STOCK RETURN BEHAVIOR AND ITS FUNDAMENTAL DETERMINANTS: AN EMPIRICAL STUDY IN THE COVID-19 ERA

Muhammad Rofi'i
Fakultas Ekonomi dan Bisnis, Universitas YARSI
E-mail: muhammad.rofii@yarsi.ac.id

Abstract

This study investigates the effect of profitability, liquidity, market value, and solvability on stock returns of firms in Indonesia during 2019–2023, a period marked by economic turbulence and recovery following the COVID-19 pandemic. The study further assesses the role of these financial indicators as market signals within the framework of signaling theory. Multiple linear regression analysis is applied to evaluate their respective impacts on stock returns. The results reveal that profitability, market value, and solvability do not significantly influence stock returns. In contrast, liquidity demonstrates a positive and significant effect. These findings indicate that, during periods of heightened economic uncertainty (COVID-19), investors prioritize liquidity as a reliable signal of financial stability, whereas other financial ratios lose explanatory power. This study provides novel evidence on how the informational value of financial indicators shifts during crisis periods. Unlike previous research conducted under normal economic conditions, the study highlights the diminished role of profitability-, earnings-, and leverage-based signals during the pandemic, offering new insights into investor behavior under extreme volatility. The findings offer practical guidance for investors, firms, and policymakers. Investors should emphasize liquidity metrics when evaluating firms during economic crises. Companies should enhance liquidity management and transparent financial communication. Policymakers may utilize these insights when designing market stabilization and corporate support programs in periods of economic disruption.

Keywords: *Fundamental Determinants, Stock Return; Signaling Theory; COVID-19.*

1. INTRODUCTION

Research Background

Investment in the capital market represents a fundamental activity for investors seeking returns from the funds they allocate (Nastiti et al., 2023; Sidarta & Syarifudin, 2022). Among various investment instruments, stocks remain the most preferred due to their potential to generate capital gains and dividends, despite being accompanied by higher levels of risk. Consequently, rigorous pre-investment analysis becomes imperative, as decisions grounded in a firm's fundamental information—particularly financial ratios—play a critical role in shaping future return expectations (Saputri et al., 2020; Setioputri et al., 2024; Sudirman et al., 2023). Stock returns, which arise from price fluctuations and dividend distributions, reflect the risk–return trade-off principle, wherein higher risks are generally associated with expectations of higher returns (Andriani et al., 2025a; B. S. Pambudi et al., 2024).

In Indonesia, companies listed in the LQ45 Index hold strategic importance for investors. This index comprises 45 firms with high liquidity and large market capitalization, evaluated semiannually to maintain the inclusion of only the most actively traded and fundamentally strong stocks. Given these characteristics, the LQ45 Index frequently serves as a benchmark for assessing overall conditions in the Indonesian capital market.

However, the period from 2019 to 2023 posed extraordinary challenges for the Indonesian capital market due to the COVID-19 pandemic. The global health crisis generated

significant economic disruptions, suppressing business activities, impairing corporate cash flows, and inducing extreme volatility in stock prices. Firms across sectors faced downward pressure on profitability, liquidity, market value, and solvability indicators. In this environment marked by heightened uncertainty, investors increasingly relied on financial ratio analysis to evaluate corporate resilience and prospects for recovery. Thus, examining how fundamental financial indicators influence stock returns during such turbulent conditions becomes both timely and essential.

Despite the theoretical relevance of fundamental analysis, prior empirical studies reveal considerable inconsistencies regarding the influence of financial ratios on stock returns. For the profitability variable, some studies indicate a positive effect on stock returns (Fitroh & Fauziah, 2022; Mayuni & Suaraya, 2018; Nastiti et al., 2023; Sidarta & Syarifudin, 2022; Wati & Erdkhadifa, 2023), while others present evidence of a negative influence (Christine & Winarti, 2022; Jeynes & Budiman, 2024; Ozbek & Gozkonan, 2024), and several studies report no significant relationship (Chiang et al., 2024; Husain, 2021; Sahari & Suartana, 2020; Selawati et al., 2022), Similar contradictions are found in the liquidity variable, with studies reporting positive (Andriani et al., 2025a; N. Chandra & Widoatmodjo, 2022; M. F. A. S. Pambudi et al., 2022; Wijaya & Sedana, 2020), negative (Husain, 2021; Sudirman et al., 2023), and insignificant effects (Digdowiseiso, 2023; Nastiti et al., 2023; Ozbek & Gozkonan, 2024; V. A. Putri & Yustisia, 2021; Sidarta & Syarifudin, 2022).

Inconsistencies likewise persist in the market value variable. Empirical findings range from positive effects on stock returns (Jeynes & Budiman, 2024; B. S. Pambudi et al., 2024; L. A. Putri & Ramadhan, 2023; Sulistiani & Ryanto, 2024), to negative effects (Andriani et al., 2025b; N. Chandra & Widoatmodjo, 2022; Nabila & Wahyuningtyas, 2023; Prastyawan et al., 2022), and no significant influence (A. A. Chandra & Darmayanti, 2022; Larasati & Suhono, 2022; Setioputri et al., 2024; Syahid et al., 2023). A similar research gap emerges for the solvability variable, where prior studies demonstrate positive effect (Digdowiseiso, 2023; Kasmadi et al., 2024; Wati & Erdkhadifa, 2023), negative effect (Mulatsih & Dewi, 2021; Ngadiman & Widjaja, 2023; Suroso, 2022), and insignificant effects (Fonou-Dombeu et al., 2024; Larasati & Suhono, 2022; Marpaung et al., 2021). These variations suggest the existence of unresolved empirical discrepancies, particularly relevant during crisis periods such as the COVID-19 pandemic.

This study contributes to the literature by examining the influence of fundamental financial ratios on stock returns of LQ45 companies over the 2019Q1–2023Q4 period, encompassing the pre-pandemic, pandemic, and post-pandemic recovery phases. The use of quarterly panel data and the selection of the most suitable regression model offer a more precise depiction of fluctuations in financial performance and their implications for stock returns. The findings of this study are expected to yield valuable insights for investors, financial managers, and policymakers regarding the role of fundamental indicators in shaping stock return behavior under conditions of economic volatility.

Literature Review

Signaling Theory

Signaling theory posits that corporate managers transmit information or undertake specific strategic actions to reduce information asymmetry between firms and investors, particularly concerning the firm's current conditions and prospects (Bergh et al., 2014; Ross, 1977). Credible financial reporting functions as a positive signal of firm value and sustainability. Conversely, actions such as the issuance of new shares may convey negative signals, as firms with weaker prospects are more likely to issue equity, potentially leading to stock price declines (Przepiorka & Berger, 2017).

The accuracy and credibility of these signals critically shape market perceptions and firm valuation (Nguyen, 2018). Signaling theory provides investors with insights regarding a firm's future value creation potential, directly influencing stock returns. Within this study, signaling theory is highly relevant because financial ratios—such as profitability, liquidity, market value, and solvability—serve as signals that help investors evaluate firm performance before making investment decisions.

Stock Return

Stock return represents the gain expected by investors for allocating capital to a firm, calculated through changes in stock prices and dividend distributions (Bahri et al., 2023; Oman et al., 2021). Returns reflect both the historical performance of the firm and its future profit-generating potential. (Christian et al., 2021) notes that stock returns originate from dividends and capital gains—the difference between the current stock price and the previous year's price.

Given its dual role as both historical and forward-looking indicator, return is considered a crucial benchmark for evaluating firm value and investment risk. The magnitude of investment gains or losses depends heavily on investor capability in analyzing financial statements to predict stock prices. Return as the difference between the amount received and the capital invested, emphasizing the investor's aim to maximize gains while considering inherent risk. Thus, stock returns serve as the dependent variable influenced by financial ratios functioning as signals under signaling theory.

Profitability

Profitability in this study is represented by return on asset, a ratio that measures the extent to which net income is generated from the firm's total assets (Kasmadi et al., 2024). A higher return on asset reflects more efficient asset utilization, thereby strengthening the firm's profitability (Christine & Winarti, 2022). Return on asset indicates a firm's ability to generate after-tax income from its assets, where higher values signal greater operational efficiency.

This aligns with Yu et al., 2025), who classify return on asset as a critical indicator of operational performance and the firm's ability to generate value for shareholders. Within signaling theory, a high return on asset functions as a positive signal of sound management performance and strong profit-generating capability, which in turn may influence stock returns.

Liquidity

Liquidity is represented in this study by the quick ratio, which assesses a firm's ability to meet short-term obligations using highly liquid assets. Desprisila et al., 2022) note that this ratio evaluates whether a firm can repay current liabilities using available liquid assets alone.

According to Husain (2021), the quick ratio reflects the firm's readiness to settle short-term obligations through assets most easily converted into cash. A high quick ratio demonstrates strong liquidity and may enhance investor confidence. Prior studies also treat the quick ratio as a key indicator of liquidity health (Digdowiseiso, 2023; Nastiti et al., 2023; Ozbek & Gozkonan, 2024). Under signaling theory, firms with strong liquidity send a positive signal regarding their short-term financial resilience, which may affect stock return expectations.

Market Value

Market value is represented by earnings per share, an indicator derived from net income per share that reflects the profit attributable to each shareholder (Estiasih et al., 2025; Pelmelay & Borolla, 2021). earnings per share serves as a measure of profitability and influences market

perceptions of stock price movements (Fitrianingsih et al., 2022; Istiqomah & Nurfadillah, 2021).

High earnings per share indicates strong profit-generating ability, making the firm more attractive to investors, whereas low earnings per share suggests weaker financial performance. Earnings per share functions as a measure of managerial success in delivering returns, and further emphasize its role in assessing the effectiveness of management in generating profit for shareholders (Aliyah et al., 2024). Under signaling theory, earnings per share serves as a strong informational signal regarding the firm's market value and expected future performance, thereby potentially affecting stock returns.

Solvability

Solvability is represented by debt to equity ratio, which compares total corporate debt with owners' equity to assess the extent of financing derived from creditors relative to shareholders (Firdaus & Kasmir, 2021). A higher debt to equity ratio indicates greater reliance on debt financing and lower levels of owner-provided capital available to absorb risk.

Maulana (2023) highlight that debt to equity ratio provides insight into the proportion of liabilities relative to equity, including both short-term and long-term obligations. Fonou-Dombeu et al. (2024) affirm the importance of this ratio for evaluating corporate capital structure and financial risk. In the context of signaling theory, firms with high leverage may convey negative signals regarding financial risk, while lower leverage may be perceived as a signal of stability—both of which have implications for stock return.

Hypothesis

The Effect of Profitability on Stock Return

Profitability ratio reflects a company's capability to generate net income relative to its asset base. Higher profitability indicates efficient asset utilization and effective managerial performance, which in turn signals strong financial health to investors. Firms with higher profitability are generally perceived as having better growth prospects and lower earnings risk, thereby increasing investor confidence and potentially driving stock prices upward.

This positive signaling mechanism aligns with empirical findings showing that profitability positively influences stock returns (Nastiti et al., 2023; Setioputri et al., 2024; Sidarta & Syarifudin, 2022; Wati & Erdkhadifa, 2023; Wijaya & Sedana, 2020). These studies consistently conclude that higher profitability contributes to higher stock return expectations.

Hypothesis 1 (Ha_1): Profitability has a positive effect on Stock Return.

The Effect of Liquidity on Stock Return

Liquidity ratio measures a company's ability to meet its short-term obligations using readily available assets. A firm with high liquidity is viewed as financially stable and capable of fulfilling immediate liabilities, which reduces default risk and increases investor trust. Strong liquidity conditions often lead to positive market reactions, as investors associate adequate liquidity with lower financial distress and potentially higher stock returns.

Empirical evidence supports this notion. The prior research reveals that higher liquidity positively affects stock returns (Andriani et al., 2025b; Ilmiyono, 2019; M. F. A. S. Pambudi et al., 2022; Rahmi et al., 2021; Wijaya & Sedana, 2020). Collectively, these findings suggest that firms with better liquidity positions are more likely to generate favorable investor responses through increased stock valuation.

Hypothesis 2 (Ha_2): Liquidity has a positive effect on Stock Return.

The Effect of Market Value on Stock Return

Market value ratio reflects managerial effectiveness in generating shareholder wealth. A high market value indicates strong firm performance and increased prospects of shareholder prosperity, which may subsequently translate into higher stock returns. From the investor's perspective, firms with high market value ratios signal robust earnings capability, financial stability, and future growth potential.

The positive association between market value and stock return is supported by several empirical studies (Digdowiseiso, 2023; Jeynes & Budiman, 2024; Mulatsih & Dewi, 2021; L. A. Putri & Ramadhan, 2023), all of which conclude that firms with stronger market value indicators tend to provide higher returns to shareholders.

Hypothesis 3 (Ha3): Market Value has a positive effect on Stock Return.

The Effect of Solvability on Stock Return

Solvability ratio assesses the extent to which a company's assets are financed through debt, representing the firm's long-term financial risk. Higher solvability—often indicating greater debt burden—may be interpreted as a negative signal by investors, as it reflects increased financial leverage and potential difficulty in meeting long-term obligations. Conversely, lower solvability is viewed more favorably because it suggests stronger financial independence and a lower risk of insolvency, which may encourage investor participation and lead to higher stock returns.

Empirical findings demonstrate that solvability exerts a negative influence on stock returns (Jeynes & Budiman, 2024; Nastiti et al., 2023; Putri & Yustisia, 2021; Suroso, 2022). These studies collectively highlight that increased leverage is associated with reduced investor confidence and decreased stock performance.

Hypothesis 4 (Ha4): Solvability has a negative effect on Stock Return.

2. RESEARCH METHODS

Research Approach

This study employs an explanatory research design with a quantitative approach to examine causal relationships among variables. Explanatory research aims to identify and measure the extent to which independent variables influence the dependent variable, thereby offering a structured understanding of cause-and-effect mechanisms within the model (Sari et al., 2023).

Types of Research Data

This study utilizes secondary data in the form of panel data, which combine time-series and cross-sectional observations (Ghozali & Ratmono, 2017). Time-series data capture developments within the same units over multiple periods, while cross-sectional data record information from different units at a single point in time. The integration of both dimensions enhances the robustness of the dataset by enabling the analysis of inter-unit differences and temporal changes simultaneously. Consequently, panel data increase estimation accuracy and provides stronger explanatory power than the use of either data type alone, making them particularly suitable for investigating causal relationships in this research.

Population and Sample

The population consists of all companies listed in the LQ45 Index from 2019Q1 to 2023Q4. The sampling technique applied is purposive sampling, a non-probability method in which samples are selected based on predetermined criteria aligned with the research

objectives. The criteria used include: (1) companies consistently included in the non-financial LQ45 list during 2019Q1–2023Q4; (2) companies that present financial statements in rupiah throughout the same period; and (3) companies that generated profits or recorded a positive return on asset for all quarters from 2019Q1–2023Q4. Based on these criteria, 12 companies were selected, resulting in a total of 240 panel observations.

Research Data Sources

The data were sourced from the official IDX website and the quarterly financial statements published by each company for the period 2019Q1–2023Q4. The use of quarterly data enhances the precision of the analysis by capturing short-term financial dynamics that may be obscured in annual data. This data set provides a comprehensive representation of financial performance during a period characterized by significant economic fluctuations. The independent variables consist of profitability, liquidity, solvability, and market value, which are proxied by return on asset, quick ratio, earnings per share, and debt to equity ratio. The dependent variable is Stock Return.

Data Analysis Techniques

This study applies multiple linear regression with panel data to examine the influence of return on assets, quick ratio, earnings per share, and debt to equity ratio on stock return. Data processing was conducted using EViews. Three panel data models were estimated—Common Effect, Fixed Effect, and Random Effect. To determine the most appropriate and efficient model, several specification tests were performed, including the Chow (Likelihood Ratio) Test, the Hausman Test, and the Lagrange Multiplier Test. These tests ensure the selection of a statistically robust model and enhance the validity of the analytical results (Ghozali & Ratmono, 2017).

The regression equation is specified as follows:

$$\boldsymbol{SR}_{\mathrm{it}} = \alpha + \boldsymbol{\beta 1 Prof}_{\mathrm{it}} + \boldsymbol{\beta 2 Liq}_{\mathrm{it}} + \boldsymbol{\beta 3 Mv}_{\mathrm{it}} + \boldsymbol{\beta 4 Sol}_{\mathrm{it}} + \varepsilon_{\mathrm{it}}$$

Where:

SR	:	Stock Return
Prof	:	Profitability Ratio
Liq	:	Liquidity Ratio
Mv	:	Market Value Ratio
Sol	:	Solvability Ratio
ε	:	Error term
t	:	Time
i	:	Company

Hypothesis testing in this study uses a significance level of α = 0.05. The decision rule is as follows: if the p-value is greater than α, the alternative hypothesis (Ha) is rejected, indicating that the independent variable does not have a significant partial effect on the dependent variable. In contrast, if the p-value is less than α, Ha is accepted, meaning the independent variable significantly influences the dependent variable.

3. RESULTS AND DISCUSSION

Descriptive Statistics

The descriptive statistical results are presented in Table 1. These statistics provide an

initial overview of the data's characteristics and distribution, forming the basis for subsequent inferential analysis.

Table 1. Descriptive Statistics

Item	SR	Prof	Liq	MV	Sol
Mean	-0.020792	0.065667	1.337583	181.3413	1.000542
Median	-0.040000	0.045000	1.090000	119.7800	0.795000
Maximum	0.910000	0.420000	3.860000	968.9200	4.070000
Minimum	-0.850000	0.000000	0.230000	0.190000	0.150000
Std. Dev.	0.257015	0.068238	0.765296	191.0786	0.821469
Skewness	-0.025694	2.324531	0.776261	1.520564	1.692923
Kurtosis	4.510019	9.358914	2.881427	5.154868	5.539117
Jarque-Bera	22.82799	620.4958	24.24385	138.9192	179.1107
Probability	0.000011	0.000000	0.000005	0.000000	0.000000
Sum	-4.990000	15.76000	321.0200	43521.91	240.1300
Sum Sq. Dev.	15.78755	1.112893	139.9770	8726135.	161.2798
Observations	240	240	240	240	240

Source: Processed Data (2025)

Based on Table 1, using 240 observations from 12 Property and Real Estate companies (2019Q1–2023Q4), the descriptive statistics provide the following overview. Stock Return (SR) shows a negative mean of –0.0208, indicating that, on average, firms experienced declining stock performance during the period. The wide range from –0.85 to 0.91 reflects substantial volatility across firms. Profitability (Prof) has an average value of 0.0657, suggesting that firms generated a moderate level of returns from their assets, the minimum value of 0.00 indicates periods in which some firms did not generate profit. Liquidity (Liq) records an average of 1.337, implying that most firms were generally capable of meeting short-term obligations, though the range from 0.23 to 3.86 shows considerable variation in liquidity strength. Market Value (MV) exhibits a mean of 181.34, with a wide disparity between the minimum (0.19) and maximum (968.92) values, reflecting significant differences in firm size within the sample. Solvabilitas (Sol) has an average of 1.0005, indicating that firms tend to balance debt and equity financing. The range between 0.15 and 4.07 demonstrates varying levels of debt dependence across companies.

Model Selection

This test aims to determine the most appropriate panel data estimation model, whether the Common Effect Model, the Fixed Effect Model, or the Random Effect Model.

Table 2. The results of the Likelihood Test (Chow Test), Hausman Test, and Lagrange Multiplier Test

Effects Test	Prob.
Likelihood test (Chow test)	0,017
Hausman Test	0,015
Langrenge Multiple test	0,746

Source: Processed Data (2025)

The results of the model selection test (Table 2) show that the Likelihood Test (Chow Test) produces a probability value of 0.017, which is below the 5% significance level. This

indicates that the Common Effect Model is not appropriate, and the Fixed Effect Model should be considered. However, the Hausman Test yields a probability value of 0.015, which is below the 5% significance level, suggesting that the Fixed Effect Model is more suitable than the Random Effect Model. Based on these three tests, it can be concluded that the most appropriate panel data model for this study is the Fixed Effect Model.

Hypothesis Testing

The panel data analysis results confirm that the Fixed Effect Model is the most suitable regression model for this study. The detailed estimation output is summarized in Table 3, providing the basis for interpreting the relationships between the independent and dependent variables.

Table 3. Results of Partial Test (t-test)

Variable	Coefficient	Prob.
C	0.128183	0,003
Profitability	0.129004	0,714
Liquidity	0.128183	0,007
Market Value	0.000087	0,439
Solvability	0.074020	0,166

Source: Processed Data (2025)

Based on the estimation results presented in Table 3, the multiple linear regression model can be formulated as follows:

$$\mathbf{SR_{it} = 0.128183 + 0.129004Pof_{it} + 0.128183Liq_{it} + 0.000087Mv_{it} + 0.074020Sol_{it}}$$

The interpretation of each coefficient is as follows:

1. Constant (C) = 0.128183
   When all independent variables are equal to zero, the baseline value of Stock Return (SR) is 0.128183
2. Profitability (Prof) Coefficient = 0.129004
   An increase in Profitability by one unit will decrease SR by 0.129004, assuming other variables remain constant.
3. Liquidity (Liq) Coefficient = 0.128183
   An increase in Liquidity by one unit will increase SR by 0.128183, ceteris paribus.
4. Market Value (Mv) Coefficient = 0.000087
   An increase in Market Value by one unit will increase SR by 0.000087, holding other factors constant.
5. Solvabilitas (Sol) Coefficient = 0.074020
   An increase in Solvabilitas by one unit will reduce SR by 0.074020, assuming other variables remain constant.

Next, the hypothesis testing is conducted simultaneously, with the results presented in Table 4.

Table 4. Results of Simultaneous Test (F-test)

Item	Prob
Prob (F-statistic)	0.001

Source: Processed Data (2025)

The F-test results reveal a p-value of 0.001, which is below the 0.05 significance threshold. This indicates that the independent variables collectively have a statistically significant effect on the dependent variable, stock return.

Table 5. Coefficient of Determination (R^2)

Item	Nilai
R-squared	0.146

Source: Processed Data (2025)

The coefficient of determination (R^2) is 0.146, indicating that the independent variables collectively account for only 14.6% of the variation in SR. The remaining 85.4% of the variation is attributable to other factors not captured in this model, including macroeconomic conditions, government policies, and additional external influences. This suggests that while the selected financial ratios have a measurable impact on stock returns, a substantial portion of variability is determined by factors beyond the scope of this study.

Profitability

The findings of this study show that profitability, represented by return on asset, does not affect stock returns, as indicated by a significance value of 0.714 > 0.05. This result is consistent with the findings of prior research (Chiang et al., 2024; M. F. A. S. Pambudi et al., 2022; Sahari & Suartana, 2020), who also reported that profitability has no influence on stock returns.

During the 2019–2023 observation period, Indonesia experienced significant economic fluctuations, including the severe economic contraction caused by the COVID-19 pandemic in 2020 and the gradual recovery throughout 2021–2023. In such an unstable environment, investors tended to focus more on macroeconomic conditions—such as government policies, restrictions on mobility, the pace of economic reopening, inflation trends, and global uncertainty—rather than on internal indicators of firm performance such as return on asset. Market movements were largely sentiment-driven, with investors reacting more strongly to short-term news and shocks rather than fundamental profitability.

From the perspective of signaling theory, profitability should ideally function as a positive signal indicating efficient asset utilization, managerial effectiveness, and long-term value creation. However, the extreme uncertainty during the pandemic weakened the relevance of this signal. Many firms recorded lower profitability due to temporary operational disruptions rather than poor management performance. As a result, the signal provided by return on asset became less credible and less influential in shaping investor expectations.

These results differ from the findings of Chandra & Widoatmodjo (2022) Nastiti et al. (2023), Sidarta & Syarifudin (2022), Wijaya & Sedana (2020), who found that profitability positively affects stock returns. Such inconsistencies may be attributed to differences in industry focus, market conditions, and time periods studied.

Liquidity

The study's results indicate that liquidity, represented by the quick ratio, has a positive effect on stock returns, with a significance value of 0.007 < 0.05. This finding is consistent with studies by Andriani et al. (2025a), Chandra & Widoatmodjo (2022), Ilmiyono (2019), Pambudi et al. (2022), Rahmi et al. (2021), who also found that liquidity positively influences stock

returns.

Throughout 2019–2023, liquidity became a central concern for investors in Indonesia. During the peak of the COVID-19 pandemic, companies faced significant risks related to cash flow shortages, declining revenue, supply chain disruptions, and increasing short-term obligations. Firms with higher quick ratio were perceived as more capable of sustaining operations and meeting obligations during periods of economic stress. This perception increased investor confidence and contributed to higher stock returns for firms with strong liquidity positions.

Within the signaling theory framework, a high quick ratio acts as a positive signal of financial stability, efficient working capital management, and resilience during crises. Under conditions of heightened uncertainty, as experienced in Indonesia during the pandemic, investors placed greater value on these liquidity signals compared to other financial indicators.

These results differ from those of Putri & Yustisia (2021), Sidarta & Syarifudin (2022), who found that liquidity does not affect stock returns. Differences may stem from variations in market conditions, sample characteristics, or the severity of financial risks during the periods studied.

Market Value

The findings show that market value, represented by earnings per share, does not affect stock returns, as indicated by a significance value of 0.439 > 0.05. This is consistent with studies by Larasati & Suhono (2022), Selawati et al. (2022), Syahid et al. (2023), Wati & Erdkhadifa (2023). During the 2019–2023 period, earnings per share—typically considered one of the primary indicators of firm value—became less reliable due to significant earnings volatility. Many firms recorded sharp declines or irregular earnings patterns caused by pandemic-induced disruptions, fluctuating demand, and changes in operational capacity. As a result, investors tended to discount the relevance of earnings per share and instead focused on broader indicators such as economic reopening progress, sector resilience, and government stimulus programs.

From a signaling theory perspective, earnings per share should represent a clear signal of a company's ability to generate profits for shareholders. However, during crisis periods, earnings signals become distorted by temporary shocks, reducing their credibility. Investors thus showed a weaker response to fluctuations in earnings per share, diminishing its influence on stock returns.

These findings contrast with studies by Digdowiseiso (2023), Pelmelay & Borolla (2021), Putri & Ramadhan (2023), Rahayu & Utiyati (2017), who found that earnings per share positively affects stock returns. Differences in economic conditions, industry composition, and the role of market sentiment likely explain the inconsistent results.

Solvability

The study indicates that solvability, represented by the debt to equity ratio, does not affect stock returns, with a significance value of 0.166 > 0.05. This finding aligns with the results of Firdaus & Kasmir (2021), Fonou-Dombeu et al. (2024), Larasati & Suhono (2022), Marpaung et al. (2021), Nurismalatri & Artika (2022).

During 2019–2023, Indonesian companies used debt strategically to maintain operations and finance recovery efforts following the pandemic's impact. Government initiatives to support businesses—such as credit relaxation programs and stimulus packages—also influenced corporate leverage levels. As a result, the debt to equity ratio did not necessarily indicate financial distress; in many cases, it reflected adaptive strategies for maintaining liquidity and stabilizing operations.

In the context of signaling theory, leverage can serve as either a negative signal of financial risk or a positive signal reflecting managerial confidence in future performance. However, during the pandemic and recovery period, these signals became ambiguous. Investors had difficulty distinguishing between debt used for survival and debt used for productive investment, weakening the signaling power of the debt to equity ratio.

These findings differ from those of Digdowiseiso (2023), Jeynes & Budiman (2024), Mulatsih & Dewi (2021), Nastiti et al. (2023), Putri & Yustisia (2021), Suroso (2022), who reported that solvability negatively affects stock returns. The discrepancies may be due to different sample characteristics, sector risks, or macroeconomic environments.

4. CONCLUSION

This study examines the influence of profitability, liquidity, market value, and solvability on stock returns in Indonesian companies during the period 2019–2023, a time marked by substantial economic disruptions and recovery phases following the COVID-19 pandemic. The results reveal that profitability does not significantly affect stock returns. This indicates that during periods of heightened uncertainty, investors tend to rely more on macroeconomic conditions and market sentiment than on internal performance indicators, reducing the relevance of profitability as a market signal. Liquidity is found to have a positive and significant impact on stock returns. This underscores the importance of strong liquidity positions during crisis periods, as firms with higher liquidity were perceived as more capable of sustaining operations and meeting short-term obligations. Liquidity thus served as a credible signal of financial resilience for investors during the pandemic and recovery years. Market value does not exhibit a significant effect on stock returns. The instability of earnings during the pandemic—driven by operational disruptions and irregular income patterns—reduced the reliability of this variable as an indicator of firm value. Consequently, investors appeared to discount earnings-based signals when making investment decisions. Solvability does not significantly affect stock returns. Changes in leverage during the study period were often influenced by external factors such as government financial support and strategic borrowing for operational continuity. As a result, the Solvability Ratio did not function as a clear signal of financial risk or stability for investors. Overall, the findings suggest that during the 2019–2023 period, Indonesian investors placed greater emphasis on indicators of short-term stability—particularly liquidity—while profitability, market value, and leverage-based measures lost predictive relevance due to the broader economic disruptions caused by the pandemic. These results highlight the shifting role of financial signals in times of economic crisis and underscore the importance of contextual factors in shaping investor behavior.

REFERENCES

Aliyah, D. R., Bangun, M. H. B., Lubis, S. A., Sitorus, A. Z., Hafsa, A., & Chrisna, H. (2024). The Influence of Price Earning Ratio and Earning Per Share on Stock Returns in the Transportation and Logistics Sub-Sector Listed on the IDX. *Jurnal Riset Ilmu Pendidikan, 4*(1), 44–51. https://doi.org/10.30596/jcositte.v1i1.xxxx

Andriani, D. A., Batubara, Z. K., Fhitri, N., & Sinaga, D. G. (2025a). Pengaruh Quick Ratio (QR), Debt To Assets Ratio (DAR) Dan Earning Per Share (EPS) Terhadap Return Saham Perusahaan Manufaktur Subsektor Otomotif Dan Komponen Yang Terdaftar Di BEI. *Jurnal Minfo Polgan*, *13*(2), 2626–2635. https://doi.org/10.33395/jmp.v13i2.14563

Andriani, D. A., Batubara, Z. K., Fhitri, N., & Sinaga, D. G. (2025b). Pengaruh Quick Ratio (QR), Debt To Assets Ratio (DAR) Dan Earning Per Share (EPS) Terhadap Return Saham Perusahaan Manufaktur Subsektor Otomotif Dan Komponen Yang Terdaftar Di BEI. *Jurnal Minfo Polgan*, *13*(2), 2626–2635. https://doi.org/10.33395/jmp.v13i2.14563

Bahri, Y. M., Komariah, K., & Jhoansyah, D. (2023). Analysis of Return On Asset Return On Equity Debt To Asset Ratio Debt To Equity Ratio On Stock Return (Study of PT XL Axiata Tbk Which Is Listed On The Indonesia Stock Exchange For The 2014-2021 Period). *COSTING:Journal of Economic, Business and Accounting*, *7*(1). https://doi.org/https://doi.org/10.31539/costing.v7i1.6850

Bergh, D. D., Connelly, B. L., Ketchen, D. J., & Shannon, L. M. (2014). Signalling theory and equilibrium in strategic management research: An assessment and a research agenda. *Journal of Management Studies*, *51*(8), 1334–1360. https://doi.org/10.1111/joms.12097

Chandra, A. A., & Darmayanti, N. P. A. (2022). Pengaruh Profitabilitas, Likuiditas, Penilaian Pasar, dan Ukuran Perusahaan Terhadap Return Saham. *E-Jurnal Manajemen Universitas Udayana*, *11*(2), 358. https://doi.org/10.24843/ejmunud.2022.v11.i02.p08

Chandra, N., & Widoatmodjo, S. (2022). Pengaruh Quick Ratio, Net Profit Margin, Return on Equity, Return on Asset, dan Earning per Share terhadap Imbal Hasil Saham pada Perusahaan Perbankan yang Terdaftar di Bursa Efek Indonesia Tahun 2011-2019. *Jurnal Manajemen Bisnis Dan Kewirausahaan*, *6*(6), 589–593. https://doi.org/10.24912/jmbk.v6i6.20660

Chiang, C. S., Sembel, R., & Malau, M. (2024). The Effect Of Financial Performance And Market Return On Stock Return With Gdp Growth As A Moderating Variable. *International Journal of Business, Economics and Law*, *31*(1).

Christian, H., Saerang, I., & Tulung, J. E. (2021). Pengaruh Current Ratio, Debt To Equity Dan Return On Equity Terhadap Return Saham Pada Perusahaan Telekomunikasi yang Terdaftar di BEI (Periode 2014-2019). *Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis Dan Akuntansi*, *9*(1). https://doi.org/https://doi.org/10.35794/emba.v9i1.32433

Christine, D., & Winarti, W. (2022). Pengaruh Return on Assets (ROA), Return on Equity (ROE), dan Earning per Share (EPS) terhadap harga saham. *Owner*, *6*(4), 4113–4124. https://doi.org/10.33395/owner.v6i4.1096

Digdowiseiso, K. (2023). What drives the stock returns? Examining the fundamental factors on the consumer defensive sector companies. *Calitatea*, *24*(194). https://scispace.com/pdf/what-drives-the-stock-returns-examining-the-fundamental-2wjkx098.pdf?utm

Estiasih, S. P., Prihatiningsih, E., & Fatmawati, Y. (2025). Dividend Payout Ratio, Earning Per Share, Debt To Equity Ratio Terhadap Harga Saham pada Perusahaan LQ45. *Jurnal Akuntansi Dan Pajak*, *21*(1), 205–212. https://doi.org/http://dx.doi.org/10.29040/jap.v21i1.1156

Firdaus, I., & Kasmir, A. N. (2021). Pengaruh Price Earning (PER), Earning Per Share (EPS), Debt To Equity Ratio (DER) Terhadap Harga Saham. *Jurnal Manajemen Dan Bisnis*, *1*(1), 40–57. https://journal.moestopo.ac.id/index.php/jmb/article/view/1338/654

Fitrianingsih, D., Kusmiyatun, K., & Kartikasari, T. (2022). Analisis Pengaruh Earning Per Share, Economic Value Added terhadap Return Saham Selama Pandemik Covid-19. *Jurnal Akuntansi, Keuangan, Dan Manajemen*, *3*(3), 225–236. https://doi.org/10.35912/jakman.v3i3.1112

Fitroh, A. K., & Fauziah, F. E. (2022). Pengaruh Return On Asset, Firm Size Dan Price Earning Ratio Terhadap Return Saham. *Jurnal Rekoginisi Ekonomi Islam*, *1*(1), 135–146. https://doi.org/10.34001/jrei.v1i1.157

Fonou-Dombeu, N. C., Nomlala, B. C., & Nyide, C. J. (2024). Investigating the effect of investor sentiment on stock return sensitivity to fundamental factors: case of JSE listed companies. *Cogent Business and Management*, *11*(1). https://doi.org/10.1080/23311975.2024.2353846

Ghozali, I., & Ratmono, Dwi. (2017). *Analisis Multivariat dan Ekonometrika dengan Eviews 10*. . Badan Penerbit Universitas Diponegoro. .

Husain, F. (2021). Pengaruh Rasio Likuiditas dan Rasio Profitabilitas terhadap Harga Saham Pada Perusahaan Indeks IDX-30. *INOBIS: Jurnal Inovasi Bisnis Dan Manajemen Indonesia*, *4*(2), 162–175. https://doi.org/10.31842/jurnalinobis.v4i2.175

Ilmiyono, A. F. (2019). Pengaruh ROA, CR dan Quick Ratio terhadap Return Saham PT Astra Agro Lestari Tbk Periode 2007 - 2017. *Jurnal Ilmiah Akuntansi Kesatuan*, *7*(2), 278–289. https://doi.org/10.37641/jiakes.v7i2.236

Istiqomah, I. N., & Nurfadillah, M. (2021). Pengaruh Return On Asset dan Earning Per Share Terhadap Return Saham pada Perusahaan Sub Sektor Property dan Real Estate yang Terdaftar di BEI. *Borneo Student Research*, *2*(3), 2021. https://journals.umkt.ac.id/index.php/bsr/article/view/2012

Jeynes, Z., & Budiman, A. (2024). Pengaruh return on asset, return on equity, current ratio, earning per share dan debt to equity ratio terhadap harga saham pt. Unilever indonesia (persero) tbk periode 2016-2022. *Jurnal Ilmiah MEA (Manajemen, Ekonomi, Dan Akuntansi)*, *8*(1). https://doi.org/https://doi.org/10.31955/mea.v8i1.3627

Kasmadi, K., Kamal, M., & Rahmadani, A. (2024). Pengaruh ROA, DER, dan PER Terhadap Return Saham Perusahaan Subsektor Transportasi dan Logistik BEI 2020-2022. *Jurnal Akuntansi Dan Teknologi Keuangan*, *2*(2), 120–124. https://doi.org/10.56854/atk.v2i2.312

Larasati, W., & Suhono, S. (2022). Pengaruh Earning Per Share, Debt To Equity Ratio Dan Return On Equity Terhadap Return Saham. *COMPETITIVE Jurnal Akuntansi Dan Keuangan*, *6*(1), 44. https://doi.org/10.31000/competitive.v6i1.4362

Marpaung, J. N., Febiola, C., Sitanggang, S. A., & Jamaluddin, J. (2021). Pengaruh return on asset, debt to equity ratio, dan earning per share terhadap harga saham pada sektor

consumer goods industry di bursa efek indonesia periode 2015 sampai 2019. *Jurnal Paradigma Ekonomika*, *16*(4), 773–784. https://doi.org/10.22437/jpe.v16i4.13086

Maulana, Y. (2023). Pengaruh ROA, EPS, CR dan DER terhadap Harga Saham Sektor Jasa Asuransi Terdaftar Bursa Efek Indonesia. *Logika : Journal of Multidisciplinary Studies*, *14*(01), 42–51. https://doi.org/10.25134/logika.v14i01.7485

Mayuni, I. A. I., & Suaraya, G. (2018). Pengaruh Roa, Firm Size, Eps, Dan Per Terhadap Return Saham Pada Sektor Manufaktur Di BEI. *E-Jurnal Manajemen Unud*, *7*(8), 4063–4093. https://doi.org/10.24843/EJMUNUD.2018.v7.i08.p2

Mulatsih, S. N., & Dewi, I. D. P. (2021). Analysis of the Effect of Current Ratio, Debt to Equity Ratio, Debt to Asset Ratio, Return on Assets, Return on Equity, Earning Per Share, Price Book Value and Net Profit Margin on Stock Prices in Jakarta Islamic Index companies listed on the Indonesia Stock Exchange (IDX)) period 2014-2018. *Duconomics Sci-Meet*, *1*, 2021. https://doi.org/10.37010/duconomics.v1

Nabila, R. F. H., & Wahyuningtyas, E. T. (2023). Analisis Kinerja Keuangan dan Sustainability Reporting terhadap Return Saham. *AKUNESA: Jurnal Akuntansi Unesa*, *11*(2), 179–189. https://doi.org/https://doi.org/10.26740/akunesa.v11n2.p179-189

Nastiti, N. S., Widodo, S., & Budiyono, I. (2023). The Effect Of Quick Ratio (Qr), Return On Asset (Roa), Debt To Equity Ratio (Der), And Book Value Per Share (Bvs) On Stock Price Of Companies Listed In Jakarta Islamic Index (Jii) For The 2017-2021 Periods. *KEUNIS*, *11*(2), 146. https://doi.org/10.32497/keunis.v11i2.4406

Ngadiman, S. S., & Widjaja, I. (2023). Pengaruh Return On Asset (Roa), Return On Equity (Roe), Debt To Equity Ratio (Der), Dan Price Earning Ratio (Per) Terhadap Return Saham Pada Perusahaan Makanan Dan Minuman Yang Terdaftar Di Bursa Efek Indonesia Pada Tahun 2017-2020. *JURNAL MANAJEMEN BISNIS DAN KEWIRAUSAHAAN*, *7*(5). https://doi.org/https://doi.org/10.24912/jmbk.v7i5.26500

Nguyen, N. (2018). Hidden markov model for stock trading. *International Journal of Financial Studies*, *6*(2). https://doi.org/10.3390/ijfs6020036

Nurismalatri, N., & Artika, E. D. (2022). Pengaruh Current Ratio (CR) Dan Debt To Equity Ratio (DER) Terhadap Harga Saham Pada Perusahaan Consumer Goods Yang Terdaftar Di Bursa Efek Indonesia Periode Tahun 2015-2020. *Jurnal Ilmiah PERKUSI*, *2*(1), 71. https://doi.org/10.32493/j.perkusi.v2i1.17625

Oman, A., Fitrianingsih, D., Salam, A. F., & Aeni, H. (2021). The Influence of Current Ratio, Debt to Equity Ratio, and Return on Equity on Stock Returns in Property and Real Estate Companies Listed on the Indonesia Stock Exchange. *COSTING:Journal of Economic, Business and Accounting*, *4*(2). https://doi.org/https://doi.org/10.31539/costing.v4i2.1533

Ozbek, G. B., & Gozkonan, U. H. (2024). The Role of Financial Ratios in Predicting Stock Returns: An Application of Generalized Method of Moments in Borsa Istanbul. *JOEEP: Journal of Emerging Economies and Policy*, *9*(2). https://dergipark.org.tr/en/pub/joeep/issue/86904/1558705

Pambudi, B. S., Sukesti, F., & Kristiana, I. (2024). The Effect of Company Size, Earning Per Share, Price to Book Value, and Exchange Rate on Stock Returns. *Economics and Business International Conference Proceeding*, *1*(2), 52–62. www.stockbit.com

Pambudi, M. F. A. S., Lating, A. I. S., Yudhanti, A. L., & Soulisa, M. R. (2022). Pengaruh Return On Asset, Return On Equity, Net Profit Margin Dan Quick Ratio Terhadap Return Saham Perusahaan Sektor Energi Pada Masa Pandemi Covid-19. *Jurnal Akuntansi, Ekonomi Dan Manajemen Bisnis*, *2*(3), 361–372. https://doi.org/10.55606/jaem.v2i3.380

Pelmelay, E. K., & Borolla, D. J. (2021). Pengaruh Earning Per Share Dan Price Earning Ratio Terhadap Return Saham. *Jurnal Keuangan Dan Bisnis ISSN*, *19*(1), 88–104. https://doi.org/https://doi.org/10.32524/jkb.v19i1.108

Prastyawan, D., Wiyono, G., & Sari, P. P. (2022). Analisis Pengaruh Earning.per.Share (EPS), Price to.Book Value (PBV), Return on Asset (ROA), Current.Ratio (CR), dan Debt to Equity Ratio (DER) Terhadap Return Saham Pada Perusahan Manufaktur Subsektor Food and Beverage yang Terdaftar di Bursa Efek Indonesia (BEI) Periode 2013-2020. *Jurnal Ilmiah Universitas Batanghari Jambi*, *22*(2), 849. https://doi.org/10.33087/jiubj.v22i2.1984

Przepiorka, W., & Berger, J. (2017). Signaling theory evolving: Signals and signs of trustworthiness in social exchange. In *Social Dilemmas, Institutions, and the Evolution of Cooperation* (pp. 373–392). Walter de Gruyter GmbH. https://doi.org/https://doi.org/10.1515/9783110472974-018

Putri, L. A., & Ramadhan, M. I. (2023). Pengaruh Rasio Likuiditas dan Rasio Profitabilitas Terhadap Harga Saham. *Owner*, *7*(2), 1113–1123. https://doi.org/10.33395/owner.v7i2.1344

Putri, V. A., & Yustisia, N. (2021). Dampak Rasio Keuangan Terhadap Harga Saham Perusahaan Barang Konsumsi Yang Terdaftar Di Bursa Efek Indonesia. *Lisyabab : Jurnal Studi Islam Dan Sosial*, *2*(1), 1–16. https://doi.org/10.58326/jurnallisyabab.v2i1.71

Rahayu, E. P., & Utiyati, S. (2017). Pengaruh EPS, RI, EVA, MVA, PER Terhadap Return Saham Pada Perusahaan Manufaktur. *Jurnal Ilmu Dan Riset Manajemen*, *6*(1).

Rahmi, N. U., Andrew, A., Stefani, A., & Fenita, F. (2021). Analisis Rasio Keuangan terhadap Harga Saham pada Perusahaan Food and Beverages. *Owner*, *5*(2), 380–395. https://doi.org/10.33395/owner.v5i2.481

Desprisila, R. A., Ferawati, R., & Habibah, G. W. I. A. (2022). Pengaruh Profitabilitas, Likuiditas Dan Solvabilitas Terhadap Return Saham Perusahaan Manufaktur Di Jakarta Islamic Index Periode 2018-2022. *Jurnal Publikasi Manajemen Informatika*, *2*(1), 161–180. https://doi.org/10.55606/jupumi.v2i1.708

Ross, S. A. (1977). The Determination of Financial Structure: The Incentive-Signalling Approach. *Source: The Bell Journal of Economics*, *8*(1), 23–40. https://doi.org/https://doi.org/10.2307/3003485

Sahari, K. A., & Suartana, I. W. (2020). Pengaruh NPM, ROA, ROE terhadap Harga Saham pada Perusahaan LQ45. *E-Jurnal Akuntansi*, *30*(5), 1258. https://doi.org/10.24843/EJA.2020.v30.i05.p15

Saputri, S. A., Mardani, R. M., & Wahono, B. (2020). Pengaruh Price Book Value (Pbv), Price Earning Ratio (Per), Return On Asset (Roa) Terhadap Return Saham (Studi Pada Perusahaan Manufaktur Sektor Industri Barang Konsumsi Yang Terdaftar Di Bursa Efek Indonesia Tahun 2016-2018). *E-JRM : Elektronik Jurnal Riset Manajemen*, *9*(3). www.fe.unisma.ac.id

Sari, Y. K., Gani, A. N., & Zhafiraah, N. R. (2023). The Effect of In-Store Logistics Performance, Store Image, Sales Promotion, and Service Quality on Customer Satisfaction. *Marketing and Business Strategy*, *1*(1), 23–34. https://doi.org/10.58777/mbs.v1i1.152

Selawati, Jhoansyah, D., & Mulia, F. Z. (2022). The Effect Of Debt To Equity Ratio (DER), Earning Per Share (EPS), Return On Asset (ROA), Return On Equity (ROE), And Current Ratio (CR) On Stock Price, Financial Studies On Properties & Real Estate Sector Companies Listed On The Indonesia Stock Exchange For The 2018-2020 Period. *Management Studies and Entrepreneurship Journal*, *3*(4), 1867–1878. http://journal.yrpipku.com/index.php/msej

Setioputri, A. M., Puspitosarie, E., & Anggarani, D. (2024). Return On Asset, Return On Equity, Earnings Per Share and Their Influence on Stock Returns in Food and Beverage Companies Listed on the IDX from 2018 to 2022. *JURNAL ECONOMINA*, *3*(7), 704–715. https://doi.org/10.55681/economina.v3i7.1403

Sidarta, A. L., & Syarifudin, S. (2022). Pengaruh Return On Asset, Return On Equity, Net Profit Margin, Dan Quick Ratio Perusahaan Kesehatan Terhadap Return Saham Pada Masa Pandemi Covid-19 (Pada Sektor Industri Healthcare Yang Tercatat Di Bei Tahun 2019-2020). *Jurnal Akuntansi Kompetif*, *5*(3), 381–389. https://doi.org/10.35446/akuntansikompetif.v5i3.1161

Sudirman, S., Sismar, A., & Difinubun, Y. (2023). Pengaruh Kinerja Keuangan Terhadap Harga Saham pada Industri Perbankan yang Terdaftar di Bursa Efek Indonesia. *Financial and Accounting Indonesian Research*, *3*(1), 35–45. https://doi.org/10.36232/fair.v3i1.1348

Sulistiani, A., & Ryanto, F. R. (2024). INOVASI: Jurnal Ekonomi, Keuangan dan Manajemen The Influence of Intellectual Capital, Market Value, and Earnings Per Share on Stock Returns. *INOVASI: Jurnal Ekonomi, Keuangan Dan Manajemen*, *20*(3), 511–519. https://doi.org/https://doi.org/10.30872/jinv.v20i3.1800

Suroso, S. (2022). Can Financial Ratios Improve Stock Returns in Manufacturing Companies? *Atestasi : Jurnal Ilmiah Akuntansi*, *5*(1), 137–151. https://doi.org/10.57178/atestasi.v5i1.32

Syahid, H. A., Djuwita, D., Bakhri, S., & Agustin, A. (2023). Return on Equity, Earning per Share, dan Harga Saham pada Perusahan Konsumer Syariah. *Journal of Sharia Accounting and Tax*, *1*(2). https://doi.org/10.70095/jsat.v1i2.14

Wati, W. D. N., & Erdkhadifa, R. (2023). Pengaruh Current Ratio , Debt Equaty Ratio, Return On Asset, Return On Equity, Dan Earning Per Share Terhadap Return Saham Pada Consumer Good Industry Yang Terdaftar Di BEI Tahun 2021. *JURNAL ECONOMINA*, *2*(12), 3737–3752. https://doi.org/10.55681/economina.v2i12.1071

Wijaya, D. P., & Sedana, I. B. P. (2020). Effects of Quick Ratio, Return on Assets and Exchange Rates on Stock Returns. *American Journal of Humanities and Social Sciences Research (AJHSSR)* , *4*(1). https://www.ajhssr.com/wp-content/uploads/2020/01/ZR2041323329.pdf?utm

Yu, S.-H., Chen, M., & Yang, F.-C. (2025). Corporate social responsibility, profitability and marketability in business performance evaluation: a directional network slacks-based measure approach. *Annals of Operations Research*, *353*(3), 1211–1237. https://doi.org/10.1007/s10479-025-06828-w