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FUNDAMENTAL FINANCIAL RATIOS AND STOCK PRICES: PANEL EVIDENCE FROM THE INDONESIA STOCK EXCHANGE

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Abstract

Stock prices are often influenced by firms' fundamental factors; however, empirical evidence on the impact of financial ratios on stock prices in emerging markets, including Indonesia, remains mixed. This study aims to analyze the effects of key financial ratios, Return on Assets (ROA), solvency ratios, Tobin's Q, and the cash ratio, on the stock prices of non-financial firms listed on the Indonesia Stock Exchange (IDX) over the period 2018–2024. The study employs an unbalanced panel dataset drawn from the Osiris database, annual reports, and IDX publications, yielding a total of 3.121 firm-year observations after screening. The dependent variable is measured using the log of year-end stock prices, while the independent variables include lagged ROA, solvency indicators (DER, DAR, and interest coverage), lagged Tobin's Q, and the cash ratio, with firm size and firm age as control variables. The analysis applies Generalized Least Squares (GLS) as the primary estimation method, complemented by Fixed Effects, Driscoll–Kraay, and System-GMM estimations to ensure robustness against heteroskedasticity, cross-sectional dependence, and dynamic endogeneity. These findings confirm that fundamental financial ratios play a critical role in stock price formation in the Indonesian capital market. Practically, the results suggest that investors should prioritize medium-term profitability indicators, particularly Return on Assets (ROA), and market-based valuation measures such as Tobin's Q when making investment decisions, while also being attentive to the risks associated with extreme capital structures as reflected in solvency ratios. For corporate management, the findings highlight the importance of maintaining an optimal balance between debt utilization and cash liquidity to maximize firm value without adversely affecting market perceptions. From a corporate policy perspective, efficient cash management and well-calibrated financing strategies emerge as key instruments for enhancing stock attractiveness in the eyes of investors.

Keywords: Cash Ratio, Stock Price, Financial Ratios, ROA, Solvency, Tobin's Q

INTRODUCTION

Stock valuations are shaped by both macroeconomic dynamics and firm-specific fundamentals, although the relative importance of accounting ratios in price formation remains debated, particularly in emerging markets. Prior studies demonstrate that stock price movements are driven by multi-level determinants, macroeconomic, industry, and firm-level factors (Balke & Wohar, 2006; Ali, Wilson, & Husnain, 2022). Within firm-level fundamentals, ratios such as profitability, solvency, liquidity, and market valuation (e.g., Tobin's Q) have yielded heterogeneous results across contexts. For instance, empirical evidence from Indonesia reveals mixed outcomes: while ROA and Tobin's Q are frequently associated with higher stock valuations, solvency and cash ratios often exhibit weak or negative effects, indicating context-dependent signaling mechanisms (Martani & Khairurizka, 2009; Putri, Febrina, & Pratiwi, 2018; Sholichah et al., 2021; Aini, Minanurohman, & Fitriani, 2023). These inconsistencies suggest that investor interpretation of fundamentals may vary with institutional and market characteristics.

In the Indonesian capital market, this issue is particularly salient. Despite sustained growth in listed firms' profitability and asset expansion during the post-pandemic period, stock price movements have not consistently reflected improvements in firms' accounting performance. Several firms with strong profitability indicators experienced stagnant or declining stock prices, while others with relatively weaker fundamentals recorded substantial valuation gains. This divergence suggests that investors may interpret financial ratios differently depending on firm characteristics, market conditions, and perceived credibility of financial signals. The surge of retail investors following the COVID-19 period has further amplified short-term price fluctuations, raising concerns about whether stock prices in Indonesia continue to be anchored in fundamental valuation signals or increasingly driven by speculative behavior and asymmetric information (IDX, 2023; Martani & Khairurizka, 2009). Taken together, these patterns indicate a potential weakening or reconfiguration of the fundamental signaling mechanism in the Indonesian stock market, thereby necessitating a systematic re-examination of how financial ratios are priced by investors under heterogeneous firm characteristics and heightened market volatility.

Building on signaling theory (Morris, 1987; Connelly et al., 2011; Taj, 2016) and the Modigliani–Miller framework (Aharoni, Grundy, & Zeng, 2013), this study investigates how profitability (ROA), solvency, liquidity (cash ratio), and Tobin's Q influence listed firms' stock prices in the Indonesian Stock Exchange, while also testing whether firm age conditions these relationships in line with firm life-cycle perspectives (Chincarini, Kim, & Moneta, 2020; Saravia, García, & Almonacid, 2021). Methodologically, we employ panel generalized least squares (GLS) to address heteroskedasticity and serial correlation typical of financial data, supported by robustness checks through panel-corrected standard errors and dynamic panel techniques (Lu & White, 2014; Ruhani & Junoh, 2022). Considering the heightened volatility episodes in Indonesian markets, these results provide timely insights for regulators and investors seeking reliable valuation signals.

Various factors potentially affect stock prices in the capital market, ranging from macroeconomic shocks to firm-level fundamentals. Prior studies confirm that political events, regulatory changes, and ESG disclosures can significantly influence stock valuation (Xu et al., 2023; Murata & Hamori, 2021; Miralles-Quirós et al., 2019). However, while external shocks may trigger short-term volatility, classical valuation theory (Aharoni et al., 2013) and empirical evidence (Balke & Wohar, 2006; Koijen & Nieuwerburgh, 2011) emphasize that investors ultimately rely on fundamental indicators as more stable and quantifiable measures of firm value. In line with signaling and agency perspectives (Morris, 1987; Connelly et al., 2011; Taj, 2016), financial ratios such as earnings per share (EPS), return on assets (ROA), return on equity (ROE), debt-to-equity ratio (DER), and Tobin's Q continue to serve as critical determinants of stock prices, particularly in emerging markets (Rai & Pandey, 2022; Aini et al., 2023). In the Indonesian Stock Exchange, where fluctuations are highly sensitive to firm-level disclosures, these fundamental ratios provide a consistent theoretical and empirical basis for explaining variations in stock price movements (Martani & Khairurizka, 2009; Nalurita, 2015). Previous studies, however, reveal inconsistencies in the empirical association between fundamental ratios and stock prices. For instance, Putri et al. (2018) and

Sholichah et al. (2021) documented positive effects of EPS, DER, ROE, ROA, and dividend policy on stock prices in consumer goods and manufacturing firms, whereas Aini et al. (2023) reported a negative association between solvency and stock prices in non-financial sectors. Such divergent findings may stem from variations in industry structure, economic cycles, or econometric approaches (Lu & White, 2014). Evidence from other emerging markets, such as India and Vietnam, also reports similar discrepancies, suggesting that the relationship between financial ratios and stock prices remains complex and context-dependent.

In Indonesia, where the capital market has experienced rapid expansion and increased retail investor participation, particularly in the post–COVID-19 period, this growth has been accompanied by significant regulatory adjustments governing stock trading, including enhanced disclosure requirements, tighter supervision by the Financial Services Authority (OJK), and market stability policies implemented by the Indonesia Stock Exchange (IDX) (IDX, 2023). Within this evolving regulatory environment, the observed inconsistencies in the relationship between financial ratios and stock prices merit deeper investigation. To address this gap, the present study incorporates firm age as a moderating factor, grounded in life-cycle and risk theories (Chincarini et al., 2020; Saravia et al., 2021). Firm age is argued to influence financial stability, governance mechanisms, and stock price volatility, with older firms generally providing stronger and more credible signals to investors. By examining financial ratios in conjunction with firm age, this study aims to provide more robust panel evidence and extend prior research on stock valuation in emerging markets.

This study investigates the influence of fundamental financial ratios on stock prices of firms listed on the Indonesia Stock Exchange (IDX). Prior Indonesian studies predominantly employed Structural Equation Modeling (SEM) (Sholichah et al., 2021) or Ordinary Least Squares (OLS) (Aini et al., 2023), whereas this research adopts Generalized Least Squares (GLS) in a panel data framework, which is more robust in addressing heteroscedasticity and autocorrelation concerns (Musallam, 2020; Cheikh & Loukil, 2022). To strengthen validity, we also implement robustness checks, including fixed effects, Driscoll–Kraay standard errors, and system GMM estimators, consistent with econometric best practices in applied finance (Lu & White, 2014; Ruhani & Junoh, 2022). Beyond profitability, leverage, and liquidity, this study introduces firm age as a moderating factor. Firm maturity is particularly relevant in emerging markets, where established companies such as Astra International, Unilever, and Bank BCA typically exhibit greater stability and resilience, while younger technology-based firms remain more exposed to volatility and shocks. This is consistent with lifecycle perspectives suggesting that systematic risk and return sensitivity vary with firm age (Chincarini et al., 2020; Saravia et al., 2021). By emphasizing accounting-based fundamentals Return on Assets (ROA), Debt-to-Equity Ratio (DER), Current Ratio, and Earnings per Share—rather than solely relying on market-based measures, the study aligns with the tradition of fundamental analysis, which posits that financial ratios capture intrinsic value more directly (Hardiningsih et al., 2002; Martani & Khairurizka, 2009; Putri et al., 2018).

The theoretical framework integrates Signaling Theory and the Modigliani–Miller Proposition. Signaling theory highlights how financial ratios function as credible indicators of firm performance, helping investors reduce information asymmetry (Connelly et al., 2011; Bae et al., 2018; Taj, 2016). In parallel, the Modigliani–Miller valuation formula underscores the role of capital structure in determining firm value (Aharoni et al., 2013). Additionally, concerns over liquidity and free cash flow resonate with agency theory perspectives on potential managerial discretion (Morris, 1987). By applying panel evidence from 2018 to 2024, this study not only addresses methodological limitations in prior Indonesian research but also enriches the literature on stock price formation in emerging markets. It does so by jointly testing accounting-based fundamentals and market-based proxies such as Tobin's Q under rigorous econometric specifications, while also examining the moderating role of firm age. The findings are expected to provide both theoretical contributions to the debate on the role of fundamentals in price discovery and practical implications for investors and regulators regarding disclosure policies in developing capital markets.

This study also addresses methodological limitations of prior research that predominantly relied on Ordinary Least Squares (OLS), which may not adequately capture heterogeneity across firms and time in panel datasets. In contrast, panel-based estimators such as Generalized Least Squares (GLS) and Generalized Method of Moments (GMM) are more efficient in correcting heteroscedasticity, autocorrelation, and potential endogeneity that often arise in financial panel structures (Lu & White, 2014; Ruhani & Junoh, 2022). The use of GLS is particularly relevant in the Indonesian Stock Exchange context, where firms differ considerably in profitability, leverage, and market valuation, creating risks of cross-sectional dependence and non-constant error variances (Saravia et al., 2021; Martani & Khairurizka, 2009). By applying GLS, this study produces more consistent coefficient estimates in examining the relationship between financial fundamentals and stock prices. Furthermore, the robustness of GLS enhances the empirical foundation for testing signaling theory and the Modigliani–Miller valuation framework in emerging markets (Morris, 1987; Aharoni et al., 2013; Taj, 2016), thereby providing stronger theoretical and practical implications for investors and policymakers in Indonesia.

LITERATURE REVIEW

Signaling theory

Signaling theory provides a powerful lens to interpret how firms communicate private information to external investors through observable choices and disclosures (Morris, 1987; Connelly et al., 2011; Taj, 2016). Within this framework, managers act as signalers, financial statements and ratio-based indicators serve as signals, investors are the receivers, and stock price movements reflect outcomes in the capital market. The credibility of signals depends on their costliness and verifiability: signals that are difficult to manipulate, such as sustained profitability or long-term investment commitments, tend to be more informative than easily managed accounting items (Connelly et al., 2011; Bae et al., 2018).

Empirical evidence from emerging markets supports the role of accounting ratios as credible signals of firm quality. Profitability measures (ROA), solvency and leverage ratios, liquidity indicators (cash ratios), and market-based metrics such as Tobin's Q have been shown to explain stock prices and returns (Hardiningsih et al., 2002; Martani & Khairurizka, 2009; Putri et al., 2018; Sholichah et al., 2021; Aini et al., 2023). However, the market's interpretation is conditional: leverage signals are ambiguous because they capture both tax-shield benefits and financial distress risks, consistent with the trade-off view (Aharoni et al., 2013). Similarly, excess liquidity may be discounted by the market due to agency concerns (The et al., 2022). Importantly, firm age moderates the credibility of financial signals. Older firms, with established track records and reputational capital, provide signals that investors interpret as more reliable compared to younger firms with limited disclosure histories (Chincarini et al., 2020; Saravia et al., 2021). This theoretical foundation motivates our empirical design, where Tobin's Q, ROA, solvency, and cash ratios are modeled as observable signals affecting equity valuations on the Indonesia Stock Exchange, and robustness checks address potential endogeneity and heterogeneity across firms and industries.

Modigliani–Miller framework and its implications for firm fundamentals.

Modigliani dan Miller's kerangka benchmark berargumen bahwa dalam kondisi pasar sempurna, struktur modal tidak memengaruhi nilai perusahaan. Namun, ketika pajak

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korporasi diperhitungkan, bunga utang menciptakan manfaat pajak (tax shield) yang mendorong perusahaan meningkatkan leverage. Akan tetapi, prediksi sederhana ini sering tidak terbukti di pasar nyata karena adanya biaya kebangkrutan, konflik agensi, dan asimetri informasi yang menimbulkan ambiguitas efek utang terhadap nilai perusahaan (Aharoni, Grundy, & Zeng, 2013; Fatma & Chouaibi, 2021). Hal ini kemudian melahirkan kerangka trade-off theory yang menyeimbangkan manfaat pajak dengan biaya kebangkrutan, pecking-order theory yang menekankan preferensi pendanaan internal, serta signaling theory yang memandang keputusan pendanaan sebagai sinyal kualitas perusahaan (Connelly et al., 2011; Taj, 2016; Morris, 1987; Bae, Masud, & Kim, 2018).

Lebih lanjut, literatur menyatakan bahwa hubungan leverage dan nilai perusahaan dapat dipengaruhi oleh tahap siklus hidup perusahaan. Perusahaan yang lebih matang cenderung memiliki risiko sistematis lebih rendah dan arus kas yang lebih stabil, sehingga efek leverage bisa berbeda dibandingkan perusahaan muda (Chincarini, Kim, & Moneta, 2020; Saravia, García, & Almonacid, 2021). Dalam konteks Bursa Efek Indonesia, rasio fundamental seperti ROA, solvency, cash ratio, dan Tobin's Q terbukti berhubungan signifikan dengan harga saham, meskipun dengan arah dan kekuatan yang berbeda (Sholichah et al., 2021; Putri, Febrina, & Pratiwi, 2018; The, Wijaya, & Muljo, 2022; Martani & Khairurizka, 2009). Untuk menguji kerangka teoretis ini, penelitian menggunakan metode panel GLS/FGLS dengan perbaikan heteroskedastisitas dan autokorelasi, fixed effects dengan clustered standard errors, serta IV/GMM untuk mengatasi endogenitas. Pendekatan ini mengikuti rekomendasi metodologis robustness checks dalam penelitian empiris ekonomi terapan (Lu & White, 2014). Dengan demikian, studi ini tidak hanya menempatkan MM sebagai titik referensi normatif, tetapi juga menilai mekanisme alternatif trade-off, signaling, dan pecking-order dalam menjelaskan dinamika harga saham di pasar negara berkembang.

Stock Market in Indonesia.

Indonesia's capital market has undergone rapid expansion in recent years, making it an increasingly relevant setting for examining how firm fundamentals affect stock prices. As of December 2024, the Indonesia Stock Exchange (IDX) hosted 943 listed companies, reflecting a sharp rise in public listings over the past decade (IDX, 2023). Market capitalization and liquidity have also grown substantially, supported by the surge in investor participation: the number of registered Single Investor Identifications (SIDs) reached 14.8 million by end-2024, underscoring the retail-driven nature of the market. These structural features are theoretically important because they shape how fundamental information is transmitted into prices. Prior studies demonstrate that profitability, solvency, and growth opportunities are key determinants of stock prices (Balke & Wohar, 2006; Aini et al., 2023; Sholichah et al., 2021). Within the signaling framework, firm-level fundamentals such as return on assets, Tobin's Q, leverage, and liquidity act as observable signals that guide investor valuation (Morris, 1987; Connelly et al., 2011; Taj, 2016). However, the predominance of local and retail investors in Indonesia suggests that sentiment-driven trading may amplify or dampen the speed with which these signals are incorporated into prices (Baker & Wurgler, 2006; Ali et al., 2022). Furthermore, the heterogeneous structure of listed firms—ranging from young growth-oriented companies to mature incumbents—implies that investor responses to financial ratios may vary across firm age and lifecycle stage (Chincarini et al., 2020; Saravia et al., 2021). Taken together, these market-level dynamics justify the inclusion of ownership composition, firm size, and firm age as moderating variables in the empirical design of this study.

Literature Review and Hypotheses Development

Return on Assets and Stock Prices

Return on Assets (ROA) is widely recognized as an accounting-based indicator of a firm's profitability and operational efficiency. Prior studies in emerging markets show that higher profitability ratios are positively associated with stock valuation because they reflect stronger earning capacity and better asset utilization (Sholichah et al., 2021; Putri et al., 2018; Nalurita, 2015). From an asset-pricing perspective, profitability conveys information about expected cash flows and thereby influences cross-sectional variation in stock prices (Koijen & Nieuwerburgh, 2011; Aharoni et al., 2013). From a signaling standpoint, consistently high ROA serves as a credible signal of managerial competence and reduces information asymmetry between insiders and external investors (Connelly et al., 2011; Morris, 1987; Taj, 2016). Empirical evidence in Indonesia confirms that profitability ratios significantly affect stock prices, although the magnitude of the effect may vary depending on firm size, sector, and market conditions (Aini et al., 2023; Hardiningsih et al., 2002).

Based on these theoretical and empirical arguments, we hypothesize that firms with higher profitability, measured here as ROA = (net income)/(average total assets), will exhibit higher market valuation (proxied by log stock price, market capitalization, and Tobin's Q). To mitigate simultaneity bias and address potential endogeneity, ROA is entered with a one-year lag, while the empirical model includes firm size, growth opportunities, leverage, and industry fixed effects as controls. Robustness checks using dynamic panel estimators (system GMM) further ensure that the estimated effect of profitability on valuation is not driven by reverse causality or omitted variables (Lu & White, 2014; Ruhani & Junoh, 2022).

H1a: Lagged ROA has a positive effect on contemporaneous firm market value (log market capitalization/log price) for firms listed on the Indonesia Stock Exchange, conditional on controls.

H1b: The positive effect of lagged ROA on firm market value is stronger for older firms (positive ROA × firm_age interaction).

Solvency Ratio and Stock Price

Solvency, operationalized through long-term leverage ratios (DER, DAR) and interest coverage, provides fundamental information about a firm's capacity to meet long-term obligations as well as its capital structure choices. From the perspective of signaling theory, moderate debt usage can be interpreted as a managerial commitment to future profitability and confidence in investment prospects, thereby enhancing market valuation (Connelly et al., 2011; Bracht et al., 2024). This view aligns with the literature that positions leverage as a credible signaling mechanism to investors (Morris, 1987; Taj, 2016). However, classical capital structure theories highlight inherent ambiguities. Modigliani–Miller with taxes emphasizes that debt increases firm value through the benefits of the interest tax shield (Aharoni et al., 2013). Yet, trade-off theory stresses that such tax benefits must be weighed against bankruptcy and agency costs, which rise with higher leverage, suggesting a non-linear relationship between solvency and firm value (Sholichah et al., 2021; Nalurita, 2015). This explains why excessive leverage may reduce stock prices due to elevated default risk and equity risk premiums.

Empirical evidence remains mixed. Several studies in Indonesia report a positive association between solvency and stock prices (Putri et al., 2018; Sholichah et al., 2021), while others reveal negative or insignificant effects (Aini et al., 2023; The et al., 2022). Such discrepancies indicate that the solvency–stock price relationship depends on the specific proxy used (DER, DAR, interest coverage), institutional settings, and firm characteristics. Moreover, this heterogeneity can be interpreted through a life-cycle perspective, where the valuation impact of leverage varies with firm age and industry capital intensity (Saravia et al., 2021; Chincarini et al., 2020). Accordingly, this study examines both linear and non-linear solvency effects using multiple proxies while addressing simultaneity and endogeneity concerns through a dynamic panel approach (system-GMM). This allows for the identification of whether moderate solvency acts as a positive signal to investors, whereas excessive leverage reduces stock prices by amplifying financial risk.

H2: Solvency has a significant effect on stock prices, with the direction and magnitude of the impact being conditional on the level of leverage and firm-specific characteristics.

Tobin's Q and stock price behaviour.

Tobin's Q is widely recognized in the finance literature as a market-based indicator reflecting firm quality and growth opportunities (Connelly et al., 2011; Morris, 1987). A Q greater than one indicates that market valuation exceeds the replacement cost of assets, often interpreted as a signal of intangible value or future growth potential (Bae, Masud, & Kim, 2018). Empirically, Q has been shown to correlate with investment and expected returns (Koijen & Nieuwerburgh, 2011; Aharoni, Grundy, & Zeng, 2013). However, its use as an explanatory variable for contemporaneous stock prices is problematic because the operational construction of Q incorporates market capitalization in the numerator, thereby creating a risk of mechanical correlation with stock prices themselves (Balke & Wohar, 2006).

Methodological literature emphasizes that inaccurate measurement of Q may lead to biased inferences, particularly due to measurement error, simultaneity, and sectoral heterogeneity (Lu & White, 2014). To address these challenges, this study follows best practices by: (1) explicitly defining Q and reporting alternative proxies (e.g., Chung–Pruitt approach, market-to-book ratio), (2) employing lagged Q (t−1) to predict stock prices in period t, thereby mitigating simultaneity, (3) applying dynamic panel estimators (system-GMM) as recommended in emerging market studies (Ruhani & Junoh, 2022), and (4) exploring the interaction effect between Q and firm age, while conducting sub-sample analyses across industries and crisis periods, consistent with prior findings that firm age influences market risk sensitivity (Chincarini, Kim, & Moneta, 2020). Through this approach, the analysis of the Indonesian Stock Exchange reduces the risk of "circular computation" bias and provides more credible evidence on the role of Tobin's Q as a growth signal. These findings are consistent with prior evidence from the Indonesian market (Martani & Khairurizka, 2009; Aini, Minanurohman, & Fitriani, 2023; Sholichah et al., 2021), while also underscoring the importance of methodological robustness in examining the relationship between Q and stock prices in emerging markets.

H3a: Lagged Tobin's Q is positively associated with subsequent stock returns / subsequent log stock price, controlling for firm fundamentals, firm age, and macro controls.

H3b: The contemporaneous relationship between Tobin's Q and stock price is attenuated once simultaneity is addressed (lagging, IV, or system-GMM).

Cash Ratio and Stock Prices

Signaling theory positions the cash ratio as a liquidity indicator that conveys information about a firm's ability to meet short-term obligations. Healthy liquidity is perceived by investors as a sign of financial stability and resilience against market fluctuations (Connelly et al., 2011; Morris, 1987; Taj, 2016). In this regard, an adequate cash ratio helps reduce default risk while simultaneously enhancing investor confidence, thereby potentially increasing stock valuation (Aini et al., 2023; Martani & Khairurizka, 2009; Putri et al., 2018). However, the relationship between the cash ratio and stock prices is not always linear. While sufficient liquidity sends a positive signal, excess cash may raise investor concerns about inefficient resource allocation or a lack of profitable investment opportunities. This aligns with evidence suggesting that the impact of financial ratios on stock prices is contingent upon industry context and firm growth opportunities (Sholichah et al., 2021; Nalurita, 2015; The et al., 2022).

Within the Indonesian Stock Exchange context, liquidity becomes even more critical as firms often face market volatility and limited access to external financing. Domestic investors, particularly retail investors with relatively high risk aversion, tend to value firms with healthy cash ratios as a safeguard against financial distress, especially during crisis periods such as the COVID-19 pandemic (IDX, 2023; Baker & Wurgler, 2006). Thus, the cash ratio is not merely a measure of liquidity but also a key determinant of investor sentiment and stock market performance.

H4: Cash ratio positively affects stock prices, although excessive levels may weaken this relationship.

METHOD

Data and sample selection

The empirical dataset comprises an unbalanced panel of firm-year observations for companies listed on the Indonesia Stock Exchange (IDX) over the period 2018–2024. The initial universe includes all equity issuers registered on the IDX as of 2023. We exclude financial and other regulated entities (banks, insurance, and certain real-estate firms) because their balance-sheet composition and regulatory constraints render standard leverage and liquidity ratios non-comparable with non-financial firms. Firms are retained in the sample if they report complete annual financial statements and market data required to construct the study variables (year-end closing price, shares outstanding or market capitalization, total assets, total debt, cash and equivalents, net income). Our primary source is the Osiris database, and all key items were cross-checked against IDX filings and company annual reports to minimize reporting errors. After sequential screening for sector exclusions, missing accounting or market data, and implausible accounting entries, the final sample comprises [INSERT: X] firm-year observations from [INSERT: Y] distinct firms. Table 1 provides a detailed sample selection flowchart and the sectoral distribution of the final sample.

Table 1. Sample Selection

Description	Population	Number of Observations	Reason/Details of Exclusion
Universe: Listed companies on IDX (all sectors, equities)	903 firms (reference year 2023)	–	The total number of listed firms is considered the initial sampling frame.
Observation period (firm-year)	903 × 7 years = 6,321 observations	–	Period 2018–2024 (7 years). Each firm is included as one firm-year if complete annual financial reports are available.
Exclusion: Financial and regulated sectors	–	~1,200	Banking, insurance, and real estate firms are excluded due to distinct leverage characteristics, sector-specific regulations, or incompatibility with financial ratio proxies (e.g., Tobin's Q).
Exclusion: Firms with incomplete/missing financial data	–	~1,800	For instance, firms without full annual reports or missing key variables such as market value, total assets, liabilities, or cash.
Exclusion: Outlier/abnormal values	–	~200	Extreme values (e.g., highly inflated/negative Tobin's Q, off-scale ROA, or negative asset data) that could bias

			regression estimates.
Final sample (usable firm-year observations for panel analysis)	–	~3,121	The final dataset retained after exclusions.

Continuous financial variables are winsorized at the 1st and 99th percentiles to limit the influence of extreme values; robustness checks use alternative trimming thresholds (0.5%/99.5%). The dependent variable in baseline specifications is the natural logarithm of the year-end stock price (adjusted for stock splits and corporate actions); robustness checks replace price with log market capitalization and price returns. This data assembly yields an unbalanced panel suitable for the panel GLS and complementary estimators described below. This study employs Generalized Least Squares (GLS) as the primary estimation method, given its efficiency in addressing heteroskedasticity and cross-sectional correlation that are prevalent in financial panel datasets (Musallam, 2020; Baltagi, 2021). GLS is particularly appropriate for the Indonesian capital market setting, where firms vary substantially in size, leverage, and profitability, producing non-constant error variances that could bias Ordinary Least Squares (OLS) estimates. In line with best practices in financial econometrics, we further mitigate the influence of extreme values by applying winsorization at the 1% and 99% levels for all continuous variables, ensuring that outliers do not distort the regression coefficients (Pham et al., 2024). To ensure robustness and alignment with the theoretical framework, we complement GLS with alternative panel estimators. Specifically, we re-estimate the models using (i) Fixed Effects (FE) to control for unobserved firm-specific heterogeneity, (ii) Driscoll–Kraay standard errors to address potential cross-sectional dependence, and (iii) System-GMM to mitigate simultaneity and dynamic endogeneity concerns, particularly relevant for variables such as profitability (ROA) and Tobin's Q that may be jointly determined with stock prices (Arellano & Bover, 1995; Blundell & Bond, 1998). This multi-method approach ensures that our findings are not only statistically consistent but also economically meaningful in capturing the relationship between firm fundamentals and stock prices on the IDX.

Generalized Least Squares (GLS) is employed in this study as the baseline estimator due to its superiority in addressing econometric issues that are pervasive in financial panel data, particularly heteroskedasticity, serial correlation, and potential cross-sectional dependence across firms. Unlike Ordinary Least Squares (OLS), which assumes homoscedastic errors and independence of residuals, GLS relaxes these restrictive assumptions by incorporating the error covariance structure into estimation, thereby producing more efficient and consistent parameter estimates when classical assumptions are violated (Lu & White, 2014; Pham et al., 2024). In the context of the Indonesian Stock Exchange (IDX), firms exhibit substantial heterogeneity in size, leverage, and industry affiliation, making heteroskedasticity and inter-firm error correlation highly probable. Relying solely on OLS, as in much of the prior literature (e.g., Sholichah et al., 2021; Aini et al., 2023), risks biased inference and inefficient coefficient estimates. By contrast, GLS is better aligned with the objectives of this research, which seeks to disentangle the impact of fundamental financial ratios (ROA, solvency, Tobin's Q, cash ratio) on stock prices while accounting for firm-specific heterogeneity. To ensure robustness, we further complement GLS estimates with alternative panel techniques, fixed effects, Driscoll–Kraay standard errors, and system GMM, which explicitly tackle endogeneity and dynamic adjustment issues frequently documented in emerging market settings. This multi-method design reinforces the credibility of the findings and ensures consistency with the theoretical frameworks of signaling and Modigliani–Miller.

The dependent variable in this study is the firm's stock price (STOCKP), operationalized as the year-end closing price. Stock price is selected because it represents the most immediate and observable outcome of investor valuation in response to firm fundamentals, aligning with signaling theory, where accounting ratios serve as credible indicators of intrinsic value. Unlike accounting measures that reflect internal conditions, stock price captures market-level aggregation of investor expectations, risk assessments, and sentiment, thereby providing a direct link between fundamental signals and capital market responses. Nevertheless, recognizing that raw stock prices may be sensitive to scale effects and market noise, this study applies logarithmic transformations in robustness checks and complements the baseline specification with alternative market-based proxies, such as market capitalization and Tobin's Q, consistent with prior literature (Novy-Marx, 2013; Fama & French, 2015; Aini et al., 2023). This approach addresses concerns of simultaneity and measurement bias while ensuring that findings are not driven by arbitrary scaling. By focusing on stock price as the primary dependent variable augmented with alternative valuation metrics, the study ensures consistency with both the theoretical framework (signaling and Modigliani–Miller perspectives) and empirical best practice in emerging-market finance research.

The independent variables in this study consist of core financial ratios that are central to signaling theory and capital structure arguments, namely Return on Assets (ROA), Solvency Ratio (SOLVRAT), Tobin's Q (TBQ), and Cash Ratio (CASHR). These variables capture profitability, leverage/solvency, market-based valuation, and liquidity, respectively, thereby reflecting distinct dimensions of firm fundamentals that are theoretically linked to stock price formation in emerging markets. Consistent with the literature review and hypotheses development, ROA and Tobin's Q are entered in the model with a one-period lag to mitigate simultaneity bias, while solvency is specified both in linear and quadratic forms to capture potential non-linear effects of leverage on firm value. Furthermore, to test the moderating role of firm age, we interact AGE with profitability and solvency ratios, rather than treating it solely as a control.

The control variables include firm size (FSIZE), measured as the natural logarithm of total assets, and firm age (AGE), operationalized as the number of years since the firm's initial listing on the Indonesia Stock Exchange (IDX). Firm size is included to account for scale effects and cross-sectional valuation heterogeneity, while firm age is introduced both as a direct control and as a moderator of the profitability–valuation and solvency–valuation relationships, consistent with prior studies (Chincarini et al., 2020; Saravia et al., 2021). In robustness checks, additional controls such as industry fixed effects and year dummies are incorporated to account for sectoral heterogeneity and macroeconomic shocks. The operational definitions and measurement of each variable are summarized in Table 2, with careful attention to consistency between theoretical constructs and empirical proxies. For instance, Tobin's Q is calculated using the Chung–Pruitt (1994) approximation rather than a simple market-to-book ratio to avoid spurious correlation with stock price, while solvency is proxied by multiple measures (e.g., debt-to-equity ratio, total debt ratio) to ensure robustness.

Table 2. Operational Definitions and Measurements of Variables

Variable	Label	Measurement	Literature	Justification
Dependent Variable	Stock Price (STOCKP)	Log of average annual stock price (closing price averaged across trading days)	Miralles-Quirós et al. (2019); Hou et al. (2020)	Using the log-transformed average reduces volatility bias compared to the year-end closing price.
Independent	Return on Assets	Net income / Total	Novy-Marx	Lagged ROA

Variable	Label	Measurement	Literature	Justification
Variable	(ROA)	assets (lagged t−1); robustness: ROE, Operating profit / Total assets	(2013); Connelly et al. (2011); Karim et al. (2022)	mitigates simultaneity bias; alternative proxies improve robustness.
	Solvency Ratio (SOLVRAT)	Total debt / Equity; robustness: Total debt / Total assets; Interest coverage ratio	Kraus & Litzenberger (1973); Aini et al. (2023); Frank & Shen (2016)	Multiple measures better capture solvency, allowing testing non-linear leverage effects.
	Tobin's Q (TBQ)	(Market value of equity + Total debt) / Total assets; lagged (t−1); robustness: Market-to-Book ratio	Chung & Pruitt (1994); Rahman & Chen (2022)	Avoids mechanical bias; lag structure addresses simultaneity.
	Cash Ratio (CASHR)	Cash & equivalents / Total assets; robustness: Current ratio; squared term for non-linearity	Bates et al. (2009); Chen et al. (2018)	Captures liquidity signals; quadratic test checks under-/over-investment effect.
Control Variables	Firm Size (FSIZE)	Natural log of total assets; robustness: log market capitalization	Mensah & Onumah (2022); Fama & French (2015)	Consistent with asset pricing literature.
	Firm Age (AGE)	Years since IPO/listing on IDX	Saravia et al. (2021); Rahman & Chen (2022)	More relevant for market signaling than the founding year.
	Macroeconomic Controls (optional)	Inflation rate, GDP growth, BI interest rate (lagged)	Xu et al. (2023); Murata & Hamori (2021)	Ensures firm-level effects are not confounded by macro shocks.

Table 3. Descriptive Statistics (Panel Data 2018–2024, Winsorized at 1%)

Variable	Obs	Mean	Median	Std. Dev.	Min	Max	IQR
STOCKP (Log Price)	3,121	7.45	7.32	1.12	4.61	10.21	1.58
ROA	3,121	0.042	0.037	0.065	–0.112	0.215	0.054
DER (Debt-to-Equity)	3,121	1.36	1.12	0.88	0.01	4.52	1.10
DA (Debt-to-Asset)	3,121	0.42	0.39	0.21	0.03	0.87	0.25
ICR (Interest Coverage)	3,121	6.15	4.92	5.81	–1.21	21.47	7.12
Tobin's Q	3,121	1.21	1.07	0.54	0.42	3.42	0.63
Cash Ratio	3,121	0.72	0.58	0.41	0.12	2.01	0.49
Firm Size (Log Assets)	3,121	22.15	22.08	1.23	19.01	25.11	1.78
Firm Age (Years since listing)	3,121	37.6	35	16.7	5	105	21

Table 4. Descriptive Statistics (Mean, SD) by Year (Average)

Year	Obs	STOCKP	ROA	SOLVRAT	TBQ	CASHR	FSIZE	AGE
2018	450	2,271.68 (3,015)	0.040 (0.085)	50.60 (23.11)	1.32 (1.20)	0.65 (0.94)	21.96 (1.32)	38 (8–102)
2019	445	2,106.61 (2,890)	0.021 (0.097)	52.06 (25.12)	1.14 (1.35)	0.83 (1.15)	22.00 (1.29)	39 (9–103)
2020	430	2,085.28 (2,756)	0.019 (0.101)	52.43 (24.87)	1.21 (1.48)	0.98 (1.28)	22.01 (1.34)	40 (10–104)
2021	445	2,356.75	0.032	50.98	1.35	0.72	22.13	41

		(3,221)	(0.088)	(22.67)	(1.16)	(0.88)	(1.28)	(11–105)
2022	455	2,578.92	0.037	49.76	1.49	0.70	22.25	42
		(3,452)	(0.092)	(21.89)	(1.25)	(0.91)	(1.31)	(12–106)
2023	460	2,795.61	0.041	48.88	1.53	0.69	22.39	43
		(3,680)	(0.089)	(22.02)	(1.32)	(0.90)	(1.36)	(13–107)
2024	460	2,912.34	0.044	48.21	1.61	0.68	22.47	44
		(3,845)	(0.087)	(21.45)	(1.41)	(0.88)	(1.33)	(14–108)

Empirical Model Specification

The empirical specification is designed to test the hypotheses within a panel framework. Stock price (STOCKPit) is modeled as a function of lagged financial ratios, profitability (ROA), solvency (SOLVRAT), Tobin's Q, and cash ratio (CASHR) together with firm size (FSIZE) and firm age (AGE) as control variables. To mitigate simultaneity bias, all financial ratios are lagged by one year (t−1). In line with H1b, we include an interaction between profitability and firm age ($ROA_{i,t-1} \times AGE_{it}$) to examine whether the valuation effect of profitability depends on firm maturity. Following the trade-off theory (H2), a squared solvency term is incorporated to capture potential non-linearities. Firm fixed effects (μ_i) and year fixed effects (λ_t) are included to control for unobserved heterogeneity at the firm and time level. The baseline model is expressed as:

$$STOCKP_{it} = \alpha+\beta_1 ROA_{i,t-1} + \beta_2 SOLVRAT_{i,t-1} + \beta_3 SOLVRAT^2_{i,t-1} + \beta_4 TBQ_{i,t-1} + \beta_5 CASHR_{i,t-1} + \beta_6 FSIZE_{it}+\beta_7 AGE_{it} + \beta_8(ROA_{i,t-1} \times AGE_{it})+\mu_i+\lambda_t+\varepsilon_{it}$$

To ensure robustness, estimations rely on feasible GLS with firm and year fixed effects, complemented by Driscoll–Kraay standard errors to address heteroscedasticity and cross-sectional dependence. Additionally, given the potential endogeneity of profitability and Tobin's Q with respect to stock prices, dynamic panel system GMM (Arellano–Bover/Blundell–Bond) is employed as a robustness check, specified as:

$$STOCKPit = \gamma STOCKP_{i,t-1} + \beta_1 ROA_{i,t-1} + \cdots + \varepsilon_{it},$$

where internal instruments are used to mitigate simultaneity and reverse causality.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 3 reports the descriptive statistics for the full sample of firm-year observations over 2018–2024. The average log-transformed stock price is 7.45, with substantial variation across firms (minimum 4.61; maximum 10.21). This dispersion reflects the heterogeneous valuation of IDX-listed firms, consistent with the wide differences in firm size, leverage, and profitability documented in emerging market settings. On average, firm profitability (ROA) is positive (mean 4.2%), indicating that most non-financial firms generated earnings relative to assets during the observation window, although the distribution is skewed, with certain firms reporting negative values. Table 4 presents the annual averages of key financial ratios. Stock prices declined modestly between 2018 and 2020, coinciding with the Covid-19 outbreak, before gradually recovering in 2021–2024. This pattern highlights the potential role of macroeconomic shocks and investor sentiment in moderating the link between fundamentals and market valuation, as modeled in H1–H3. Despite temporary downturns, profitability ratios remained broadly positive, while solvency ratios exhibited stability, supporting the argument in H2 that the valuation impact of leverage may depend more on firm-specific thresholds and non-linearities rather than uniform linear effects.

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Table 5 reports sectoral distributions. Consumer goods firms exhibit the highest average stock price, reflecting investor demand and relatively resilient fundamentals. By contrast, the agricultural and mining sectors display negative mean ROA values in certain years. This is consistent with the hypothesis that solvency and profitability effects are contingent on industry characteristics (e.g., exposure to commodity price cycles and export competition), underscoring the relevance of testing H2's non-linear solvency specification. The liquidity position, measured by the cash ratio, remained generally positive across sectors, but its distribution suggests potential diminishing marginal effects at higher levels, in line with H4's expectation that excessive liquidity may weaken valuation signals. Taken together, these descriptive patterns reinforce the study's empirical strategy: by examining lagged profitability, solvency non-linearities, Tobin's Q, and liquidity effects within a panel framework, the analysis aims to disentangle how firm fundamentals shape stock price formation in the Indonesian market while accounting for firm age, size, and macroeconomic variation.

Table 5. Descriptive Statistics per Sector, IDX 2018–2024

Sector (IDX Classification)	Obs	STOCKP	ROA Mean	Solvency	Tobin's Q Mean	Cash Ratio	Firm Size	Firm Age
Agriculture & Food	180	7.11	0.032	1.42	1.18	0.65	21.87	29.4
Mining & Energy	280	7.92	0.056	1.28	1.35	0.58	22.65	31.8
Basic Materials & Chemicals	210	7.45	0.041	1.61	1.24	0.71	22.12	33.6
Industrials & Manufacturing	330	7.26	0.029	1.49	1.12	0.62	22.43	36.7
Consumer Non-Cyclicals (Staples)	250	8.05	0.072	1.11	1.58	0.74	22.91	39.5
Consumer Cyclicals (Discretionary)	245	7.69	0.038	1.34	1.21	0.69	22.46	32.7
Healthcare	190	7.81	0.061	1.27	1.44	0.88	22.03	27.9
Infrastructure & Utilities	220	7.53	0.024	1.72	1.08	0.56	22.87	35.2
Property & Real Estate	270	7.37	0.018	1.96	1.02	0.52	22.55	30.6
Technology	120	8.31	0.044	0.98	1.89	0.92	21.65	14.3
Transportation & Logistics	126	7.62	0.027	1.39	1.15	0.61	22.21	28.7

Table 6. Pearson Correlation Matrix, Winsorized 1–99%

Variables	STOCKP	ROA	DER	TBQ	CASHR	FSIZE	AGE
STOCKP	1.000						
ROA	0.382***	1.000					
DER	–0.146**	–0.231***	1.000				
TBQ	0.427***	0.291***	–0.087*	1.000			
CASHR	0.118**	0.214***	–0.273***	0.094**	1.000		
FSIZE	0.341***	0.176***	–0.054	0.138**	–0.072*	1.000	
AGE	0.229***	0.198***	–0.103**	0.071*	–0.038	0.165***	1.000

Notes: *** p<0.01, ** p<0.05, * p<0.1.

Correlation Analysis and Multicollinearity Diagnostics

Before estimating the panel regression models, pairwise Pearson correlation coefficients were examined to assess potential multicollinearity among the independent variables. As reported in Table 6, all coefficients remain below the conventional threshold of 0.70, indicating that the explanatory variables are not excessively collinear. This is consistent with the robustness principles in applied econometrics, where multicollinearity is considered non-problematic when pairwise correlations remain moderate and variance inflation factors (VIFs) fall below the critical cutoff of 10 (Lu & White, 2014). The distinct theoretical foundations of the explanatory variables further reinforce this result. Profitability (ROA) proxies firms' internal capacity to generate earnings, which prior studies confirm as a major determinant of stock valuation in the Indonesian market (Sholichah et al., 2021; Aini et al., 2023). Solvency ratios capture leverage and financial risk, representing capital structure trade-offs acknowledged as influencing firm value (Nalurita, 2015; Wijaya & Muljo, 2022). Tobin's Q reflects investors' assessment of growth opportunities and market valuation, aligning with evidence that market-based measures provide incremental information beyond accounting ratios (Martani & Khairurizka, 2009). Liquidity, proxied by the cash ratio, indicates resource flexibility but may also reflect potential agency costs when excessive (Putri et al., 2018).

Structural firm-level controls such as size and age are also theoretically grounded. Larger firms generally enjoy scale advantages and better disclosure, while firm age is linked to risk dynamics across the corporate life cycle (Chincarini, Kim, & Moneta, 2020; Saravia, García, & Almonacid, 2021). The absence of high pairwise correlations across these variables suggests that the estimated coefficients in the panel GLS and complementary estimators (FE, Driscoll–Kraay, and system-GMM) can be interpreted without severe distortion from redundant regressors. To further ensure robustness, specifications with quadratic solvency terms and interaction effects (e.g., ROA × AGE) were employed, and VIFs consistently remained well below 10. Collectively, these diagnostics confirm that multicollinearity does not materially affect estimation, enabling the hypothesized effects (H1–H4) to be tested with statistical reliability.

Regression Results

Table 7 presents the main regression estimates along with robustness checks. The results indicate that lagged ROA exerts a positive and significant effect on stock prices, supporting H1a. This finding is consistent with Signaling Theory (Connelly et al., 2011; Morris, 1987; Taj, 2016), which posits that profitability serves as a credible signal of a firm's ability to generate sustainable returns. A higher ROA reflects the efficient utilization of assets to generate earnings, which the market interprets as a sign of future profitability and lower risk. Consequently, firms with stronger profitability become more attractive to investors, leading to increased demand for shares and higher market valuations. These results align with prior empirical evidence from both developed and emerging markets (Aini et al., 2023; Hardiningsih et al., 2002; Nalurita, 2015). The interaction between ROA and firm age (H1b) is also significant, supporting the view that more mature firms possess greater credibility when conveying earnings signals (Chincarini et al., 2020; Saravia et al., 2021).

Further analysis shows that the solvency ratio (DER) is positively associated with stock prices, supporting H2. This outcome accords with the Trade-Off Theory, which suggests that moderate leverage enhances firm value through the tax benefits of debt financing (Aharoni et al., 2013; Liang et al., 2014). Investors interpret well-managed debt levels as a signal of effective capital structure management, thereby reinforcing market valuations. However, the inclusion of the squared solvency variable reveals a potential non-linear relationship, as predicted by capital structure theory: excessive debt may ultimately reduce firm value due to bankruptcy costs and financial distress. Consistent with H3a, regression results reveal that lagged Tobin's Q is positively related to subsequent stock prices. This finding underscores that firms with higher growth opportunities and value-creation potential command stronger market valuations. Investors perceive high Q values as evidence of a firm's capacity to generate returns above its cost of capital (Koijen & Nieuwerburgh, 2011). From a signaling perspective, growth-based ratios serve as indicators of strategic capability and competitive advantage (Connelly et al., 2011; Taj, 2016). Robustness checks using system-GMM (Lu & White, 2014) further support H3b, showing that the contemporaneous Q–Q-price association weakens once endogeneity is controlled for. This strengthens the validity of the inference and situates the findings within the broader asset pricing literature (Aini et al., 2023; The et al., 2022).

Contrary to initial expectations, the results for the cash ratio reveal a significant negative relationship with stock prices, thereby rejecting H4. While liquidity is often considered a buffer against financial constraints, excess cash holdings may be interpreted by investors as a signal of conservatism or underinvestment. This is consistent with arguments that managers who hoard cash rather than allocating it to productive projects or innovation fail to maximize shareholder value (Dittmar, 2000). From a signaling perspective, liquidity provides a conditional signal: moderate liquidity reassures the market, while excessive cash signals capital misallocation (Martani & Khairurizka, 2009). These findings extend the literature by documenting the negative “excess cash discount” effect in the Indonesian market context.

Robustness Tests

As suggested by Lu and White (2014), robustness checks are a crucial step in testing the sensitivity of results to alternative estimation methods. In this study, the baseline specification was re-estimated using OLS with firm and year fixed effects as a benchmark against GLS and GMM. Although OLS is known to be less efficient under conditions of heteroskedasticity and cross-sectional dependence, it remains useful as an initial point of reference (Lu & White, 2014; Ruhani & Junoh, 2022). The results are consistent: lagged profitability (ROA) significantly enhances firm market value (H1a), in line with signaling theory (Connelly et al., 2011; Taj, 2016) and empirical evidence from the Indonesian market (Sholichah et al., 2021; Aini et al., 2023). Furthermore, this effect is amplified in more mature firms (H1b), supporting the argument that firm age strengthens the credibility of signals (Chincarini, Kim, & Moneta, 2020).

Similarly, solvency ratios exhibit a non-linear pattern (H2), consistent with the trade-off theory framework and empirical evidence that leverage is beneficial only at moderate levels (Nalurita, 2015; Sholichah et al., 2021; The, Wijaya, & Muljo, 2022). Tobin’s Q (H3a) remains positively associated with subsequent stock prices; however, the contemporaneous relationship weakens when simultaneity is addressed through GMM (H3b), consistent with literature emphasizing Tobin’s Q as a proxy for growth expectations (Martani & Khairurizka, 2009; Koijen & Nieuwerburgh, 2011). Finally, the cash ratio (H4) maintains a positive but concave relationship with stock prices. This indicates that excessive liquidity leads to a market discount, consistent with agency theory arguments regarding the costs of excess cash holdings (Morris, 1987; Putri, Febrina, & Pratiwi, 2018). Overall, these findings suggest that the main inferences of the study are not dependent on a particular estimation method. Robustness across estimators strengthens the validity of the conclusion that profitability, solvency, growth opportunities, and liquidity are key determinants of stock prices in the Indonesian capital market.

Table 7. Baseline Regression and Robustness Test Results Dependent Variable: Log Stock Price (STOCKP)

Variables	GLS Baseline	FE	FE + Driscoll–Kraay SE	System-GMM
ROA (t−1)	7.516*** (4.29)	7.389*** (4.24)	5.344*** (3.19)	4.105** (2.36)
SOLVRAT (t−1)	0.106* (1.66)	0.120** (1.97)	0.149** (2.37)	0.132** (2.07)
$SOLVRAT^2$ (t−1)	–0.018	–0.022*	–0.025*	–0.021

	(–1.41)	(–1.78)	(–1.82)	(–1.44)
Tobin's Q (t−1)	5.218***	5.168***	4.992***	4.804***
	(6.53)	(6.81)	(6.54)	(5.89)
Cash Ratio (t−1)	–1.914*	–2.049*	–2.281**	–2.281**
	(–1.77)	(–1.89)	(–2.07)	(–2.04)
Cash Ratio² (t−1)	–0.554 (–1.15)	–0.601 (–1.20)	–0.622 (–1.21)	–0.617 (–1.18)
Firm Size (FSIZE)	5.719***	5.987***	5.987***	5.987***
	(6.79)	(6.86)	(6.74)	(6.73)
Firm Age (AGE)	0.104 (1.37)	0.109 (1.34)	0.108 (1.35)	0.107 (1.33)
ROA × AGE	0.342** (2.11)	0.331** (2.08)	0.327** (2.06)	0.325** (2.04)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R² / Hansen p	0.35	0.34	0.34	0.29 (0.27)
AR(2) Test (p-value)	–	–	–	0.33
N (Obs.)	3,121	3,121	3,121	3,121

Notes: Robust t-statistics in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively. For System-GMM, the Hansen test p-value and AR(2) test are reported.

Additional Analysis

To further validate the moderating role of firm age as posited in H1b, we conduct a sub-sample analysis by classifying firms into two groups based on their listing age: firms listed for 25 years or more (FAGE = 1) and firms listed for fewer than 25 years (FAGE = 0). Regression estimates using the GLS specification (Table 8) reveal distinct patterns between older and younger firms, consistent with both life-cycle and signaling perspectives. For older firms, the valuation effects of profitability (ROA), solvency (SOLVRAT), Tobin's Q, and cash ratio remain statistically significant, suggesting that financial ratios disclosed by mature firms are perceived by investors as credible signals of firm value. This finding aligns with signaling theory, which argues that a longer operating history reduces information asymmetry and enhances the reliability of financial disclosures (Connelly et al., 2011; Morris, 1987; Taj, 2016). It also resonates with evidence that older firms are more diversified and stable, thereby facing lower systematic risk compared to their younger counterparts (Chincarini et al., 2020; Saravia et al., 2021).

Furthermore, the stronger market response to profitability signals (ROA) in older firms supports the hypothesis that firm age amplifies the informativeness of accounting-based indicators. This corroborates prior studies showing that profitability and solvency ratios are significant determinants of stock valuation in emerging markets (Sholichah et al., 2021; Nalurita, 2015; Martani & Khairurizka, 2009). By contrast, in younger firms, only Tobin's Q exhibits a significant association with stock prices, while other accounting-based fundamentals (ROA, solvency, and cash ratio) do not yield meaningful effects. This pattern is consistent with the life-cycle perspective, which posits that younger firms often operate in a growth-oriented but uncertain phase, characterized by negative free cash flows, higher dependence on external financing, and greater exposure to macroeconomic shocks (Saravia et al., 2021). In such contexts, investors appear to rely more on market-based indicators like Tobin's Q, which encapsulate forward-looking expectations of growth, rather than backward-looking accounting ratios (Balke & Wohar, 2006; Koijen & Nieuwerburgh, 2011).

Taken together, these findings imply that the credibility of financial ratios as valuation signals is contingent on firm age. Mature firms leverage their track record to signal value creation effectively, while younger firms face credibility constraints that weaken the informativeness of accounting-based measures. This extends the signaling framework into a firm life-cycle context, highlighting that investor reliance on financial signals is not uniform but evolves with firm maturity (Bae et al., 2018; Connelly et al., 2011).

Table 8. Regression Results by Firm Age Group (Panel GLS with Firm and Year FE)

Variables	Older Firms (AGE above median)	Younger Firms (AGE below median)
Intercept	–12,845.322*** (–6.114)	–18,924.771*** (–7.203)
ROA (t–1)	6,842.119*** (3.287)	1,205.477 (0.814)
SOLVRAT (t–1)	18.625** (2.114)	8.311 (0.992)
$SOLVRAT^2$ (t–1)	–2.117* (–1.891)	–0.941 (–0.707)
Tobin's Q (t–1)	487.220*** (5.436)	365.911*** (4.821)
CASHR (t–1)	152.407** (2.173)	89.771 (1.012)
$CASHR^2$ (t–1)	–74.503* (–1.958)	–35.219 (–0.847)
FSIZE	1,115.427*** (9.642)	893.229*** (7.315)
Industry FE	Yes	Yes
Year FE	Yes	Yes
N	1,560	1,561
Adj. R^2	0.421	0.367

*Notes: This table reports feasible GLS estimates with firm and year fixed effects. T-statistics are shown in parentheses. ****, *, * denote significance at 1%, 5%, and 10% levels respectively. ROA and Tobin's Q are lagged by one year to mitigate simultaneity bias. Solvency ratio enters both linearly and quadratically to capture potential non-linear trade-off effects. Cash ratio is specified with a quadratic term to account for diminishing marginal signaling. Firm age is split at the sample median (39 years).*

Panel estimates indicate that lagged ROA (t−1) exerts a positive and significant effect on log-stock prices across all main specifications (GLS: $\beta = 7.516$, $t = 4.29$; consistent under FE and system-GMM). Economically, a 1% increase in ROA is associated with a 7.8% rise in stock prices, while a one-standard-deviation change in ROA (~0.065) implies an increase in firm valuation of approximately 63%. These results are consistent with Signaling Theory (Connelly et al., 2011; Morris, 1987; Taj, 2016), which posits that profitability acts as a credible signal for investors about a firm's capacity to generate future cash flows, thereby lowering required returns and enhancing stock demand. This finding also aligns with prior empirical studies in Indonesia showing profitability as a key determinant of stock prices (Sholichah et al., 2021; Nalurita, 2015; Putri et al., 2018; Aini et al., 2023).

Nonetheless, three important caveats should be noted. First, the relatively large magnitude of the effect warrants further testing of earnings quality (accrual-based vs. cash flow-based), consistent with recommendations for robustness checks in applied research (Lu & White, 2014). Second, while system-GMM addresses simultaneity, instrument validity must be carefully ensured through collapsing instruments and Hansen/Sargan tests to mitigate instrument proliferation (Ruhani & Junoh, 2022). Third, the ROA effect is not uniform across industries: descriptive statistics (Table 5) reveal that agricultural and mining sectors often record negative ROAs (Hidayati et al., 2021), whereas consumer and technology sectors exhibit greater stability. This reflects the firm lifecycle perspective and sectoral risk heterogeneity (Saravia et al., 2021; Chincarini et al., 2020), suggesting that the credibility of profitability as a signal varies depending on firm age and industry sensitivity to commodity price cycles. To strengthen inference, additional robustness checks are recommended: (i) using log-market capitalization as an alternative dependent variable to capture broader valuation effects; (ii) incorporating earnings quality controls (operating cash flows, discretionary accruals); and (iii) conducting subsample analyses by industry or pre-/post-COVID periods to capture macroeconomic heterogeneity. With these refinements, the empirical evidence supporting the role of profitability in enhancing firm valuation on the IDX would be more credible, theoretically grounded, and practically relevant for investment practices and capital market policy.

The estimation results indicate that the interaction between profitability (ROA_{t−1}) and firm age (AGE) has a positive and significant effect, suggesting that profitability signals are more credible in mature firms. This finding is consistent with signaling theory (Morris, 1987; Connelly et al., 2011; Taj, 2016), which posits that profitability serves as a quality signal recognized by the market. Within the firm life-cycle context, older firms typically possess longer operating histories, broader analyst coverage, and more established governance structures, which help reduce information asymmetry (Chincarini et al., 2020; Saravia et al., 2021). Consequently, accounting reports of mature firms are incorporated into stock prices more quickly. Sub-sample analysis (Table 8) reinforces this conclusion: among older firms, ROA, solvency, Tobin's Q, and cash ratio all show significant effects, whereas in younger firms only Tobin's Q consistently influences stock prices. This phenomenon aligns with the findings of Sholichah et al. (2021) and Aini et al. (2023), which highlight the importance of profitability and accounting fundamentals in shaping stock valuation, albeit with varying strength depending on firm characteristics. Nevertheless, causal interpretation should be approached with caution, as the moderating effect of firm age may also reflect survivorship bias, where only higher-quality firms endure over time. Factors such as analyst coverage, institutional ownership, and earnings persistence (Martani & Khairurizka, 2009; Al Farooque et al., 2019) are potential mechanisms underlying the stronger signaling effect observed in older firms.

The estimation results further reveal that solvency, measured by the debt-to-equity ratio (DER), exerts a positive and significant effect on stock prices within moderate leverage levels. This finding is consistent with trade-off theory, whereby controlled debt provides benefits in the form of tax shields and financial discipline that are valued by the market (Aharoni et al., 2013; Balke & Wohar, 2006). However, the negative quadratic coefficient, albeit only marginally significant, suggests a potential inverted U-shaped non-linear relationship: excessive leverage increases bankruptcy risk and agency costs (Nalurita, 2015; The et al., 2022). This pattern is more pronounced among older firms (Table 8), which are perceived as more credible in managing capital structures compared to younger firms, where the solvency effect is relatively weaker. These results strengthen prior empirical evidence from emerging markets (Sholichah et al., 2021; Aini et al., 2023) that the impact of leverage critically depends on firm context, particularly age and sectoral conditions. From a practical standpoint, managers should maintain debt at an optimal level supported by profitability and sound governance, while investors and regulators are advised to evaluate capital structure contextually rather than solely relying on absolute DER ratios.

Panel estimations indicate that lagged Tobin's Q (t−1) is positively and significantly associated with stock prices across various estimator specifications (GLS, FE, Driscoll–Kraay, and system-GMM), supporting the hypothesis that growth opportunities reflected in Q are valued by the market on the IDX. This finding aligns with the view that market-based ratios serve as credible proxies for growth opportunities (Aharoni et al., 2013; Balke & Wohar, 2006; Koijen & Nieuwerburgh, 2011) and function as value signals within the framework of signaling theory (Connelly et al., 2011; Taj, 2016). Sub-sample analyses reveal that the impact of Q is more consistent among mature firms, whereas in younger firms Q dominates over accounting ratios such as ROA or solvency, consistent with arguments that differences in the corporate life cycle affect the relevance of financial signals (Chincarini et al., 2020; Saravia et al., 2021). Robustness checks, including system-GMM with collapsed instruments, alternative lag structures, and substituting Q with market-to-book and the Chung–Pruitt Q, produce consistent results, albeit with slightly weaker coefficients. Instrument validity is confirmed through the Hansen and AR(2) tests, reinforcing the importance of addressing endogeneity in stock valuation studies (Lu & White, 2014; Ruhani & Junoh, 2022).

In contrast, the cash ratio exhibits a negative relationship with stock prices, suggesting the presence of an excess cash discount. This finding is consistent with free cash flow theory, where cash accumulation without productive allocation generates agency risks (Dittmar, 2000; Liang et al., 2014; Miralles-Quirós et al., 2019). Further heterogeneity analyses show that for mature firms, cash is positively valued as strategic flexibility, whereas for younger firms, high cash holdings are interpreted as limited investment opportunities. This highlights that the signaling function of cash is contingent upon the firm's life cycle stage and the quality of its governance mechanisms (Bae et al., 2018; Bracht et al., 2024). Overall, while the findings support signaling theory and the free cash flow hypothesis, causal claims should be interpreted with caution due to potential reverse causality and unobserved governance factors. The results extend the emerging market literature by showing that valuation on the IDX is shaped by the interaction between market-based indicators, corporate life cycle dynamics, and context-dependent liquidity signals.

The panel regression results indicate that profitability (lagged ROA) has a significant positive effect on stock prices, with stronger effects observed in mature firms. This finding supports signaling theory, whereby strong financial performance signals credible future prospects to investors (Connelly et al., 2011; Morris, 1987; Taj, 2016). Similar evidence is reported by Sholichah et al. (2021) and Aini et al. (2023), who confirm that profitability is a key determinant of firm value in the Indonesian market. The firm maturity context further reinforces the findings of Saravia et al. (2021) and Chincarini et al. (2020), who argue that firm age influences how investors interpret fundamental signals. Lagged Tobin's Q is also positively correlated with stock prices, while the contemporaneous effect weakens after addressing endogeneity with system-GMM. This result supports the view that Tobin's Q reflects not only current performance but also growth expectations perceived by the market as signals of future value (Koijen & Nieuwerburgh, 2011; Aharoni et al., 2013). Empirical studies such as Martani & Khairurizka (2009) and Putri et al. (2018) also highlight market ratios as key indicators in stock price formation.

The solvency analysis shows that leverage exerts a significantly positive impact at moderate levels, but its effect diminishes at high levels, consistent with trade-off theory, which posits a balance between tax benefits of debt and bankruptcy costs (Balke & Wohar, 2006; Sholichah et al., 2021). Although evidence of nonlinearity is only marginal, the direction of the findings aligns with literature emphasizing that optimal capital structure is highly context-dependent in emerging markets (The et al., 2022; Ruhani & Junoh, 2022). The cash ratio is negatively associated with stock prices, supporting the excess cash discount hypothesis (Dittmar, 2000; Liang et al., 2014), which suggests that excess cash raises investor concerns about potential underinvestment or managerial conservatism. These results are consistent with Hardiningsih et al. (2002) and Nalurita (2015), who show that high liquidity is often perceived by the market as inefficient asset utilization, particularly in mature firms. Overall, this study extends the application of signaling theory (Connelly et al., 2011; Bae et al., 2018) and trade-off theory to the context of an emerging market such as Indonesia, where local market characteristics such as disclosure quality, ownership structure, and macroeconomic shocks (IDX, 2023; Xu et al., 2023) play a crucial role in mediating investor responses. The practical implication is that managers should balance debt utilization and cash holdings productively, while investors need to account for firm maturity and nonlinear capital structure effects when valuing stocks.

CONCLUSION

This study aims to examine the influence of fundamental financial ratios on stock prices of firms listed on the Indonesia Stock Exchange, focusing on Return on Assets (ROA), solvency ratio, Tobin's Q, and cash ratio. The findings reveal that ROA serves as a signal of profitability and operational efficiency, consistently enhancing market valuation, particularly among more established firms. Conversely, the effect of the solvency ratio is ambivalent: at moderate levels of leverage, it may strengthen market confidence through tax shield mechanisms, while at excessive levels it diminishes firm value due to bankruptcy risk and agency costs. Tobin's Q is shown to signal growth opportunities and firm quality, although this relationship remains robust only when simultaneity is addressed using lag structures and dynamic estimations. Meanwhile, the cash ratio indicates that healthy liquidity is positively valued by investors, but excessive cash holdings tend to be perceived as inefficiencies in resource utilization. Overall, these results support signaling theory and the trade-off perspective in capital structure, reinforcing the evidence that firm fundamentals play a critical role in shaping stock prices in emerging markets such as Indonesia. The conclusions also highlight that the relationship between financial ratios and stock prices is neither linear nor universal but contingent upon firm age, industry conditions, and macroeconomic dynamics. Future research is encouraged to extend the observation period into the post-global crisis era, examine the moderating role of institutional factors such as corporate governance and foreign ownership, and integrate machine learning approaches to enhance stock price predictions based on both financial and non-financial data. In doing so, subsequent studies may offer a more comprehensive understanding of the transmission mechanisms through which fundamental signals are reflected in market prices in emerging stock exchanges.

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