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Market Microstructure and Ownership Structure as Determinants of Stock Returns: Evidence from Indonesian Listed Companies

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Abstract

Background: Limited evidence jointly examines trading activity, scripless shares, detailed ownership categories, and free float as correlates of stock returns in Indonesia. The MSCI ban on February 2026 on any index adjustments related to Indonesian securities, which was partly due to the low transparency regarding free float and ownership structure, prompted the study.
Objective: This study examines these relationships among Indonesia Stock Exchange-listed firms during 2021–2025.
Methods: Balanced panel data cover 624 firms and 3,120 firm-year observations obtained from KSEI, IDX, Bank Indonesia, and the World Bank. Fixed-effects regression was selected using Chow and Hausman tests and estimated in Stata 17 with Driscoll–Kraay standard errors.
Results: At the 5% significance level, corporate and individual ownership are positively associated with stock returns, whereas insurance and pension fund ownership are negatively associated. Trading volume activity, scripless shares, free float, and the remaining ownership categories are not statistically significant. Market capitalization is positively associated with returns, interest rates are negatively associated, and GDP growth is not statistically significant. The reported adjusted R^2 is 0.249.
Conclusion: The findings highlight heterogeneous ownership associations within a unified market microstructure framework. They inform investors' assessment of shareholder composition and support attention to ownership transparency alongside infrastructure reforms. Annual data, a five-year period, and unresolved endogeneity limit causal interpretation and the precision of inference.

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INTRODUCTION

The development of capital markets serves as an important catalyst for economic growth, particularly in emerging economies (Tan & Shafi, 2021). Comparative evidence from the Indonesian stock market also provides a basis for examining differences in risk and return profiles across domestic and international market benchmarks (Hamonangan et al., 2024). Along with rapid digitalization and increasing investor participation, the Indonesian capital market has experienced significant structural changes over the past decade. The implementation of scripless trading, improvements in settlement systems, and stronger regulatory frameworks have enhanced market efficiency and transparency while simultaneously increasing investor confidence. Nevertheless, challenges related to liquidity, ownership transparency, and market investability continue to attract considerable attention from regulators and international index

providers.

Stock returns reflect gains or losses on share investment, whereas liquidity describes the ease of trading without substantial price changes. This study treats stock returns as the outcome and trading volume activity, scripless shares, and free float as explanatory market microstructure variables. Trading volume can reflect information arrival and investor participation, but can also capture speculative transactions and sentiment; consequently, its association with returns remains empirically unsettled (Bajzik, 2021; Chordia et al., 2001; Karpoff, 1987).

Besides trading activity, ownership structure has become another important determinant of market performance. Different shareholder categories possess different investment objectives, monitoring incentives, and investment horizons, resulting in heterogeneous effects on stock returns (García et al., 2015). Corporate shareholders emphasize strategic control and long-term value creation, whereas pension funds and insurance companies tend to adopt conservative investment strategies with lower risk tolerance (Bayar et al., 2022; Pinkus et al., 2026). Meanwhile, individual investors often demonstrate more active trading behaviors, making stock prices more responsive to market sentiment (Barber & Odean, 2000; Statman et al., 2006). Consequently, distinguishing ownership classifications provides a more comprehensive understanding of how shareholder composition influences stock returns than treating institutional ownership as a homogeneous construct.

The transition from physical certificates to scripless shares has also transformed Indonesia's capital market. Dematerialized securities improve settlement efficiency, reduce operational risk, and enhance transaction transparency (Foucault et al., 2023; Suratman et al., 2023). Likewise, free float has recently become a strategic issue following MSCI's concerns regarding ownership transparency and market investability. A higher free float ratio increases market depth, reduces information asymmetry, and attracts institutional investors (Hearn et al., 2025; Viratama et al., 2024). In response, Indonesian regulators strengthened free float requirements to improve market quality and align domestic regulations with international standards (Exchange, 2026; Reuters, 2026). The regulatory framework was further clarified through a circular issued by the Indonesia Stock Exchange in 2026, providing additional guidance on the listing requirements for shares and other equity securities issued by listed companies (Exchange, 2026). Despite these developments, empirical evidence regarding whether scripless shares and free float directly influence stock returns remains inconsistent across previous studies (Gupta, 2025; Jawed et al., 2022).

Theoretically, this study is grounded in several complementary frameworks. The Efficient Market Hypothesis (Fama, 1970) holds that stock prices fully reflect available information, implying that trading activity and infrastructure improvements alone should not generate abnormal returns in a semi-strong efficient market. Market microstructure theory explains how trading mechanisms, liquidity, and the organisation of exchanges affect price formation and transaction costs (Foucault et al., 2023). Agency theory Jensen and Meckling (1976) clarifies how different shareholder categories exercise monitoring and control, producing heterogeneous effects of ownership structure on firm performance and returns. Finally, information asymmetry theory explains how free float and ownership transparency alter the distribution of information among market participants and, consequently, the risk premium embedded in stock returns. Taken together, these theories provide the conceptual foundation linking market microstructure and ownership structure variables to stock returns. Macroeconomic conditions represent another important dimension of stock market performance. Evidence from Oman highlights the relevance of macroeconomic determinants in examining stock market returns, providing a comparative perspective for the inclusion of macroeconomic control variables (Alshihab, 2023).

Prior studies commonly examine trading activity, ownership, or free float separately, while limited evidence combines these variables with scripless shares and detailed shareholder classifications in a single Indonesian stock-return model. Evidence on liquidity cannot directly establish an effect on returns, and differing outcomes and samples limit comparisons across studies. Treating institutional ownership as homogeneous can also obscure differences among insurance companies, corporations, pension funds, financial institutions, individuals, mutual funds, securities companies, foundations, and other investors. These gaps motivate a joint assessment using KSEI ownership data without claiming that no comparable study exists.

Building on these gaps, this study examines the associations of trading volume activity, scripless shares, nine ownership categories, and free float with stock returns during 2021–2025, controlling for market capitalization, GDP growth, and the Bank Indonesia policy rate. Its contribution is to integrate these variables in one panel framework covering 624 firms across listed sectors and 3,120 firm-year observations. The sample spans post-pandemic recovery and market digitalization; regulatory developments in 2026 provide subsequent policy context rather than events observed in the estimation period. The findings can inform investors' assessment of ownership composition and regulators' attention to market transparency and governance.

METHOD

The study employed a quantitative approach, with the conceptual framework presented in Figure 1. Both the Chow and Hausman tests yielded p-values of less than 0.001, supporting the fixed-effects specification over the common-effects and random-effects alternatives. Model selection was based on the results of these two tests.

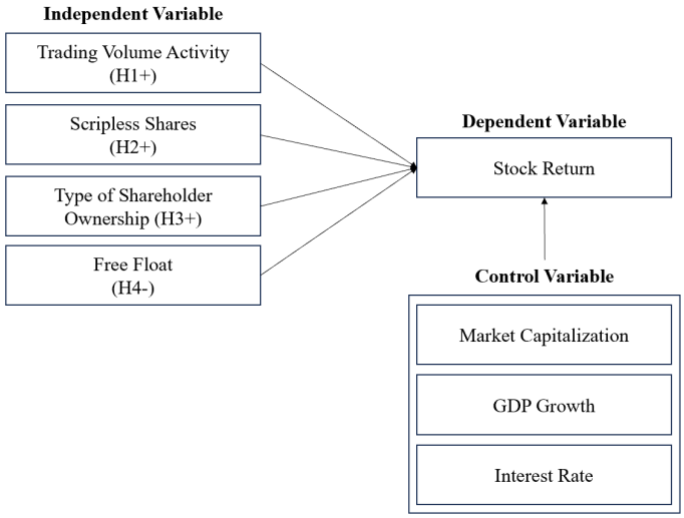


Figure 1. Research Model

This study employed a quantitative explanatory design using secondary data and balanced panel regression. Purposive sampling was used to retain firms with continuous listing and trading records throughout 2021–2025, thereby ensuring comparable firm-year observations. Although fixed effects account for time-invariant firm characteristics, they do not eliminate reverse causality or bias arising from time-varying omitted factors.

Table 1
Purposive Sampling Result

Description	No.
Firms listed in IDX as of 31 December 2025	956
Firms listed on the IDX between 2021 and 2025	(255)
Firms whose fiscal year does not end in December	(7)
Firms without any trading volume in a year	(70)
Number of firms that fulfil the criteria	624
Observation period	5
Number of observations	3,120

Secondary data were obtained from KSEI, IDX, Bank Indonesia, and the World Bank. The sampling frame comprised 956 firms listed as of 31 December 2025. Table 1 presents the exclusions applied to obtain the balanced panel.

Purposive sampling was conducted based on the following criteria:
1) Companies listed before 1 January 2021.
2) Companies that remained continuously listed until 31 December 2025.

3) Companies with fiscal years ending on 31 December.
4) Companies with complete ownership and trading records and nonzero trading volume in each observation year.

Based on these criteria, 624 companies were selected, yielding 3,120 firm-year observations, as presented in Table 1.

The empirical analysis employed fixed-effects panel regression using Stata 17. The model specification combined firm-level market and ownership measures with national macroeconomic controls. GDP growth and the policy interest rate varied across years rather than across firms; therefore, their estimated coefficients require particular caution when interpreting results from a five-year panel.

The empirical model was specified as follows:

$$RET_{it} = \propto + \beta_1 TVA_{it} + \beta_2 SS_{it} + \beta_3 IS_{it} + \beta_4 CP_{it} + \beta_5 PF_{it} + \beta_6 IB_{it} + \beta_7 ID_{it} + \beta_8 MF_{it} + \beta_9 SC_{it} + \beta_{10} FD_{it} + \beta_{11} OT_{it} + \beta_{12} FF_{it} + \beta_{13} MC_{it} + \beta_{14} GDPG_{it} + \beta_{15} IR_{it} + \varepsilon$$

Where RET denotes stock returns; TVA represents trading volume activity; SS indicates scripless shares; IS represents insurance ownership; CP denotes corporate ownership; PF represents pension fund ownership; IB denotes financial institution ownership; ID indicates individual ownership; MF represents mutual fund ownership; SC denotes securities company ownership; FD denotes foundation ownership; OT represents other ownership categories; FF represents free float; MC denotes market capitalization; GDPG represents GDP growth; and IR denotes the Bank Indonesia 7-Day Reverse Repo Rate. Furthermore, α represents the intercept, β denotes the regression coefficients, and ε represents the disturbance term. Firm fixed effects were included in the estimation, where i denotes the firm and t denotes the year. GDPG and IR represent national macroeconomic indicators that take the same values across firms within each year. The estimated coefficients for ownership and stock returns represent conditional associations rather than identified causal effects.

Variable-specific secondary data were collected from KSEI ownership records, IDX trading and financial information, Bank Indonesia policy rate data, and World Bank GDP growth data. Table 2 presents the operational measurements used in the analysis.

Table 2
Variable Measurement

Variable	Variable Name	Variable Measurement	Measurement Scale	Source
RET	Stock Return	$\frac{\text{Closing price}_t - \text{Closing price}_{t-1}}{\text{Closing price}_{t-1}}$	Ratio	Chen et al. (2024)
TVA	Trading Volume Activity	$\frac{\text{Number of shares traded}}{\text{Number of outstanding shares}}$	Ratio	Nainggolan (2023); Risma Julkismayana & Ni Made Adi Erawati (2024)
SS	Scripless Shares	$\frac{\text{Number of scripless shares}}{\text{Number of outstanding shares}}$	Ratio	Setiadi et al. (2023); Suratman et al. (2023)
IS	Insurance Shareholding	$\frac{\text{Number of shares held by insurance companies}}{\text{Number of outstanding shares}}$	Ratio	PT Kustodian Sentral Efek Indonesia (2021)
CP	Corporation Shareholding	$\frac{\text{Number of shares held by corporation}}{\text{Number of outstanding shares}}$	Ratio	PT Kustodian Sentral Efek Indonesia (2021)
PF	Pension Fund Shareholding	$\frac{\text{Number of shares held by pension fund}}{\text{Number of outstanding shares}}$	Ratio	PT Kustodian Sentral Efek Indonesia (2021)
IB	Financial Institution Shareholding	$\frac{\text{Number of shares held by financial institutions}}{\text{Number of outstanding shares}}$	Ratio	PT Kustodian Sentral Efek Indonesia (2021)
ID	Individual Shareholding	$\frac{\text{Number of shares held by individual}}{\text{Number of outstanding shares}}$	Ratio	PT Kustodian Sentral Efek Indonesia (2021)
MF	Mutual Fund Shareholding	$\frac{\text{Number of shares held by mutual fund}}{\text{Number of outstanding shares}}$	Ratio	PT Kustodian Sentral Efek Indonesia (2021)

Variable	Variable Name	Variable Measurement	Measurement Scale	Source
SC	Securities Company Shareholding	$\frac{\text{Number of shares held by securities companies}}{\text{Number of outstanding shares}}$	Ratio	PT Kustodian Sentral Efek Indonesia (2021)
FD	Foundation Shareholding	$\frac{\text{Number of shares held by foundation}}{\text{Number of outstanding shares}}$	Ratio	PT Kustodian Sentral Efek Indonesia (2021)
OT	Others Shareholding	$\frac{\text{Number of shares held by others}}{\text{Number of outstanding shares}}$	Ratio	PT Kustodian Sentral Efek Indonesia (2021)
FF	Free Float	$\frac{\text{Number of shares held by investors excluding corporations and others}}{\text{Number of outstanding shares}}$	Ratio	MSCI (2023)
MC	Market Capitalization	Ln (closing price x No. of outstanding shares)	Nominal	Alshubiri, (2021); Fitrah et al. (2022); Gunawan & Hendrawaty 2018)
GDPG	GDP Growth	$\frac{GDP_t - GDP_{t-1}}{GDP_{t-1}}$	Ratio	Mustofa & Faizin (2025); Putra & Warmadewa, (2022)
IR	Interest Rate	BI 7 days repurchase rate	Ratio	Riska Amelia & Randy Kuswanto, (2025); BI (2023)

Source: Research Data (2026)

Table 2 presents the operational definitions, measurement scales, and references for all variables included in the study. The variable measurements were adopted from established literature to support construct validity and ensure comparability with previous studies.

RESULTS AND DISCUSSION

Table 3
Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation
RET	-82.000	964.040	37.638	147.321
TVA	0.000	24.581	0.685	1.782
SS	0.024	100.000	73.119	33.193
IS	0.000	94.766	2.000	6.915
CP	0.000	99.958	38.738	32.985
PF	0.000	77.413	0.610	3.311
IB	0.000	98.744	4.951	15.047
ID	0.023	100.000	18.738	20.174
MF	0.000	43.491	2.459	4.932
SC	0.000	96.234	2.200	5.869
FD	0.000	4.421	0.069	0.295
OT	0.000	93.681	3.354	10.153
FF	0.024	100.000	31.027	25.015
MC	22.861	34.705	28.110	1.994
GDPG	3.703	5.307	4.840	0.577
IR	3.500	6.000	5.150	0.944

Source: research data (2026)

Descriptive Statistics

Table 3 presents the descriptive statistics of the study variables based on 3,120 firm-year observations. Overall, stock returns exhibit substantial variability across firms, indicating heterogeneous market performance during the observation period. Similarly, trading volume activity also shows considerable dispersion, suggesting differences in market liquidity and investor participation among listed companies.

Corporate ownership is the largest shareholder category on average, followed by

individual ownership. Scripless shares have a mean of 73.119% and a standard deviation of 33.193 percentage points, indicating substantial variation across firms rather than uniform adoption. Insurance ownership is denoted by IS, and financial institution ownership by IB. Free float also varies considerably, as shown in Table 3.

Market capitalization is measured in natural logarithms, so its dispersion should not be compared directly with percentages or untransformed values. GDP growth and interest rates capture common annual conditions and provide time-series variation only; they do not create cross-sectional variation within a given year.

Regression Result

The documented Chow and Hausman test results support fixed effects (both $p < 0.001$). Table 4 presents the coefficient estimates, Driscoll–Kraay standard errors, t-statistics, and probability values to show the magnitude and precision of the estimated associations.

Table 4

Regression Result

Variable	Coefficient	Standard Error	t-stat	Probability	
C	-2604.076	881.081	-2.96	0.040	
TVA	3.409	2.874	1.19	0.301	
SS	-33.502	14.386	-2.33	0.080	
IS	-2.579	0.789	-3.27	0.031	**
CP	1.239	0.409	3.03	0.039	**
PF	-10.745	2.515	-4.27	0.013	**
IB	0.155	1.037	0.15	0.888	
ID	1.584	0.305	5.20	0.007	*
MF	-9.833	4.234	-2.32	0.081	
SC	-0.922	0.660	-1.40	0.235	
FD	19.262	12.045	1.60	0.185	
OT	1.837	0.725	2.53	0.064	
FF	27.347	14.361	1.90	0.130	
MC	102.063	30.109	3.39	0.028	**
GDPG	-8.309	14.964	-0.56	0.608	
IR	-28.397	7.324	-3.88	0.018	**
F-test p-value				0.000**	
Adjusted R^2				0.249	

*Source: Research data, 2026. * p < 0.01; ** p < 0.05. Statistical significance in the text is assessed at 5%.*

Table 5

Variance inflation factor

Variable	VIF	1/VIF
SS	8.266	.121
CP	7.995	.125
ID	4.123	.243
FF	3.599	.278
IR	3.35	.299
GDPG	3.321	.301
IB	2.461	.406
OT	1.732	.577
MF	1.432	.698
IS	1.367	.732
MC	1.273	.786
SC	1.259	.794
PF	1.131	.885
TVA	1.112	.9
FD	1.045	.957
Mean VIF	2.898	.

Table 5 reports VIF values from 1.045 to 8.266, with a mean of 2.898. None exceeds 10, although the relatively higher values for scripless shares and corporate ownership warrant caution. This diagnostic does not establish exogeneity or resolve possible dependencies arising from proportional ownership measures.

The Wooldridge test rejects the null of no first-order autocorrelation ($F = 369.858$, $p < 0.001$), indicating serial correlation within firms. These results motivate the use of standard errors that accommodate dependent disturbances.

The Modified Wald test rejects homoskedasticity across firms ($\chi^2 = 29{,}821{,}434.33$, $p < 0.001$). The estimates use Driscoll–Kraay standard errors to address heteroskedasticity and dependence. However, only five annual periods are available, limiting the reliability of inference based on a long-time-series approximation; no alternative-model or sensitivity analysis is documented.

The reported model-level probability is below 0.001, and the reported adjusted R^2 is 0.249. These statistics indicate joint significance and partial explanatory power within the fitted specification; they do not establish that ownership variables outperform alternative models or identify the sources of unexplained variation.

At the 5% level, corporate and individual ownership are positively associated with returns, whereas insurance and pension fund ownership are negatively associated. Trading volume activity, scripless shares, free float, and ownership by financial institutions, mutual funds, securities companies, foundations, and other investors are not statistically significant. The p-values for scripless shares, mutual funds, and other ownership are below 0.10 but above 0.05, so their classification depends on the prespecified significance threshold.

Market capitalization has a positive statistically significant coefficient, interest rates have a negative statistically significant coefficient, and GDP growth is not statistically significant at 5%. These conditional associations should be interpreted cautiously because macroeconomic variables are common across firms and are observed over only five years.

Discussion

Trading Volume Activity on Stock Returns

Trading volume activity is commonly regarded as an indicator of market liquidity and the intensity of information dissemination in the capital market. In an efficient market, higher trading volume is expected to facilitate faster price adjustment because new information is more rapidly incorporated into stock prices (Chordia et al., 2001; Karpoff, 1987). However, the empirical results of this study indicate that trading volume activity does not significantly affect stock returns.

One possible interpretation is that annual trading volume aggregates informed trading, liquidity needs, and sentiment-driven transactions whose return implications differ. This is consistent with the distinction between information-related volume and temporary price pressure discussed by (Chan & Fong, 2004; Sakariyahu et al., 2024). Differences from the broader volume–return literature Bajzik (2021) may reflect market composition, measurement frequency, and sample design, but these explanations are not directly tested here. Recent research has also examined investor sentiment and trading activity from different perspectives. (Bonaparte, 2025) discusses the global fear-of-missing-out phenomenon in financial markets, while (Triwulandari et al., 2026) examine trading volume activity as a mediating variable in the relationship between financial performance indicators and stock prices. These perspectives suggest that trading activity may be associated with market outcomes through mechanisms not directly captured by the present regression model (Chan & Fong, 2004; Sakariyahu et al., 2024; Bajzik, 2021).

From a market microstructure perspective, trading intensity can affect liquidity and price formation without generating a stable annual return association. Market microstructure research further emphasizes the importance of liquidity provision, price impact, and trade informativeness in explaining short-term market dynamics (Ignashkina et al., 2022; Teodorović, 2011). These mechanisms may operate at transaction-level frequencies and therefore cannot be directly inferred from the annual trading volume measures employed in the present study. The insignificant coefficient does not demonstrate that order flow lacks private information or that investors disregard trading activity. Higher-frequency data and direct measures of informed trading would be needed to examine those mechanisms.

Scripless Shares on Stock Returns

The results indicate that scripless shares do not have a statistically significant association with stock returns, suggesting that the implementation of electronic or dematerialized trading systems does not directly influence return performance in the Indonesian Stock Exchange from 2021 to 2025. Although the coefficient shows a negative direction, the lack of statistical significance suggests that improvements in market infrastructure, such as the transition to scripless trading, primarily enhance operational efficiency, transparency, and settlement processes without necessarily translating into changes in stock returns.

Dematerialization can support settlement efficiency and securities administration (Foucault et al., 2023; Suratman et al., 2023). These operational benefits are conceptually distinct from capital gains and need not translate into a statistically significant association with annual stock returns. The present model does not directly measure settlement risk or quantify infrastructure benefits (Ignashkina et al., 2022; Teodorović, 2011).

POJK No. 9 of 2025 provides policy context for the transition toward dematerialized securities (Financial Services Authority of the Republic of Indonesia, 2025). Because this development occurs near the end of the sample, the estimates should not be treated as an evaluation of the regulation's full implementation or longer-term effects.

The average scripless share proportion is 73.119%, but the standard deviation of 33.193 percentage points indicates substantial heterogeneity. These statistics do not support a claim of near-universal adoption or uniformly priced benefits. A plausible explanation for the insignificant annual return association is that administrative improvements affect trading processes more directly than firm cash flows; testing this explanation would require additional measures and a longer observation period.

Ownership Structure on Stock Returns

Ownership coefficients differ across investor categories, highlighting the value of disaggregating shareholder composition. These conditional associations are compatible with heterogeneous monitoring incentives and investment horizons, but the model does not directly observe those mechanisms.

The positive corporate ownership coefficient is compatible with strategic monitoring and governance explanations (Aggarwal et al., 2011). Agency theory suggests that shareholders' incentives to monitor managers can differ with ownership arrangements. However, firms with stronger prospects may also attract corporate shareholders; the observed coefficient alone cannot distinguish monitoring from investor selection.

The negative insurance and pension fund ownership coefficients may be consistent with conservative mandates and long-term portfolio objectives (Bayar et al., 2022; Pinkus et al., 2026). This interpretation remains a hypothesis because risk preferences, prudential constraints, and monitoring intensity are not measured. Reverse causality or differences in the firms selected by these investors could also contribute to the associations.

Individual ownership is positively associated with stock returns. Retail demand and behavioral trading provide possible explanations, while overconfidence and herding can produce price movements unrelated to fundamentals (Barber & Odean, 2000; Statman et al., 2006). Investor behavior may also differ across ownership categories and investment strategies. Cui et al. (2025) examine differences between retail and institutional investor sentiment in relation to stock returns, while Lee et al. (2023) investigate anti-herding behavior among mutual funds. These studies provide additional perspectives on investor heterogeneity, although the present analysis does not directly measure sentiment or herding behavior. The regression does not establish that retail participation causes higher returns or that investors' realized portfolio performance improves, and these outcomes should not be conflated.

The other ownership categories are not statistically significant at 5%. This result does not establish that these investors lack monitoring influence or sufficient concentration. Differences in investment strategies, measurement, coefficient precision, and the short observation window may limit detection of their associations with annual returns.

Free Float on Stock Returns

Free float is expected to improve market liquidity by increasing the proportion of shares available for public trading. Previous studies argue that companies with higher free float generally experience greater liquidity and attracct broader investor participation (Bostanci & Kılıç, 2010; Viratama et al., 2024C). Nevertheless, the present study finds that free float does not significantly influence stock returns.

The free-float coefficient is not statistically significant at 5%, so this model does not establish an annual return association after accounting for the included variables. Evidence on liquidity or investability addresses different outcomes. A nonsignificant return coefficient cannot determine whether free float improves liquidity, transparency, or investor access.

The 2026 free-float reforms occur after the 2021–2025 estimation period. Accordingly, these results cannot evaluate their effectiveness or establish that their regulatory rationale is unsupported. The practical implication is that assessments of free-float policy should distinguish return outcomes from liquidity and transparency outcomes and use observations covering implementation, together with an appropriate evaluation design.

CONCLUSION

This study examines market microstructure, ownership structure, and stock returns for 624 IDX-listed firms during 2021–2025. At the 5% level, corporate and individual ownership are positively associated with returns, whereas insurance and pension fund ownership are negatively associated. Trading volume activity, scripless shares, free float, and the remaining ownership categories are not statistically significant. Market capitalization is positively associated with returns, interest rates are negatively associated, and GDP growth is not statistically significant. By integrating detailed ownership categories with market microstructure variables in one panel framework, the study contributes evidence on heterogeneous shareholder associations in the Indonesian capital market.

The findings support considering ownership composition in investment analysis and distinguishing governance and transparency objectives from return outcomes when assessing market reforms. Interpretation is limited by annual observations, a five-year panel, the absence of sector-specific and alternative-specification analyses, and unresolved endogeneity. Driscoll–Kraay inference should also be treated cautiously with such a short time dimension. Future research should extend the period, use higher-frequency data where appropriate, examine sector heterogeneity, and apply methods that address reverse causality. The present results describe conditional associations and cannot evaluate reforms introduced after 2025.

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AUTHOR CONTRIBUTION STATEMENT

R.I.T.L. and I.T.S.H. contributed to conceptualization, methodology, validation, formal analysis, investigation, resources, data curation, and manuscript revision and editing. R.I.T.L. contributed to software, preparation of the original draft, and project administration.

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