

Firm Size as a Moderator of the Effects of Financial Leverage and the Investment Opportunity Set on Financial Performance

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Abstract

This study examines the effects of financial leverage, proxied by the debt-to-equity ratio (DER), and the investment opportunity set (IOS), proxied by the market-to-book value of equity (MBVE), on financial performance measured by economic value added (EVA). It also evaluates the moderating role of firm size. The sample comprises 51 property and real estate companies listed on the Indonesia Stock Exchange during 2020-2024 and selected through purposive sampling. Panel data were analyzed in EViews 12 using a fixed-effects model and moderated regression analysis. DER has a significant negative effect on EVA, whereas IOS has no significant effect. Firm size significantly moderates the DER-EVA relationship: the negative interaction coefficient indicates that size intensifies the adverse association between leverage and EVA. Conversely, firm size does not moderate the IOS-EVA relationship. These findings suggest that the funding advantages of large firms may be offset by higher debt-related costs, agency costs, and organizational complexity. Large property firms should therefore exercise tighter control over leverage and ensure that debt-funded investments generate returns above the cost of capital. The study integrates leverage, growth opportunities, firm size, and EVA within a panel-data framework for an emerging-market property sector.

Keywords: *Economic Value Added; Financial Leverage; Firm Size; Investment Opportunity Set; Property and Real Estate Firms*

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INTRODUCTION

Business enterprises differ in their competitive capacity. Although accounting profit remains important, sustainable economic value creation for stakeholders is essential for conveying credible, positive signals to capital markets. Financial performance consequently shapes investor expectations. During the study period, several Indonesian property companies recorded unstable or negative EVA. Based on data processed for this study, PT Ristia Bintang Mahkotasejati Tbk recorded a 61% decline from 2020 to 2021, followed by an 8% increase in the subsequent year. PT Roda Vivatex Tbk reported negative performance throughout the observation period, with fluctuations exceeding 200% and 72%. PT Perintis Trinitis Properti Tbk increased by 105% from 2021 to 2022 but declined by more than 1,000% in the following year. These patterns may reflect macroeconomic conditions, including economic growth, inflation, and interest rates (Yurisafira et al., 2023). Sholikhah et al. (2024) similarly reported that several property companies generated negative EVA despite recording positive accounting profit. Bank Indonesia's Residential Property Price Survey further showed that year-on-year growth in the Residential Property Price Index slowed from 1.46% in the third quarter of 2024 to 0.84% in the third quarter of 2025. Residential property sales continued to

contract, although the contraction eased from -7.14% to -1.29% year on year. Mortgage financing also remained dominant, accounting for 75.80% of home purchases in 2024 and 74.41% in 2025 (Bank Indonesia, 2024, 2025). Together, these conditions indicate that the property sector continues to face a weak recovery in demand and a high dependence on debt-based financing.

A firm creates economic value when its net operating profit after tax exceeds the cost of the capital employed (Brigham & Houston, 2021). Financial performance may therefore be assessed using economic value added (EVA), which reflects whether management has used assets efficiently to generate returns above the cost of capital (Tanjung, 2024). Compared with conventional accounting profit, EVA provides a more comprehensive indication of the effectiveness of operating and investment decisions (Larage et al., 2025).

In the property sector, this distinction is important because a company may report accounting profit while interest and other capital charges still exceed the return generated by its assets. EVA therefore links the sector's debt dependence and delayed investment returns to a value-based measure of performance (Sholikhah et al., 2024).

Financial performance is closely associated with financial leverage, or the extent to which a firm relies on debt financing (Agatha, 2024). Debt can send a favorable signal when it is deployed efficiently and generates returns that exceed its cost (Brigham & Houston, 2019). Excessive leverage, however, can increase the cost of capital and financial risk because substantial principal and interest obligations raise the probability of default and may erode the tax benefits of debt (Goh et al., 2023).

Through the EVA equation, leverage affects performance through both operating and financing channels. Higher debt raises interest obligations and may increase the cost of debt and the overall cost of capital. If NOPAT generated by debt-financed assets does not increase enough to cover the resulting capital charge, EVA decreases. The expected relationship therefore depends on whether additional debt produces returns above the full cost of capital (Brigham & Houston, 2019; Goh et al., 2023).

The investment opportunity set (IOS) represents a firm's future investment and growth opportunities (Jafriani et al., 2024). A high IOS generally indicates greater potential to create economic value through profitable investment (Wibowo et al., 2025). The relationships of leverage and IOS with EVA illustrate that financing and investment decisions are central to corporate value creation (Larage et al., 2025). Large firms generally possess stronger resources, management systems, and financing flexibility, enabling them to manage financial risk and investment opportunities more effectively (Suyuti et al., 2025). They may also benefit from lower borrowing costs and broader access to capital (Dang et al., 2018).

However, IOS is an opportunity measure rather than a record of realized operating returns. A high MBVE can contribute to EVA only when the underlying projects are implemented and generate NOPAT above the capital charge. Property projects often require a long development and sales period, so market expectations may not appear in current-period EVA.

Prior evidence on financial leverage, IOS, and firm size remains inconclusive. Agatha (2024) found that leverage negatively affects financial performance, consistent with Noor and Dewi (2022). By contrast, Iskandar and Ermalina (2025) found no significant effects of either IOS or leverage on financial performance, a result also reported by Goh et al. (2023). Young and Nuringsih (2023) likewise found that investment opportunities did not have a positive effect on EVA. These mixed findings warrant further examination using EVA and a moderating framework.

The evidence also leaves several gaps. The cited studies report mixed direct relationships and use a mixture of accounting-based measures, firm value, and EVA. This makes it difficult to determine whether a financing policy or an investment opportunity creates value after the full cost of capital is deducted. Methodologically, the studies cited here do not address the same panel-data model with firm size as a contingency variable.

Contextually, the Indonesian property sector combines large capital needs, debt dependence, and long project cycles. These conditions make it necessary to test whether firm size changes the way leverage and IOS are converted into EVA, rather than treating size as only another explanatory variable (Agatha, 2024; Noor & Dewi, 2022; Young & Nuringsih, 2023).

The novelty of this study lies in integrating financial leverage, IOS, firm size, and financial performance within a single empirical framework. It uses EVA as a value-based measure of financial performance and positions firm size as a moderator to assess whether debt use and growth opportunities are translated efficiently into economic value.

Accordingly, the contribution is not only the inclusion of several variables in one model. It is the test of a theoretically motivated contingency: firm size may alter the cost, risk, and implementation conditions through which financial leverage and IOS affect EVA in an emerging-market property sector.

Accordingly, this study aims to determine (1) whether financial leverage and IOS individually affect financial performance, (2) whether firm size moderates the effect of financial leverage on financial performance, and (3) whether firm size moderates the effect of IOS on financial performance.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Signaling Theory

Signaling theory, introduced by Spence (1973), explains how informed parties communicate signals to external parties to reduce information asymmetry. In corporate settings, management possesses more comprehensive information and may communicate it through financial statements, financing policies, investment decisions, and performance indicators that convey the firm's prospects (Connelly et al., 2025). Financing decisions can signal management's assessment of business risk and growth potential (Brigham & Houston, 2019). Financial leverage may reflect managerial confidence in the firm's capacity to generate future cash flows (Bui et al., 2023), whereas IOS may signal growth opportunities that investors perceive favorably (Wibowo et al., 2025). The credibility of these signals is ultimately reflected in the firm's ability to create economic value, as measured by EVA. Firm size may further enhance signal credibility because large firms generally exhibit greater transparency and stability (Zenabia & Falih, 2024).

Agency Theory

Agency theory defines the firm as a contractual relationship in which owners (principals) delegate decision-making authority to managers (agents) (Jensen & Meckling, 1976). This relationship can generate information asymmetry and conflicts of interest because managers possess more information about the firm and may prioritize personal objectives, job security, or private benefits, whereas owners seek stronger organizational performance and returns. Monitoring, bonding, and residual losses incurred to mitigate these conflicts constitute agency costs (Jensen & Meckling, 2012).

Financial Leverage

Financial leverage is a financing policy that reflects the extent to which debt is used to fund a firm's assets and activities (Bui et al., 2023). Debt may provide tax benefits, but it also increases financial risk when it is not managed optimally (Brigham & Houston, 2019). Efficiently managed leverage can convey a favorable market signal, whereas excessive leverage can heighten perceived risk (Connelly et al., 2025). Thus, financial leverage affects financial performance through its influence on the firm's financing structure and cost of capital (Brigham & Houston, 2019).

Because EVA is defined as NOPAT less the WACC charge on invested capital, leverage can reduce performance even when it increases the funds available to the firm. Interest obligations reduce the operating surplus, while higher financial risk can raise the required return on capital. Leverage is therefore value creating only when the assets financed with debt

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generate returns greater than the associated capital charge (Brigham & Houston, 2019; Goh et al., 2023).

Investment Opportunity Set (IOS)

The investment opportunity set represents the range of investment alternatives available to a firm and its potential for future growth (Irawan & Apriwenni, 2025). Firms with a high IOS generally have stronger growth prospects and may receive more favorable market assessments (Agustina et al., 2024). From a signaling perspective, IOS communicates management's confidence in business continuity and future value creation (Simanjuntak et al., 2025). Investment opportunities that generate returns above the cost of capital can increase economic value (Sari & Paramita, 2021). However, the effective realization of these opportunities may depend on firm size because size shapes resource capacity and access to financing (Simanjuntak et al., 2025).

MBVE does not show that an investment has already produced cash flow; it reflects the market's expectation of future growth. For IOS to increase EVA, the firm must convert that expectation into projects that produce NOPAT above WACC after they are financed and implemented. A high IOS can therefore coexist with a low current EVA when project benefits are delayed or the cost of capital is high (Young & Nuringsih, 2023).

Financial Performance

Financial performance reflects how effectively a firm manages its resources to generate returns. One value-based measure is economic value added (EVA), which indicates the economic value created after deducting the full cost of capital (Bui et al., 2023). EVA measures residual operating profit after accounting for all capital charges (Stewart, 1991) and is more comprehensive than accounting profit because it incorporates both financing structure and risk (Young & Nuringsih, 2023). Under signaling theory, positive EVA indicates that returns exceed the cost of capital, whereas negative EVA indicates value destruction (Bui et al., 2023). EVA may therefore be affected by financing structure, the effective use of investment opportunities, and the managerial capacity associated with firm size (Wibowo et al., 2025).

EVA thus provides the outcome needed to test whether financing and investment decisions create value after all capital charges, rather than only whether they are associated with accounting profit.

Firm Size

Firm size reflects the scale of a firm's operations, resource capacity, and organizational complexity (Zenabia & Falih, 2024). Large firms generally have more developed management systems, greater transparency, and stronger access to financing, which can increase market confidence. Smaller firms, by contrast, may face a higher risk of negative returns when their assets are not managed prudently (Bui et al., 2023).

Size can produce two opposing mechanisms. Greater scale may lower borrowing costs and provide resources for project monitoring, but it can also increase agency costs, organizational layers, and bureaucratic delays. These mechanisms imply that size may weaken or intensify the effects of leverage and IOS; its moderating direction is therefore an empirical question (Dang et al., 2018; Jensen & Meckling, 2012).

Effect of Financial Leverage on Financial Performance

The causal link can be stated through the components of EVA. Debt raises interest obligations and may increase the cost of debt and WACC. When NOPAT from debt-financed assets does not exceed the additional capital charge, EVA falls. The effect of leverage therefore depends on whether borrowed funds generate returns above the full cost of capital (Brigham & Houston, 2019; Goh et al., 2023).

Debt provides additional capital for operating and investment activities and may improve financial performance, particularly in industries that rely heavily on external financing. Prior research indicates that financial leverage affects EVA because debt is directly

related to a firm's capital structure and cost of capital (Noor & Dewi, 2022). However, leverage above an appropriate industry level can increase financial risk, particularly among smaller firms (Amelinda et al., 2023). Based on this reasoning, the following hypothesis is proposed:

H1: Financial leverage significantly affects financial performance.

Effect of the Investment Opportunity Set on Financial Performance

MBVE measures an expected opportunity, not realized returns. The opportunity can improve EVA only when it is implemented and the resulting NOPAT is higher than the WACC charge. Because property projects may take several years to generate cash flows, a high MBVE may not affect current-period EVA (Sari & Paramita, 2021; Young & Nuringasih, 2023).

IOS captures investment opportunities that may generate future economic value. A high IOS can increase firm value when investments yield returns above the cost of capital (Agustina et al., 2024). However, the conversion of growth opportunities into realized value may depend on firm-specific characteristics (Zenabia & Falih, 2024). Accordingly, the following hypothesis is proposed:

H2: The investment opportunity set significantly affects financial performance.

Firm Size as a Moderating Variable

Firm size can moderate these relationships through its effect on both financing and implementation. Larger firms may obtain cheaper debt and have more resources to monitor projects, but their scale may also increase agency costs and organizational complexity. The first mechanism could reduce the burden of leverage and support IOS realization; the second could increase the burden of debt and delay value creation. The net direction cannot be assumed and must be tested (Dang et al., 2018; Jensen & Meckling, 2012).

Firm size may shape the effects of leverage and IOS on financial performance. Large firms generally possess stronger resources, broader financing access, and greater risk-management capacity (Amelinda et al., 2023), which may alter the consequences of additional leverage. They may also be better positioned to finance, implement, and realize future investment opportunities (Dang et al., 2018). The following moderating hypotheses are therefore proposed:

H3: Firm size moderates the effect of financial leverage on financial performance.

H4: Firm size moderates the effect of the investment opportunity set on financial performance.

RESEARCH METHODS

Research Design and Data Sources

This quantitative study tests the hypotheses using secondary data from annual financial statements published by the Indonesia Stock Exchange (www.idx.co.id) and company websites. Scholarly publications support the theoretical framework.

Population and Sample

The population comprised all property and real estate companies listed on the Indonesia Stock Exchange during 2020-2024, totaling 92 companies. The sample was determined using purposive sampling with the following criteria: the company was listed on the Indonesia Stock Exchange, published complete annual financial statements throughout the observation period, used Indonesian rupiah as its reporting currency, and had complete financial data for the study variables. Thus, 51 companies were selected as the sample for testing.

The sample-selection flow is summarized below. The 41 excluded companies are reported in aggregate under the purposive-sampling criteria.

Table 1. Sample-selection process

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Selection stage	Number of companies
Population: property and real estate companies listed on the Indonesia Stock Exchange (2020-2024)	92
Excluded under the purposive-sampling criteria (combined)	41
Final sample	51

Source: Authors' compilation.

Variable Measurement

Financial performance is the dependent variable; DER and IOS are the independent variables; and SIZE is the moderator.

Financial performance reflects a firm's ability to manage resources and generate returns (Subramanyam & Wild, 2017). It is measured using economic value added (EVA), which captures economic profit after deducting the full cost of capital and indicates whether debt-financed activities create value.

$$EVA = NOPAT - (WACC \times Invested\ Capital)$$

(1)
(Brigham & Houston, 2019)

Financial leverage is measured by the debt-to-equity ratio (DER), calculated as total liabilities divided by total equity. DER indicates reliance on external financing and the resulting financial risk.

$$DER = \frac{Total\ Liabilities}{Total\ Equity}$$

(2)
(Subramanyam & Wild, 2017)

IOS represents future investment prospects and growth potential. It is measured by the market-to-book value of equity (MBVE), calculated as market value of equity divided by book value, and reflects investors' growth expectations.

$$MBVE = \frac{Share\ Price \times Shares\ Outstanding}{Total\ Equity}$$

(3)
(Sari & Paramita, 2021)

Firm size (SIZE) reflects operating scale, resource capacity, and organizational complexity. It is measured as the natural logarithm of total assets to reduce the influence of extreme nominal asset values.

$$SIZE = \ln(Total\ Assets)$$

(4)
(Zenabia & Falih, 2024)

Data Analysis

Data were analyzed in EViews 12 using panel-data regression. Moderated regression analysis (MRA) with interaction terms tested whether SIZE changes the DER-EVA and IOS-EVA relationships.

RESULTS AND DISCUSSION

Descriptive Statistics

Descriptive statistics summarize each variable's distribution (Ghozali, 2018). The mean DER was 0.7284, with a standard deviation of 0.7187. The mean falls within the 0.40-1.20 industry range reported in the study data. IOS had a mean of 1.4733 and a standard deviation of 3.1816, indicating substantial variation in investment opportunities across firms. SIZE had a mean of 3.2967 and a standard deviation of 0.0910, whereas EVA had a mean of 15.3782 and a standard deviation of 8.6994, demonstrating variation in economic value creation among the sampled firms.

Hypothesis Testing

The Chow, Hausman, and Lagrange multiplier specification tests identified the fixed-effects model (FEM) as the appropriate panel-data estimator. Hypotheses were evaluated

using regression coefficients, t-statistics, and probability values at a 5% significance level ($\alpha = .05$) (Ghozali, 2018).

Diagnostic testing showed that all absolute pairwise correlations were below 0.85 and all variance inflation factors were below 10, indicating no serious multicollinearity. The Glejser test produced probability values above .05 for all predictors, providing no evidence of heteroskedasticity.

Table 2. Hypothesis-testing results

Model	Coefficient	p-value	Decision
DER -> EVA	-5.459761	0.0000	Supported
IOS -> EVA	0.140052	0.5560	Not supported
SIZE -> EVA	48.62185	0.2478	Not significant
DER x SIZE -> EVA	-48.49975	0.0031	Supported
IOS x SIZE -> EVA	1.215855	0.6895	Not supported

Source: Processed EViews output, 2026.

Table 2 shows that DER has a negative and statistically significant effect on EVA (coefficient = -5.459761, $p < .001$); therefore, H1 is supported. IOS has no significant effect on EVA (coefficient = 0.140052, $p = .5560$), and H2 is not supported. The direct effect of SIZE is also not significant (coefficient = 48.62185, $p = .2478$). The DER x SIZE interaction is negative and significant (coefficient = -48.49975, $p = .0031$), supporting H3. This coefficient indicates that firm size intensifies the adverse relationship between leverage and EVA. By contrast, the IOS x SIZE interaction is not significant (coefficient = 1.215855, $p = .6895$), and H4 is not supported.

Table 3. F-statistic results

Metric	Model	
	Model 1	Model 2
F-statistic	4.7277	4.9512
p-value	0.0000	0.0000

Source: Processed EViews output, 2026.

Both Model 1, which includes the direct effects, and Model 2, which includes the interaction terms, are jointly significant ($p < .001$). Thus, the regressors in each specification collectively explain a statistically significant proportion of the variation in EVA.

Table 4. Coefficients of determination

Metric	Model	
	Model 1	Model 2
R-squared	0.5548	0.5721
Adjusted R-squared	0.4375	0.4565

Source: Processed EViews output, 2026.

R-squared increases from .5548 in Model 1 to .5721 in Model 2, an increase of .0173. Adjusted R-squared rises from .4375 to .4565, an increase of .0190, or 1.90 percentage points. After adjustment, the interaction model explains 45.65% of the variation in EVA. The modest increase suggests that the firm-size interactions add limited overall explanatory power beyond the main effects, while the remaining variation is attributable to factors outside the model.

Effect of Financial Leverage on Financial Performance

Financial leverage has a statistically significant negative effect on financial performance. Higher debt increases interest expense and financial risk, thereby raising the firm's capital burden and reducing EVA. This outcome can send a negative signal to investors because it indicates weaker economic value creation (Ross, 1977). The finding is consistent with Noor and Dewi (2022), who also reported a significant negative relationship between leverage and EVA.

Effect of the Investment Opportunity Set on Financial Performance

The investment opportunity set has no significant effect on financial performance. Growth opportunities reflected in MBVE may not produce economic value within the same period because property investments typically require a long realization horizon. Market expectations alone therefore do not constitute a favorable signal unless prospective gains are converted into operating returns. This finding is consistent with Young and Nuringsih (2023), who reported no positive effect of investment opportunities on EVA.

Moderating Role of Firm Size in the Relationship between Financial Leverage and Financial Performance

Firm size significantly moderates the effect of financial leverage on financial performance. The negative interaction coefficient indicates that larger firm size strengthens, rather than weakens, the adverse effect of leverage on EVA. Large firms may face greater agency costs, organizational complexity, and bureaucratic inefficiency, which can increase debt-related costs and impede the conversion of assets into economic value. The resulting signal may be interpreted negatively by the market (Ross, 1977). Following Baron and Kenny's (1986) framework, SIZE functions as a pure moderator because its direct effect on EVA is not significant, whereas the DER x SIZE interaction is significant.

Moderating Role of Firm Size in the Relationship between the Investment Opportunity Set and Financial Performance

Firm size does not moderate the relationship between IOS and EVA. A larger asset base does not necessarily improve a firm's ability to convert investment opportunities into economic value because investment outcomes depend more directly on project quality, implementation speed, and capital-cost efficiency. This result is consistent with Yuniarti and Susetyo (2023) and Fadliana and Khaerunnisa (2024).

CONCLUSION

This study concludes that financial leverage has a significant negative effect on financial performance. Although the sampled property and real estate companies reported an average DER of 0.7284, debt at this level still imposes financing costs that can erode economic value added. IOS, by contrast, has no significant effect on EVA. Growth opportunities may require a long realization period and do not create economic value until they generate returns above the cost of capital. Once those opportunities are realized, they can provide a stronger signal to investors and the market (Stewart, 1991).

The MRA results show that firm size moderates the relationship between financial leverage and financial performance but does not moderate the relationship between IOS and financial performance. The significant negative DER x SIZE interaction indicates that the adverse effect of leverage on EVA becomes stronger as firm size increases. Large firms may incur greater bureaucratic and agency costs, making debt less efficient as a mechanism for creating economic value (Jensen & Meckling, 2012).

Managerial Implications

Managers of large property firms should recognize that additional debt can materially reduce economic value and send an unfavorable market signal. Leverage decisions should therefore be tied to projects with demonstrable returns above the cost of capital. Growth

prospects should also be supported by concrete implementation plans, disciplined capital allocation, and measurable operating outcomes before they are communicated as sources of future value.

Limitations and Future Research

These findings should be interpreted in light of several limitations. The sample is restricted to listed Indonesian property and real estate firms during 2020-2024, the constructs are represented by a single proxy for each variable, and the model does not explicitly control for macroeconomic factors that may influence the cost of capital. Future research could incorporate interest rates, inflation, and economic growth; examine alternative IOS and firm-size proxies; and test whether the results remain robust across sectors and observation periods.

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