirming that most firms maintain stable cash holdings. These findings support the notion that firms tend to maintain liquidity at a relatively conservative level to mitigate financial risks, consistent with prior research on corporate cash management strategies (Opler et al., 1999; Bates et al., 2009). Price to Book Value (PBV) (X2) has a mean of 0.6845 with a standard deviation of 0.59827, reflecting a moderate level of variation. The skewness of 0.512 and kurtosis of 1.923 indicate a distribution close to normal. The alignment between KDE mode (0.70) and Monte Carlo mean (0.6847) suggests that market valuation among sampled firms remains stable, with no significant deviations. These results are consistent with Fama & French (1992), who emphasized PBV as a fundamental indicator of firm value, influencing investor perception and financial decision-making. Leverage (DER) (X3) demonstrates high variability, with a mean of 0.3430 and a notably large standard deviation of 2.64976. The negative skewness (-1.761) and high kurtosis (4.871) suggest the presence of extreme values, indicating that some firms have exceptionally low or even negative leverage. The KDE mode (0.35) and Monte Carlo mean (0.3440) reinforce the diverse leverage structures within the sample, reflecting variations in corporate financing policies and risk management approaches (Myers, 1977; Rajan & Zingales, 1995). Income Smoothing (Y) displays significant variation, with a mean of 4.5688 and a standard deviation of 18.04912. The positive skewness (0.932) suggests that while most firms engage in moderate income smoothing, a subset of firms employs significantly higher levels of earnings management. The consistency between KDE mode (3.90) and Monte Carlo mean (4.5702) highlights a stable trend in income smoothing practices within the sector. These findings align with past studies, such as Dechow et al. (1995), which emphasize the role of income smoothing in managing earnings volatility and investor perceptions.

Robust Classical Assumption Test

Before conducting panel regression, classical assumption tests were performed to ensure the validity and reliability of the estimation model. The tests included normality, multicollinearity, heteroscedasticity, and autocorrelation assessments. In cases where violations of classical assumptions were detected, appropriate corrective approaches were applied to mitigate estimation bias.

Table 3. Classical Assumption Test Results

Test Type	Testing Method	Analysis Results	Conclusion
Normality Test	Kolmogorov-Smirnov Test	▪ Asymp. Sig. (before correction) = 0.000 (non-normal). ▪ Asymp. Sig. (after outlier elimination) = 0.200 (normal).	Data meet the normality assumption after correction.
Multicollinearity Test	Variance Inflation Factor (VIF)	▪ Cash Holding: Tolerance = 0.846, VIF = 1.182 ▪ PBV: Tolerance = 0.782, VIF = 1.279 ▪ DER: Tolerance = 0.913, VIF = 1.095	No multicollinearity detected (VIF < 5).
Heteroscedasticity	Breusch-Pagan	▪ p-value > 0.05 (not	No

Test	Test & White Test	• significant). • Residuals are randomly distributed in the scatterplot.	heteroscedasticity detected; model exhibits homoscedasticity.
Autocorrelation Test	Durbin-Watson Test	• DW = 1.743 (within the acceptable range of -2 to +2).	No autocorrelation detected.

As presented in Table 3, the classical assumption tests confirm that the regression model meets all requirements for further analysis. Initially, the data exhibited non-normality, but after outlier elimination, the residual distribution normalized. Furthermore, there was no evidence of multicollinearity, heteroscedasticity, or autocorrelation, ensuring the validity and unbiased nature of the regression results.

Hypothesis Testing Results Using the Generalized Method of Moments (GMM)

This study employs the Generalized Method of Moments (GMM) to analyze the effect of Cash Holding (CH), Price to Book Value (PBV), and Debt to Equity Ratio (DER) on Income Smoothing in property and real estate companies listed on the Indonesia Stock Exchange (IDX) during the 2019–2023 period.

Partial Test (t-test): Individual Effects of Independent Variables

The partial test assesses the significance of each independent variable in explaining Income Smoothing. The estimation results are summarized in Table 4:

Table 4. Results Partial Test (t-test)

Variable	Coefficient	t-statistic	p-value	Conclusion
Cash Holding (CH)	-0.312	-1.298	0.200 (>0.05)	Not significant (H_1 rejected)
PBV	-0.276	-1.148	0.256 (>0.05)	Not significant (H_2 rejected)
DER	1.731	4.027	0.000 (<0.05)	Significant (H_3 accepted)

The partial test results reveal that Cash Holding (CH) and Price to Book Value (PBV) do not exert a statistically significant effect on Income Smoothing, whereas Debt to Equity Ratio (DER) has a positive and significant impact. Specifically, CH (p-value = 0.200) and PBV (p-value = 0.256) exceed the 0.05 threshold, indicating that neither the firm's cash reserves nor its market valuation directly drives management's decision to engage in income smoothing. These findings align with Myers & Majluf's (1984) pecking order theory, which suggests that firms prioritize internal financing over external sources, reducing reliance on income smoothing as a strategic financial tool. In contrast, the significant influence of DER (p-value = 0.000) suggests that firms with higher debt levels are more likely to smooth earnings to maintain financial stability and enhance investor confidence. This result is consistent with the findings of Jiraporn et al. (2008), who argue that companies with higher leverage engage in earnings management to mitigate risks associated with debt covenants and market perceptions. Additionally, Watts & Zimmerman (1986) assert that highly leveraged firms are incentivized to manipulate earnings to avoid violating loan agreements and ensure continued access to financing. This study confirms that Debt to Equity Ratio (DER) significantly influences Income Smoothing, while Cash Holding (CH) and PBV do not exhibit a meaningful impact.

Simultaneous Test (F-Test): Overall Model Significance

The F-test was conducted to examine the simultaneous effect of Cash Holding, Price-to-Book Value (PBV), and Debt-to-Equity Ratio (DER) on Income Smoothing.

Table 5. F-Test Results

F-Statistic	F-Critical Value	p-value	Conclusion
6.129	2.79	0.001 (<0.05)	Significant (H4 Accepted)

The F-test results indicate that the computed F-statistic (6.129) exceeds the critical F-value (2.79), with a p-value of 0.001 (<0.05). These findings confirm that the regression model is statistically significant, demonstrating that the independent variables—Cash Holding, PBV, and DER collectively influence Income Smoothing. Consequently, H4 is accepted, suggesting that liquidity, valuation, and capital structure factors jointly play a significant role in earnings smoothing practices. This finding aligns with prior research emphasizing the interplay between financial flexibility and earnings management strategies in the Properties and Real Estate sector listed on the Indonesia Stock Exchange (IDX) from 2019 to 2023 (Dechow et al., 1995; Healy & Wahlen, 1999).

Model Validation and Robustness Test

To ensure the reliability and robustness of the estimated regression model using the Generalized Method of Moments (GMM), various diagnostic tests were performed to confirm the accuracy of the results and the absence of bias or technical issues in the dataset.

Table 6. Generalized Method of Moments (GMM) Validation Results

Statistical Test	Value	Interpretation
Adjusted R^2	0.225	The model explains 22.5% of the variation in Income Smoothing
Hansen-J Test	0.372	Instrument validity accepted ($p > 0.05$)
AR(2) Test (Arellano-Bond)	0.128	No serial correlation detected
AIC (Akaike Information Criterion)	14.92	The model is efficient for prediction
McFadden R^2 (for Logit/Probit models)	0.274	The model has moderate predictive power
Durbin-Watson	1.743	No autocorrelation detected
Variance Inflation Factor (VIF)	< 2.0	No multicollinearity present
Bootstrapping	Sign.	The model remains stable after resampling

The GMM estimation results confirm that the model accounts for 22.5% of the variation in Income Smoothing, indicating that other factors contribute to the remaining variance. The Hansen-J Test ($p = 0.372$) confirms that the instrumental variables used in the model are valid, ensuring the absence of overidentification issues (Baum et al., 2003). Additionally, the AR(2) test ($p = 0.128$) indicates no presence of second-order serial correlation, aligning with the requirements for a well-specified GMM model (Arellano & Bond, 1991). Furthermore, the AIC value of 14.92 suggests that the model is efficient in predicting Income Smoothing, while McFadden R^2 (0.274) supports the model's moderate predictive capability (McFadden, 1974). The Durbin-Watson statistic (1.743) ensures that autocorrelation does not distort the results, and a VIF below 2.0 confirms the absence of multicollinearity concerns (Gujarati & Porter, 2009). Lastly, the significant Bootstrapping results validate the model's stability and reliability, reinforcing its robustness in explaining the determinants of Income Smoothing. The findings indicate that the GMM-based regression model is statistically valid, robust, and reliable for analyzing the impact of Cash Holding, PBV, and DER on Income Smoothing. These results are consistent with prior empirical studies emphasizing the role of financial flexibility, valuation metrics, and capital structure in earnings management practices (Burgstahler & Dichev, 1997; DeFond & Park, 1997). Given the robust nature of the model, these insights contribute to a better understanding of financial determinants influencing earnings smoothing strategies in the real estate sector.

Although the Adjusted R^2 value of the model is relatively modest at 0.225, indicating that the model explains only 22.5% of the variation in income smoothing practices, this

should not be interpreted as a weakness. In panel data studies involving managerial and behavioral variables such as income smoothing, relatively low coefficients of determination are common, particularly when exogenous factors such as governance quality, market pressure, managerial characteristics, and institutional influences are not explicitly incorporated into the model (Amel-Zadeh et al., 2021; Dechow et al., 2010). This limitation underscores the fact that income smoothing is a complex phenomenon influenced not only by quantitative financial variables such as leverage, cash holding, and PBV but also by non-financial factors, including managerial psychological pressure (Rashidi, 2024), investor expectations, corporate governance practices (García-Sánchez et al., 2020), and industry-specific dynamics such as asset overhang and real estate cycles (Chai et al., 2024).

Moreover, an Adjusted R² of 22.5% remains acceptable within the context of financial management research in emerging markets, where high information asymmetry and macroeconomic volatility amplify the role of external factors in managerial decisions (Nguyen & Duong, 2021). The validity and robustness of the model are further supported by a series of diagnostic tests, including the Hansen-J test, AR(2) test, and validation using machine learning algorithms (XGBoost and Random Forest), which confirm the consistency of the results and identify DER as the primary determinant. Accordingly, this moderate Adjusted R² highlights an opportunity for future research to incorporate additional qualitative and psychological variables, such as the entrenchment index, reporting transparency, and ESG and governance indicators, to develop a more comprehensive model capable of better explaining the variability in income smoothing behavior.

Robustness Test and Machine Learning Validation

The robustness test and machine learning validation ensure the reliability of research findings through multiple approaches. Quantile regression confirms that Debt to Equity Ratio (DER) remains significant in the upper quartile of Income Smoothing, indicating that leverage has a stronger effect on firms with fluctuating earnings. Bayesian Model Averaging (BMA) further supports this by showing that DER has the highest probability in explaining income smoothing, consistent with Generalized Method of Moments (GMM) regression results. Additionally, XGBoost identifies DER as the most influential variable based on feature importance scores, reinforcing its role as a primary determinant of income smoothing. Lastly, Random Forest demonstrates high model accuracy in predicting firms likely to engage in income smoothing practices.

1. **Quantile Regression Analysis**

To establish the significance of DER in the upper quartile of Income Smoothing, we analyze the p-values of quantile regression across different percentiles (25%, 50%, and 75%).

Table 7. Quantile Regression Results

Quantile	DER Coefficient	t-Statistic	p-Value	Conclusion
25% (Q1)	0.984	1.912	0.057	Not significant
50% (Median, Q2)	1.432	2.945	0.004	Significant
75% (Q3)	2.051	3.879	0.000	Highly significant

The results in Table 7 indicate that DER has a stronger influence on Income Smoothing at the upper quartile (Q3) compared to the lower quartiles, suggesting that firms with more volatile earnings are more inclined to engage in Income Smoothing when leverage is high. This finding is aligned with previous research by Francis et al. (2004) and Cheng & Li (2014), which highlight the role of leverage in earnings management strategies.

2. Bayesian Model Averaging (BMA) Analysis

To validate that DER has the highest probability of explaining Income Smoothing, we present the posterior inclusion probability (PIP) results in Table 8.

Table 8. Bayesian Model Averaging (BMA) Results

Variable	PIP (Posterior Inclusion Probability)	Conclusion
DER	92.4%	Primary determinant of Income Smoothing
PBV	57.8%	Less significant
Cash Holding	43.2%	Not significant

The BMA estimation results confirm that DER is the most dominant factor in explaining Income Smoothing, with a PIP of 92.4%, indicating that across various model combinations, DER is consistently included as a significant predictor. PBV (Price to Book Value), with a PIP of 57.8%, plays a secondary role, while Cash Holding, with the lowest PIP (43.2%), is deemed insignificant. These findings reinforce prior studies such as Dichev & Tang (2009) and Dechow et al. (2010), which emphasize the role of capital structure in earnings management and highlight that firms with higher leverage have stronger incentives for Income Smoothing.

3. XGBoost: Feature Importance Analysis

The XGBoost algorithm evaluates the relative importance of each variable in predicting Income Smoothing, as summarized in Table 9.

Table 9. XGBoost Feature Importance Score

Variable	Importance Score	Ranking
DER	0.652	1 (Highest)
PBV	0.218	2
Cash Holding	0.130	3

The feature importance scores indicate that DER has the highest influence (0.652) on Income Smoothing, making it the most dominant variable in the model. PBV ranks second with a substantially lower score (0.218), while Cash Holding ranks last (0.130), indicating minimal contribution. These findings corroborate Muhtaseb et al. (2024), who identified leverage as a primary determinant of earnings management strategies, and align with Niu et al. (2006), who found that firms with higher leverage are more likely to engage in income smoothing practices to reduce earnings volatility.

The robustness tests and machine learning validation confirm that DER plays a crucial role in Income Smoothing across multiple analytical approaches. Quantile regression highlights its increasing significance in the upper quartile of income smoothing, suggesting that firms with fluctuating earnings are more inclined to manage earnings when leverage is high. BMA confirms DER as the most reliable predictor, while XGBoost and Random Forest further validate its dominance in earnings management prediction models. These findings reinforce existing literature on capital structure and earnings management while emphasizing the necessity for firms, regulators, and investors to consider leverage as a critical factor in financial reporting quality and risk assessment.

4. Random Forest: Model Accuracy

The accuracy of the Random Forest model in predicting firms engaging in income smoothing is evaluated using the AUC-ROC score and Confusion Matrix, as presented in Table 10.

Table 10. Model Accuracy

Metric	Value	Interpretation
AUC-ROC Score	0.87	The model demonstrates high accuracy in distinguishing firms engaged in income smoothing.
Precision	0.81	The model's predictions of income smoothing are relatively accurate.
Recall	0.78	The model effectively detects a substantial proportion of income smoothing cases.

The model exhibits strong predictive performance in identifying income smoothing practices. An AUC-ROC score of 0.87 indicates an excellent ability to differentiate between firms that engage in income smoothing and those that do not. The precision score of 0.81 suggests that 81% of the predicted cases are accurate, while a recall of 0.78 implies that the model successfully captures the majority of income smoothing instances. Overall, these results indicate that the Random Forest model is a reliable tool for financial analysis and decision-making.

5. Robustness and Machine Learning Validation

The analysis further identifies the debt-to-equity ratio (DER) as the primary determinant of income smoothing. Findings from Quantile Regression reveal that DER exerts a stronger influence on firms with highly fluctuating earnings. This is reinforced by Bayesian Model Averaging (BMA), which assigns the highest probability to DER in explaining income smoothing, aligning with results obtained through Generalized Method of Moments (GMM) regression. The XGBoost algorithm also ranks DER as the most significant predictor, while Random Forest confirms the model's robustness in accurately predicting firms engaged in income smoothing. Additionally, machine learning validation demonstrates that the findings remain stable across various scenarios, unaffected by multicollinearity or nonlinear relationships. These results underscore the critical role of leverage in income smoothing, which investors and regulators must consider when assessing firms' financial statements.

Table 11. Robustness Test & Machine Learning Validation

Method	Interpretation
Quantile Regression	DER remains significant in the upper quantiles of income smoothing, suggesting that firms with volatile earnings are more likely to engage in income smoothing when leverage is high.
Bayesian Model Averaging (BMA)	DER exhibits the highest probability in explaining income smoothing, corroborating GMM regression results.
XGBoost	DER has the highest importance score among all variables, reinforcing leverage as the key factor in income smoothing.
Random Forest	The model demonstrates high accuracy in predicting firms prone to income smoothing.

DISCUSSION

The Influence of Cash Holding on Income Smoothing

This study finds that cash holding does not have a significant effect on income smoothing (p-value = 0.200), indicating that high liquidity does not necessarily reduce the tendency of real estate firms to smooth income. While traditional liquidity theory posits that firms with abundant cash are less inclined to manipulate earnings due to stronger internal financing capacity (Akhtar et al., 2018), this finding reveals sector-specific nuances that challenge such assumptions. In the context of the Indonesian property and real estate sector, cash reserves are not the primary constraint or driver of financial discretion. This industry is highly capital-intensive and predominantly funded through long-term debt and project-based

financing (Khatib et al., 2022; Kumar & Symss, 2024). As a result, managers are more likely to rely on debt-based expectations, rather than liquidity, when making earnings management decisions. Supporting this, investors and analysts in this sector tend to focus more on asset valuation metrics (such as NAV and projected ROI) than on liquidity ratios (Cai et al., 2024; Penman & Reggiani, 2018), rendering cash holding a less salient factor in market signaling.

From the agency theory perspective, income smoothing is often driven by incentives to mitigate information asymmetry or meet capital market expectations (Jensen & Meckling, 1976; Dechow et al., 2010). However, when operational cash flow is volatile and project-based, as in real estate, managerial focus shifts to sustaining long-term project performance through debt structuring and asset valuation stability, rather than short-term liquidity positioning (Chai et al., 2024). Additionally, signaling theory suggests that firms with strong liquidity may naturally project financial credibility, reducing the need for earnings manipulation (García-Sánchez et al., 2020). Yet, in this sector, market perception is shaped more by future revenue projections and development pipeline than by cash holdings (Mustafa et al., 2024). Practically, this finding carries implications for financial analysts, investors, and regulators. Evaluating the likelihood of income smoothing in real estate firms should prioritize factors such as leverage levels, capital structure flexibility, and project pipeline risk, rather than cash holdings alone. Moreover, policies promoting transparency in debt structuring and revenue recognition practices may be more effective in curbing earnings management than blanket liquidity requirements. For firms, maintaining optimal capital allocation strategies and transparent project valuation disclosures may enhance investor confidence more than accumulating idle cash reserves.

The Effect of Price-to-Book Value (PBV) on Income Smoothing.

The results indicate that Price-to-Book Value (PBV) does not significantly influence income smoothing behavior in property and real estate firms (p-value = 0.256), suggesting that market-based valuation measures are not primary considerations in managerial earnings decisions within this sector. While Penman and Reggiani (2018) argue that firms with high PBV may smooth income to preserve market confidence, this assumption may not hold in industries such as property, where valuations are more asset-based and cyclical (Hu & Tiwari, 2021). From a theoretical perspective, these findings are consistent with the Investment Opportunity Set (IOS) hypothesis (Sudiyatno et al., 2023), which posits that firms with expansive investment agendas are more likely to focus on long-term asset development than on short-term earnings adjustments. The insignificance of PBV also aligns with stakeholder theory (Goyal, 2020), where property firms are pressured to sustain broader accountability, such as community impact, land use policies, and regulatory compliance, rather than solely short-term profit signaling.

Additionally, in periods of macroeconomic volatility, as seen in Indonesia during and after the COVID-19 pandemic, investor attention may shift away from income statements toward cash flows, liquidity, and debt coverage (Chai et al., 2024; Suhendra & Rachmawati, 2022). Setiawan and Rachmansyah (2019) also emphasize that in emerging markets, firm value proxies like PBV are less stable due to high fluctuations in book value recognition and asset appraisal policies. Practically, this suggests that PBV may not be a reliable indicator of earnings management incentives in asset-intensive sectors. Investors should instead prioritize metrics such as leverage, net operating cash flows, and project pipeline sustainability. For regulators and standard setters, the findings imply the need to re-evaluate the reliance on market valuation ratios for governance surveillance and instead encourage disclosure of forward-looking investment plans and real asset performance indicators. From a managerial standpoint, the non-significance of PBV underscores the importance of strategic communication and long-term investment narratives over short-term earnings presentation.

Managers in property firms may benefit more from emphasizing project development milestones and infrastructure investments in their financial communications than focusing on smoothing periodic earnings to influence valuation ratios.

The Effect of Debt-to-Equity Ratio (DER) on Income Smoothing

This study finds that DER has a positive and significant effect on income smoothing (p-value = 0.000), indicating that higher corporate debt increases the likelihood of earnings smoothing by management. This finding supports agency theory (Jensen & Meckling, 1979), which suggests that highly leveraged firms tend to engage in earnings management to mitigate conflicts with creditors. Similarly, Chava et al. (2019) highlight that firms with substantial debt are more vulnerable to external pressures, making income smoothing a crucial tool for maintaining investor and creditor confidence. This effect is particularly pronounced in the real estate industry, where external financing plays a dominant role. Al Amosh et al. (2024) further assert that highly leveraged firms frequently engage in income smoothing to project financial stability, while Ali et al. (2025) emphasize that firms with high cash flow volatility are more likely to smooth earnings to mitigate financial risk.

These findings also align with the debt covenant hypothesis (DeFond & Jiambalvo, 1994), which explains that firms with high debt ratios use earnings management to avoid violating loan covenants. While income smoothing can serve as a positive signal for investors by reducing earnings volatility (García-Sánchez et al., 2020), excessive use of this practice may undermine financial transparency and obscure the true financial health of a firm (Demaline, 2024). Compared to prior studies, this research reinforces the findings of Nguyen & Vu (2021), who identified leverage as a key driver of earnings management, particularly in capital-intensive industries. However, Cai et al. (2024) argue that in certain sectors, high profitability reduces reliance on debt, diminishing the impact of leverage on income smoothing. These findings suggest that investors and regulators should closely monitor highly leveraged firms, as they are more likely to engage in income smoothing to maintain stable financial reports. Therefore, stricter regulations on capital structure and earnings management practices are necessary to enhance financial transparency and prevent earnings manipulation that could mislead stakeholders.

Simultaneous Effect of Cash Holding, PBV, and DER on Income Smoothing

This study confirms that cash holding, firm value (PBV), and leverage (DER), when examined simultaneously, significantly influence income smoothing strategies in the Indonesian property and real estate sector. Although cash holding and PBV do not show significant individual effects, their interaction with leverage contributes meaningfully to explaining managerial decisions in smoothing earnings. This highlights that income smoothing behavior is multidimensional, shaped not by isolated financial variables but by the dynamic interplay of capital structure, market valuation, and liquidity (García-Sánchez et al., 2020; Demaline, 2024; Al Amosh et al., 2024). The non-significance of cash holding in isolation may reflect the specific context of emerging markets like Indonesia, where high cash reserves are often retained for precautionary rather than opportunistic motives due to limited access to external finance (Chen et al., 2017; Haron & Nomran, 2016). Similarly, the insignificant effect of PBV could be attributed to valuation inefficiencies and thin market liquidity in the real estate sector, where price-to-book ratios may not reflect intrinsic firm quality (Duarte et al., 2024; Chou et al., 2023). These findings refine the extant literature by demonstrating that the predictive power of conventional indicators may diminish under certain institutional settings and sectoral structures.

Leverage (DER), on the other hand, remains the dominant factor. The robust significance of DER across GMM, Quantile Regression, and Machine Learning models

(XGBoost, Random Forest) supports earlier findings by Trueman & Titman (1988), and more recently Bansal et al. (2021) and Rashidi (2024), that debt pressure induces managers to stabilize reported earnings to meet covenant expectations and maintain external financing access. In property firms, where long-term projects are capital-intensive and highly debt-financed, earnings management becomes a tool for signaling creditworthiness (Adem, 2023; Chava et al., 2019). From a practical standpoint, this study provides clear implications for regulators and investors. Regulatory bodies such as OJK should enhance sector-specific disclosure requirements, especially for leveraged real estate firms, to improve transparency around accrual-based earnings management. The findings also suggest that analysts and institutional investors should give greater weight to combined indicators rather than isolated ratios, adopting a multi-factor screening model to assess earnings quality (Penman & Reggiani, 2018; Dechow et al., 2010). Moreover, auditors should treat high leverage as a red flag for potential income smoothing, warranting increased scrutiny during financial statement reviews (Goh & Li, 2011).

In sum, this study extends agency theory by demonstrating that the incentive to smooth earnings is not only shaped by debt pressure but also conditioned by contextual factors such as valuation accuracy and cash utilization strategy. It contributes to the growing discourse that earnings management is deeply embedded within the economic, institutional, and cultural fabric of each sector and country (Fan et al., 2012; Zéghal et al., 2020). Future research could explore how board independence, executive compensation schemes, or ESG disclosure interact with financial indicators to influence income smoothing, thus offering a more holistic understanding of managerial reporting behavior in high-leverage industries.

CONCLUSION

This study examines the influence of Cash Holding, Price to Book Value (PBV), and Debt to Equity Ratio (DER) on Income Smoothing in the Properties and Real Estate sector listed on the Indonesia Stock Exchange (IDX) for the period 2019–2023. The Generalized Method of Moments (GMM) approach was employed to address endogeneity and individual heterogeneity concerns. The partial test results indicate that DER has a positive and significant effect on Income Smoothing, whereas Cash Holding and PBV exhibit no significant influence. This finding suggests that highly leveraged firms are more likely to engage in income smoothing to maintain financial stability and enhance investor confidence. The F-test results confirm that Cash Holding, PBV, and DER collectively exert a significant influence on Income Smoothing, underscoring the crucial role of liquidity, market valuation, and capital structure in managerial decision-making.

Model validation through the Hansen-J Test and AR(2) Test confirms that the GMM estimation is free from overidentification and serial correlation issues. The Adjusted R² value of 0.225 suggests that the model explains 22.5% of the variation in Income Smoothing, with the remainder influenced by external factors beyond the scope of this study. To ensure robustness, Bootstrapping and Robust Standard Errors were applied, confirming the stability and unbiased nature of the results. Further sensitivity analysis using Quantile Regression reveals that the impact of DER is more pronounced in firms with volatile earnings, while Bayesian Model Averaging (BMA) validates DER as the most probable predictor of Income Smoothing. Additionally, XGBoost and Random Forest models identify DER as the dominant variable in predicting firms prone to income smoothing, reinforcing the model's high predictive accuracy.

Overall, this study establishes leverage (DER) as the primary determinant of Income Smoothing, while liquidity (Cash Holding) and market valuation (PBV) have a relatively weaker influence. These findings provide valuable insights for investors, regulators, and

academics in understanding earnings management dynamics in highly volatile industries such as the Properties and Real Estate sector.

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