The Influence of Financial Performance and Macroeconomic Factors on Price to Book Value in Property and Real estate Companies in Indonesia

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ABSTRACT
The objective of this research is to assess the contribution of several financial indicators on market valuation of the firm. The company's financial setup is represented as quantified by the proportion of debt to equity, through the Equity Ratio (DER). A company's liquidity is reflected through the Current Ratio (CR), while profitability is indicated as Return on Equity ((ROE). The effects of these financial indicators on firm valuation are analyzed using Price to Book Value (PBV) as an indicator of market valuation. Additionally, this analysis looks into the importance of inflation functioning as an interaction variable that may affect the interactions among those financial metrics. The analysis draws upon data from 52 companies operating spanning the property and real estate market, whose shares were actively traded on the national trading exchange of Indonesia during the 2019–2023 period. The analytical framework employs panel data regression utilizing the Random Effect Model (REM), supported by interaction testing to evaluate moderation effects. The findings reveal that DER exerts a positive and statistically substantial effect on Price to Book Value, particularly for firms categorized as undervalued. In contrast, CR exhibits a negative effect, while ROE does not show a significant correlation with the company's value. Moreover, inflation serving as a moderating factor in the relationship among financial ratios and the value of undervalued firms.

Keywords: Capital Structure (DER); Inflation; Liquidity Level (CR); Profitability Performance (ROE); Price to Book Value (PBV)

INTRODUCTION

Globalization has strengthened the interconnectedness of economic activities in various sectors, including the property and real estate industries, which are highly dependent on macroeconomic stability. In this context, company value is a key indicator that reflects market expectations regarding business development and management's ability to run the company's operations. This assessment is usually manifested in the Price to Book Value (PBV), which is often used as a reference by investors to identify whether a company's shares have been valued proportionally.

According to Firm Value Theory by Penman & Reggiani (2013), company value can be determined from accounting information such as capital structure, liquidity, and profitability, which are assessed based on financial parameters such as debt to equity ratio (DER), liquidity ratio (CR), and return on equity (ROE). These ratios do not solely represent the internal performance of the company, but also serve as external signals in investment decision-making, as stated in Signaling Theory (Spence, 1973).

Previous studies have shown the relevant effects of financial variables on company value. For example, research by Listyawati & Kristiana (2023) shows that ROE, CR, and company scale measured by SIZE have a positive correlation with PBV value in manufacturing companies, while DER shows a significant negative effect. Another study by Wijaya & Fitriati (2024) found that in property and real estate companies, CR, SIZE, and ROE contribute significantly to PBV, while DER does not show a significant contribution.

However, the influence of these financial ratios is not necessarily consistent, especially when considering external factors such as inflation. Based on the Arbitrage Pricing Theory and Fisher Effect Theory perspectives, inflation is a form of systemic risk that can reduce asset value by increasing capital costs. This then affects the relationship between financial structure and company value. In addition, inflation can also have an impact on liquidity and consumer purchasing power, which ultimately affects market perceptions of property company valuations.

In the context of moderating variables, research by Anshary (2022) shows that managerial ownership does not affect the intensity of the relationship between the final profit efficiency indicator

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(NPM), CR as a liquidity indicator, and DER as a leverage indicator that affects the perception of a company's market value in the mining sector. Meanwhile, research conducted by Tsaniatuzaima & Maryanti (2022) examined the role of GCG as a moderating variable on the influence of financial ratios on PBV and found that only DER showed a significant interaction with GCG in influencing company value.

Based on these findings, it is important to conduct further research to gain a deeper understanding of how financial ratios such as DER, CR, and ROE impact company valuation in the property and real estate industry, and whether inflation plays a role in strengthening or weakening these relationships. This research is relevant considering that the property sector is highly influenced by macroeconomic conditions and has unique cost characteristics, particularly in facing price fluctuations and monetary policy in the 2019–2023 period.

LITERATUR REVIEW

Signaling Theory

Signaling Theory developed by Spence (1973) explains that management has more complete information than external parties such as investors. In this condition, management uses financial signals such as DER, CR, and ROE to inform the company's condition and prospects. An optimal DER, for example, can signal that the company is capable of managing its capital structure effectively. A stable CR indicates healthy short-term liquidity, while ROE is an indicator of success in generating profits from available capital. These signals are very important, especially amid high inflation, so that investors maintain confidence in the company's long-term prospects and reflect a higher value on PBV.

Agency Theory

Jensen & Meckling's (1976) view within the Agency Theory framework focuses on interactions in which rights are contractually regulated between the principal as the stakeholder and the agent as the operational executor. When the interests of the two parties are not aligned, agency conflicts arise, especially in the management of capital structure and the use of profits. DER can be used to control the use of funds by management, because debt carries fixed payment obligations that reduce the possibility of using funds for unproductive investments. ROE also serves as a measure of management's efficiency in generating returns on owners' equity. When DER and ROE are managed in a balanced manner, the risk of agency conflict can be minimized, and investor confidence in the value of the company increases.

Pecking Order Theory

As explained in the Pecking Order concept described by Myers & Majluf (1983), companies prioritize funding options from internal sources (retained earnings) over debt or share issuance. CR in this context reflects the extent to which companies rely on internal funds, while DER indicates the use of debt as a second alternative. In practice, companies that maintain CR and DER within reasonable limits signal to investors that they are efficient in financing without jeopardizing financial stability. In the capital-intensive property sector, this theory helps explain how financing structures can influence market perceptions and PBV.

Trade-Off Theory

Myers (1984) in his Trade-Off Theory concept reveals that business entities usually try to find a balance between the benefits and costs of using debt, such as tax savings and tax reductions, with the financial burdens that arise, including the risk of bankruptcy. DER in this context becomes an important indicator of proportional capital management. In the property and real estate sector, the proportional use of debt can be an effective strategy for financing long-term projects. However, if the proportion is too high, it can actually reduce the value of the company. Therefore, investors will view companies with a controlled DER positively, thereby increasing PBV.

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Fisher Effect Theory & APT (Arbitrage Pricing Theory)

The Fisher Effect Theory was developed by Irving Fisher, who stated that an increase in inflation will increase nominal interest rates, which will ultimately raise capital costs and lower the value of companies (Fisher, 1930). APT (Arbitrage Pricing Theory) was introduced by Stephen A. Ross, which states that stock values are influenced by various macroeconomic factors, including inflation, as systemic risk (Ross, 1976). Through this study, inflation acts as a moderating factor that influences the strength of the relationship between DER, CR, and ROE variables and PBV. When inflation is high, the positive influence of financial ratios may weaken due to external pressures that change investors' perceptions of risk and return expectations.

RESEARCH METHOD

This study employs quantitative methods through a causal and comparative research structure. The aim is to examine the impact of financial aspects on company valuation or firm value, including macroeconomic factors such as inflation as a moderating variable. The primary focus of this study is to examine the influence of the debt ratio on DER, the liquidity ratio on CR, and profitability measurement through ROE to evaluate their impact on company value, as reflected by PBV, while considering inflation as a moderating variable.

In this study, the reference observations were entities operating in the property segment and officially listed on the IDX website between 2019 and 2023. A purposive sampling approach was used to determine the research sample, meeting certain criteria: entities continuously listed on the stock exchange between 2019 and 2023, having complete annual financial reports, and presenting the required variable data. Based on these criteria, 52 entities were selected as a sample of 209 observations. The observational data applied in this study is a panel data model with an unbalanced distribution, as not all companies' financial reports met the criteria within the observation period. This study relies on secondary data available and accessible through the official IDX website, as well as inflation data obtained from the Statistics Indonesia (BPS).

This study uses panel data regression based on the Random Effects Model (REM) approach, selected based on the Hausman test results. To evaluate the moderating effect of inflation, this study applies the Moderated Regression Analysis (MRA) approach as an interaction analysis method, where the interaction between the independent variables (DER, CR, ROE) and inflation as a moderating variable is added to the analysis model.

RESULT AND DISCUSSION

Table 1. Descriptive Statistics

Variable	Sample	Minimum	Maximum	Mean	Median	Std. Deviasi
DER	209	-55,73	4,99	0,15	0,51	4,44
CR	209	0,03	308,79	6,55	2,37	25,46
ROE	209	-1,27	8,51	0,05	0,01	0,61
PBV	209	-25,27	1,00	0,31	0,39	1,82
INFLASI	209	1,68	5,51	2,94	2,61	1,42

Source: Output STATA v17 (2025)

Based on these results, the DER variable recorded the lowest value at -55.73 and the highest value at 4.99, with an average value of 0.15 and a standard deviation of 4.44. The extreme minimum value indicates possible capital structure imbalances in some companies, such as equity deficits. The CR variable showed an average of 6.55 and a standard deviation of 25.46, with a maximum value of 308.79, reflecting significant liquidity imbalances between companies.

Furthermore, ROE showed that the average profitability of companies during the study period was relatively low, at 0.05 with a standard deviation of 0.61. The minimum ROE value of -1.27 also indicates that some companies were experiencing losses.

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The PBV variable recorded the lowest value at -25.27 and the highest value at 1.00, with an average value of 0.31. This indicates that the majority of business entities have market values lower than their book values, which may reflect a lack of investor confidence in these companies. Meanwhile, the inflation variable had an average value of 2.94 with a standard deviation of 1.42, reflecting that inflation in Indonesia remained relatively stable during 2019–2023, although it still fluctuated between years.

Table 2. Test Output for Panel Regression Model Selection

Test	Statistics	p-value	Conclusion
Chow Method	F = 4,04	0,0000	Fix Effect Model (FEM)
Hausman Method	chi² = 2,13	0,7119	Random Effect Model (REM)
LM (Laprange Multiplier) Method	chi² = 46,25	0,0000	Random Effect Model (REM)

Source: Output STATA v17 (2025)

Based on the Chow method test results, the F-statistic was 4.04, with a p-value of 0.0000. Because the p-value was below the threshold of 0.05, the findings of this test can be concluded that the Fixed Effects (FEM) model is more appropriate for the model compared to the Common Effects (CEM) model.

Furthermore, the Hausman method test results yielded a chi-square value of 2.13, with a recorded probability level of 0.7119. Because the resulting p-value is greater than 0.05, the Random Effects (REM) model can be selected as a more efficient approach compared to the Fixed Effects (FEM) model.

Furthermore, the results of the LM (Laprange Multiplier) method yielded a chi-square value of 46.25 with a probability value of 0.0000. Therefore, the Random Effects (REM) model is considered more appropriate and relevant for use than the Common Effects (CEM) model.

Based on the output from the three model tests, the regression model deemed most appropriate and suitable for this research context is the Random Effects Model (REM).

Referring to the output generated from the normality test using the Z-test on the residuals, the data processing results show a Z statistic of 6.793 with a recorded probability (Prob > Z) of 0.00000, as can be seen in Table 3:

Table 3. Normal Distribution Test Output (Before Handling)

Variable	Sample	Z	Prob>z
Residual	209	6,793	0,00000

Source: Output STATA v17 (2025)

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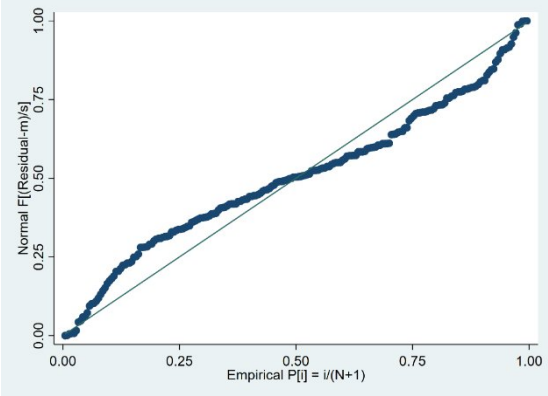

Figure 1. Output of Normality Test Using Q-Q Plot (Before Handling)

Figure 1 shows that most of the points deviate from the diagonal line, especially at the beginning and end of the distribution. This fact indicates that the residual distribution does not fully conform to the normal distribution pattern. This result is consistent with the previous statistical normality test, which showed a probability value (Prob > Z) of 0.00000, below the 5% significance level, thus indicating that the residual normality was not achieved.

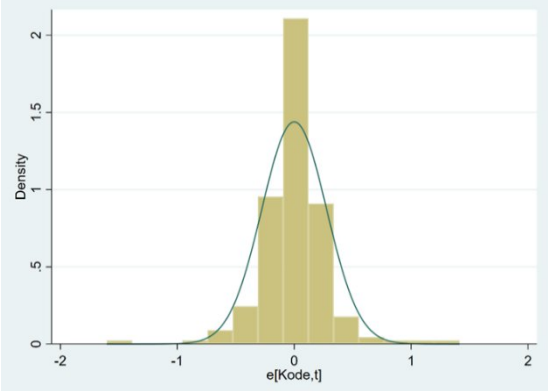

Figure 2. Normality Testing Using Histogram (Before Handling)

From Figure 2, it can be seen that the residual distribution does not form a normal distribution pattern. This is evident from the histogram's asymmetrical shape, which has a higher peak at the mean, followed by uneven distribution on both sides. The normal curve superimposed on the histogram shows that most residual values are concentrated around the mean, but the distribution is not quite even, indicating a discrepancy with the normal distribution. This pattern indicates that the residuals do not fully follow a normal distribution, thus the assumption of a normally distributed residual in the regression model is not met.

To correct the non-normal distribution of the residuals, a natural logarithm (Ln) transformation was performed on the undervalued PBV, an indicator of market value relative to book value, and an allowance for outlier observations was made. This step was taken to reduce skewness and eliminate distortion from extreme data that could affect the estimation results. This approach aligns with Gujarati & Porter (2020), who emphasize that log transformation and outlier elimination can improve the validity and reliability of regression models.

Tabel 4. Output of Multicollinearity Test

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Variable	VIF	1/VIF
DER	1,13	0,888014
CR	1,09	0,917339
ROE	1,08	0,928835
INFLASI	1,05	0,954399
Mean VIF	1,09	

Source: Output STATA v17 (2025)

The test results show that all independent variables in the model applied in this research have low VIF values, namely DER (1.13), CR (1.09), ROE (1.08), and inflation (1.05), with a mean VIF of 1.09. All tolerance values are also above 0.88, indicating the absence of a strong linear relationship between the independent variables.

Therefore, in this case, it can be concluded that the applied regression model does not contain multicollinearity issues. All independent variables in the model are suitable for use in regression analysis because they do not influence each other linearly to a detrimental degree.

Table 5. Autocorrelation Test Output (Wooldridge)

Model	Statistics	Prob > F	Conclusion
Wooldridge Autocorrelation Test	F = 0,813	0,3728	There is no autocorrelation

Source: Output STATA v17 (2025)

Based on the findings of this testing process, the F-statistic was obtained with a value of 0.813, and a probability value of 0.3728. Because the p-value exceeds the significance threshold of 0.05, it can be concluded that there is no significant autocorrelation in the first lag in the analyzed regression model.

Table 6. Heteroscedasticity Test Output*s (Breusch-Pagan/Cook-Weisberg)*

Model	Statistics	p-value	Conclusion
Breusch-Pagan/Cook-Weisberg Test	chi^2 = 56,16	0,0000	There is Heteroscedasticity

Source: Output STATA v17 (2025)

Testing the predicted value of the LogPBV variable yielded a chi-square statistic of 56.16, with a probability value of Prob > chi^2 of 0.0000. Because the p-value obtained was much smaller than the 5% significance level, it can be concluded that there is significant heteroscedasticity in the regression model used.

The presence of heteroscedasticity indicates that the residual variance is inconsistent across observations, which can affect the accuracy of standard error calculations and the validity of statistical tests. According to Gujarati & Porter (2020), this condition is a common violation in regression analysis, especially in cross-section and panel data, and must be addressed with an appropriate approach to maintain the validity of the estimation results.

One suggested corrective method is to use robust standard errors, which can produce standard error estimates that remain consistent even when the homoscedasticity assumption is violated. In the context of panel data, this approach is more appropriate with clustered robust standard errors, which account for the clustering structure of observation units across time. In practice, this method can be implemented with the vce(company cluster) command in software such as STATA 17.

Wooldridge (2020) explains that the use of clustered standard errors is very effective in addressing various residual issues, such as heteroscedasticity and autocorrelation, without requiring knowledge of the specific distribution of the errors. This approach is considered practical and robust for both balanced and unbalanced panel data.

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Based on the test results and supporting literature, the application of clustered robust standard errors in the panel data model in this study is an appropriate step to ensure that the coefficient estimates and standard errors remain valid, even if the homoscedasticity assumption is violated.

Table 7. Moderated Regression Analysis

LogPBV	Coefficient	Robust std.err.	P>|t|
DER	0,1577608	0,0143553	0,000
CR	-0,001923	0,000951	0,043
ROE	0,9869061	0,5792099	0,088
INFLASI	-0,0209738	0,0062309	0,454
DERxINFLASI	-0,0210061	0,0028048	0,000
CRxINFLASI	0,0004489	0,0001493	0,003
ROExINFLASI	-0,1770351	0,1255304	0,158
CONSTANT	0,3187889	0,0336015	0,000

Source: Output STATA v17 (2025)

Based on the findings from the moderated regression analysis, DER and CR showed a significant contribution to firm value, with coefficients of 0.1578 (positive) and -0.0019 (negative). Furthermore, no significant contribution was found between ROE and firm value, with a p-value of 0.088.

Regarding the interaction with inflation, the variables DER × INFLATION and CR × INFLATION showed significant effects, negative and positive, respectively, indicating that inflation moderates the effect of DER and CR on firm value. Meanwhile, the ROE × INFLATION interaction was not significant (p = 0.158), implying that inflation does not act as a moderating variable in the relationship between ROE and firm value.

Therefore, from these findings, it can be concluded that inflation has a significant moderating role in the relationship between DER and CR and firm value, but not significantly on ROE.

Table 8. Simultaneous Testing Output (F-test)

Model	Sample	F	Prob > F
Residual Regression	206	4640,13	0,0000

Source: Output STATA v17 (2025)

The F-value of 4640.13 with a probability value of 0.0000 indicates that the regression model is simultaneously significant at the 1% significance level. This means that the variables DER, CR, ROE, inflation, and their interactions collectively contribute to firm value (LogPBV). Therefore, this regression analysis model structure is suitable for further testing.

Table *9.* Output of Determination Coefficient Test (R^2)

Model	Sample	R^2
Residual Regression	206	0,6867

Source: Output STATA v17 (2025)

The R^2 coefficient value reached 0.6867, indicating that approximately 68.67% of the variation in firm value estimated by (LogPBV) can be explained by DER, CR, ROE, inflation, and the impact of moderating interactions. The remaining 31.33% is due to other external factors not accounted for in this research model.

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The regression showed that capital structure, represented by DER, has a significant positive impact on PBV, indicating that companies that increase their debt-to-equity ratio tend to experience increases in market value. In the context of the property sector, which relies heavily on external financing to fund long-term projects, the use of debt is a common strategy. These results reflect that optimal use of leverage can increase investor confidence in a company's growth prospects. Theoretically, this finding aligns with the view expressed in Myers' (1984) Trade-Off Theory, which posits that business entities will seek an optimal balance between the tax benefits of debt and the risk of bankruptcy. A controlled DER can indicate efficient capital structure management and serve as a positive signal to the market. Spence's (1973) Signaling Theory also explains that a capital structure with a reasonable proportion of debt signals management's confidence in the company's ability to meet its financial obligations. The results of this study align with previous studies by Wijaya & Fitriati (2024) and Putra & Nurdiansyah (2023) on business entities operating in the property and real estate business segment, and are supported by the findings of Nafisah et al. (2020) in a study of entities operating in the food and beverage industry. Amid challenging economic conditions during 2019–2023, including the pandemic and interest rate fluctuations, companies that were able to maintain a balanced capital structure were still positively valued by the market.

Regression results show that CR statistically contributes negatively to PBV. This suggests that business entities with high levels of liquidity actually tend to have lower market values. In the property industry, a high CR can indicate the accumulation of current assets that are not being used productively, thus reducing operational efficiency. According to Firm Value Theory by Penman & Reggiani (2013), company value is formed from market expectations regarding a business entity's ability to generate future cash flows. An excessively high CR without corresponding asset productivity can be interpreted as a signal of inefficiency. Signaling Theory also supports this view: excess liquidity without commensurate performance can be perceived negatively by the market. This finding aligns with research by Purba & Mahendra (2022), Tsaniatuzaima & Maryanti (2022), and Putra & Nurdiansyah (2023), all of which found a negative effect of CR on PBV in different industrial sectors. In the context of economic uncertainty in 2019–2023, accumulating current assets as a defensive strategy will only be appreciated if accompanied by effective risk management and expansion strategies. In this study, the financial performance indicator ROE correlated insignificantly with PBV. However, conceptually, ROE is a key indicator of profitability, reflecting a company's internal capital management strategy to drive profit achievement. These results indicate that in the property industry, which is full of uncertainty and long-term orientation, ROE may not be the primary parameter investors rely on to evaluate company value. Signaling Theory by Spence (1973) states that a high ROE should be a positive signal. However, if profits are not believed to be sustainable, especially in unstable economic conditions, the market tends to ignore this signal. This finding supports the results of studies conducted by Putra & Nurdiansyah (2023) and Oktasari et al. (2025), which also found no significant effect of ROE on PBV in sectors with long-term project characteristics.

The analysis findings indicate that inflation is insignificantly correlated with PBV. Although Fisher's (1930) Fisher Effect theory states that inflation can affect interest rates and firm value through the cost of capital, these findings indicate that inflation during the 2019–2023 period was not high or volatile enough to alter market perceptions of property company valuations. Ross's (1976) Arbitrage Pricing Theory states that inflation is a systemic risk, but its impact is highly dependent on intensity and market perception. In the context of Indonesia's relatively stable macroeconomic environment during this period, inflation was not significant enough to shape PBV. These results are also supported by studies by Purba & Mahendra (2022) and Putra & Nurdiansyah (2023).

The interaction between DER and inflation shows a significant negative effect on PBV, indicating that inflation weakens the positive relationship between DER and firm value. According to Myers' (1984) Trade-Off Theory, inflation can increase borrowing costs and increase the risk of bankruptcy, making previously advantageous leverage riskier. According to Spence's (1973) Signaling Theory, a high DER (Debt to Equity Ratio) under stable conditions can signal trust, but under conditions of high inflation, this signal shifts to financial risk. This finding is also supported by Purba & Mahendra (2022), who showed that inflation significantly moderates the relationship between

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capital structure and firm value.

The results of the interaction test indicate that inflation strengthens the effect of CR on PBV. This means that under conditions of high inflation, the market values companies with strong liquidity more highly. This is in line with Arbitrage Pricing Theory and Firm Value Theory by Ross (1976), where liquidity resilience is an important signal in uncertain macroeconomic situations. This research is consistent with the findings of Sitompul et al. (2023) and Ghule & Vora (2021), who concluded that business entities with high liquidity are associated with favorable market perceptions, especially when facing inflationary pressures.

The interaction between ROE and inflation shows an insignificant moderating effect on PBV. This means that inflation does not significantly influence firm value. In Ross's (1976) Arbitrage Pricing Theory, inflation is considered a systemic risk, but its effects can be minimized if the company maintains stable profitability. These results align with Ghule & Vora (2021), who stated that the effectiveness of internal management is a greater determinant of a company's market value than macroeconomic pressures. In the capital-intensive property sector, investors' focus is more on managerial efficiency than on responses to short-term inflation.

CONCLUSION

The primary focus of this study is to evaluate the relationship between financial indicators and macroeconomic influences on the value of business entities active in the property and real estate sector in Indonesia, utilizing the PBV ratio as a measure of market valuation. Testing was conducted using random effects panel data regression with robust standard errors on 206 observations from 51 companies during the 2019–2023 period.

Leverage, as reflected by the DER ratio, showed a significant positive correlation with a company's market value. This finding suggests that the use of debt-based financing can strengthen market perceptions if managed soundly and efficiently. This finding aligns with the premise of the Trade-Off concept in financing decisions, which states that a financing strategy through external financing can increase the value of a business entity within a reasonable threshold, as long as the tax benefits and managerial control outweigh the financial risks posed.

Liquidity, as represented by CR, exhibited a significant, proven depreciating effect on PBV. In other words, this indicates that the accumulation of short-term assets that are not immediately used productively can create inefficiencies and reduce market optimism regarding growth prospects.

The level of profitability, as reflected in ROE, shows an insignificant relationship with PBV. Although ROE theoretically represents a company's ability to optimize equity to generate income, in the context of the property industry, which tends to be long-term and capital-intensive, investors appear to consider other indicators such as risk and capital structure more than return on equity.

Inflation, as an external variable, also does not directly affect company value. The stability of national inflation during the study period and the company's ability to adapt to price fluctuations appear to have mitigated its impact on market expectations.

The results of the interaction test indicate that inflation negatively moderates the relationship between DER and PBV, meaning that higher inflation leads to a positive contribution from leverage, resulting in a decline in the company's market value. This is due to the increased financial burden of interest-bearing liabilities and the risk of default in situations of high price pressure.

Conversely, inflation positively moderates the relationship between CR and PBV, indicating that companies with high liquidity are valued more highly by the market during inflationary conditions, as they are perceived as having good short-term financial resilience to respond to economic uncertainty. The interaction between ROE and inflation does not significantly moderate company value. This means that profitability remains assessed as a stand-alone internal indicator, and is not substantially influenced by external inflationary pressures in the market valuation process.

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