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Z-score Analysis for Financial Stability on Real Estate Companies in the Indonesian Stock Exchange

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Abstract

Main purpose: This study empirically investigates the influence of Profitability (PRFT), Leverage (LEVG), Liquidity (LIQD), Firm Age (FAGE), Interest Rate (INTR), Firm Value (FVAL), Firm Size (FISZ), and the COVID-19 pandemic (COVD) on the Financial Stability (FSTA) of real estate companies listed on the Indonesia Stock Exchange during the period 2012–2022.

Method: The research utilizes secondary data and applies a purposive sampling method to select samples based on predefined criteria, drawing from a population of 83 registered real estate firms.

Main Findings: The findings indicate that the independent variables collectively have a significant effect on FSTA. However, the individual significance tests reveal that in Model 1, PRFT and COVD do not significantly impact FSTA, while in Model 2, INTR and COVD show no significant effect on FSTA.

Theory and Practical Implication: The study highlights the applicability of the trade-off and pecking order theories in explaining how real estate firms strategically manage profitability, leverage, and liquidity to sustain financial stability.

Novelty: This study uniquely examines the interplay between capital structure and financial indicators during the COVID-19 pandemic, providing empirical insights specific to Indonesia's real estate sector—an area that has received limited scholarly attention.

Keywords: Profitability, Leverage, Liquidity, Firm Age, Interest Rate, Firm Value, Firm Size and COVID-19.

Abstrak

Tujuan Utama: Studi ini secara empiris menyelidiki pengaruh Profitabilitas (PRFT), Leverage (LEVG), Likuiditas (LIQD), Usia Perusahaan (FAGE), Suku Bunga (INTR), Nilai Perusahaan (FVAL), Ukuran Perusahaan (FISZ), dan pandemi COVID-19 (COVD) terhadap Stabilitas Keuangan (FSTA) perusahaan real estat yang terdaftar di Bursa Efek Indonesia selama periode 2012–2024.

Metode: Penelitian ini menggunakan data sekunder dan menerapkan metode purposive sampling untuk memilih sampel berdasarkan kriteria yang telah ditentukan, dengan populasi terdiri dari 83 perusahaan real estat yang terdaftar.

Temuan Utama: Hasil penelitian menunjukkan bahwa variabel independen secara bersama-sama berpengaruh signifikan terhadap FSTA. Namun, uji signifikansi parsial menunjukkan bahwa pada Model 1, PRFT dan COVD tidak berpengaruh signifikan terhadap FSTA, sementara pada Model 2, INTR dan COVD tidak menunjukkan pengaruh signifikan terhadap FSTA.

Implikasi Teori dan Kebijakan: Studi ini menyoroti relevansi teori trade-off dan pecking order dalam menjelaskan bagaimana perusahaan real estat secara strategis mengelola profitabilitas, leverage, dan likuiditas untuk mempertahankan stabilitas keuangan.

Kebaruan Penelitian: Studi ini secara unik menelaah keterkaitan antara struktur modal dan indikator keuangan selama pandemi COVID-19, memberikan wawasan empiris yang spesifik pada sektor real estat Indonesia—suatu area yang masih minim mendapat perhatian akademis.

Kata Kunci: Profitabilitas, Leverage, Likuiditas, Umur Perusahaan, Suku Bunga, Nilai Perusahaan, Ukuran Perusahaan, dan COVID-19.

INTRODUCTION

The 2008 global financial crisis was largely triggered by a breakdown in financial stability, which heavily relies on the availability of liquidity. Lehman Brothers' collapse in that year was primarily due to a severe liquidity shortage resulting from an imbalance between its assets and liabilities—particularly because of its heavy involvement in the subprime mortgage market beginning in 2007. Similarly, [Jing et al. \(2021\)](#) compared the collapse of China's Evergrande Group to that of Lehman Brothers, labeling it the Chinese equivalent of the 2008 crisis. By mid-2021, Evergrande had accumulated around RMB 2 trillion in liabilities, including many off-balance sheet obligations. These debts accounted for approximately 2% of China's GDP, while the company employed about 200,000 workers and managed over 800 development projects—more than half of which were suspended due to financial strain.

Formerly known as Hengda Group, Evergrande Real Estate Group Limited had become China's second-largest property developer by sales and was ranked 122nd on the Fortune Global 500 list ([Almeida et al., 2022](#)). However, on December 3, 2021, the company officially defaulted on its debt ([Linyu, 2022](#)). This collapse stemmed mainly from the misalignment in the maturity structure of its assets and liabilities, which ultimately led to a critical liquidity crunch. By 2021, Evergrande's net asset value (NAV) had deteriorated sharply, showing a negative figure of US\$74.43 billion due to a staggering debt-to-equity ratio of -545%, implying its liabilities vastly exceeded its assets. The firm's excessive leverage, five times its equity, resulted in a sharp decline in its value and considerable financial instability.

NAV, a measure of a company's intrinsic value, is determined by subtracting total liabilities from total asset market values and is particularly applicable to real estate firms focused on owning and leasing properties ([Rehkugler et al., 2012](#)). However, firms with significant growth potential often have valuations exceeding their NAV ([Chen, 2023](#)). Alongside NAV, market capitalization is another method used by investors to assess firm value, calculated by multiplying the number of outstanding shares by the share price ([Fernando, 2023](#)).

Evergrande's reliance on debt financing over equity significantly weakened both its NAV and market capitalization, ultimately leading to liquidity problems and default. According to the trade-off theory, [Myers \(1984\)](#) suggested that using debt strategically can reduce financial distress costs and provide tax benefits through interest deductions. Major firms like Evergrande often opt for debt due to the availability of substantial collateral assets. However, [Miller \(1988\)](#) reaffirmed the [Modigliani and Miller \(1963\)](#) theory, which posits that while debt has benefits, it also increases the likelihood of bankruptcy when used excessively. Evergrande's situation aligns with this view, illustrating that rising leverage escalates financial vulnerability.

In contrast to these crises, Indonesia's real estate sector experienced a relatively stable financial trajectory during the COVID-19 pandemic from 2020 to 2022. While numerous companies in other sectors faced significant financial hardships, several real estate firms in Indonesia maintained notable resilience. The pandemic caused unprecedented disruptions across the global economy. Declared a pandemic by the World Health Organization (WHO) in March 2020, COVID-19 led to lockdowns and mobility restrictions, paralyzing economic activities worldwide. The resulting economic downturn affected most nations, including Indonesia, which experienced negative GDP growth. The International Monetary Fund (IMF) projected that 95% of countries would face economic contractions during this period ([Rahmah and Novianty, 2021](#)). To mitigate the crisis, the U.S. Federal Reserve implemented a major quantitative easing program in March 2020, purchasing US\$500 billion in Treasury securities and US\$200 billion in mortgage-backed securities ([Timiraos, 2020](#)).

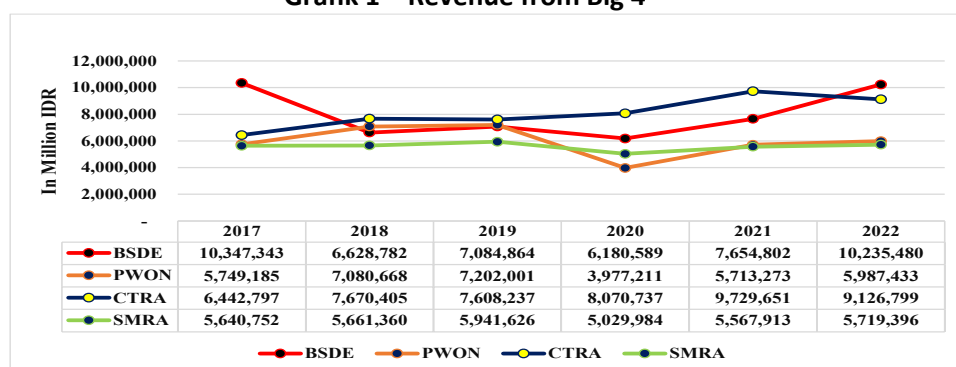
According to [the World Bank \(2016\)](#), financial stability is characterized by a financial system that efficiently allocates resources and manages risk, even amid significant disruptions. [The Federal](#)

Reserve (2018) emphasizes that financial stability does not imply the prevention of individual failures but rather the resilience of the financial system to absorb shocks and continue functioning effectively. Jakubík and Teplý (2008) link financial stability to liquidity, cautioning that illiquidity heightens bankruptcy risk. Savina (2020) highlights that financial stability, reflecting sustainable solvency, is the core aim of financial analysis, often assessed through indicators like the debt-to-equity ratio. Ujam et al. (2023) further argue that financial stability entails a company's ability to sustain operations and weather economic volatility. Several studies support the view that capital structure significantly influences firm value, which is closely associated with profitability and liquidity—both critical to achieving financial stability (Santika and Kusuma, 2002; Aivazian et al., 2005; Berger and Di Patti, 2006; Suharli, 2006; Kontesa, 2015; Vätavu, 2015; Detthamrong et al., 2017). These works collectively offer theoretical and empirical insights into the relationship between capital structure and financial stability, especially during periods of economic distress (Altman, 1968; Campbell et al., 2008; ElBannan, 2021; Nguyen et al., 2023).

Capital structure refers to the mix of debt and equity a firm uses to finance its operations and investments (Priya et al., 2015; Nawaz et al., 2011; Siddik et al., 2017). Vätavu (2015) posits that a well-optimized capital structure can lower a firm's weighted average cost of capital (WACC), thereby enhancing shareholder value. According to Ahmed et al. (2024), while excessive debt heightens financial risk, a balanced structure promotes financial health by optimizing costs and managing obligations. Therefore, determining an optimal capital structure—one that leverages the benefits of both debt and equity—is vital for improving a firm's stability and value (Ahmed et al., 2024; Priya et al., 2015).

Although the pandemic adversely impacted many businesses in Indonesia, several property firms demonstrated exceptional performance. Lockdowns and mobility restrictions significantly limited economic activity, typically causing businesses and investors to adopt a conservative stance. As noted by López-Gutiérrez et al. (2014), firms usually curtail investments in times of economic uncertainty, and Ortmann et al. (2020) observed that individual investors tend to avoid risky ventures, focusing instead on survival. However, the Indonesian property market deviated from this pattern. Surprisingly, despite the downturn, many individuals continued purchasing real estate—including high-value properties. This unexpected behavior was reflected in the impressive performance of Indonesia's "Big 4" property developers: PT Bumi Serpong Damai Tbk (BSDE), PT Pakuwon Jati Tbk (PWON), PT Ciputra Development Tbk (CTRA), and PT Summarecon Agung Tbk (SMRA). Their strong financial performance during the pandemic contradicted conventional expectations and suggests a "phenomenon gap" between theoretical assumptions, such as reduced consumer spending during crises, and actual investor behavior, which remained relatively active in the property sector.

Grafik 1 – Revenue from Big 4



Source: Website of each company

Financial instability poses a serious risk to businesses worldwide. While some firms proactively prepare for economic shocks, others remain vulnerable. During financial crises, widespread layoffs often lead to higher unemployment and broader economic downturns. To endure such disruptions, companies must prioritize financial stability. Studies have shown that firms with strong financial foundations are better equipped to withstand economic volatility (Chant et al., 2003; Ujam et al., 2023). Much of the existing literature on financial stability focuses on the banking sector and other industries (Madi, 2016; Alfiano, 2018; Vo et al., 2019; Rubio-Misas, 2020; Al Salamet & Al-Kharouf, 2021; Karim et al., 2022; Kharabsheh & Gharaibeh, 2022; Hudaya & Firmansyah, 2023). Although Nguyen et al. (2023) examined the relationship between capital structure and financial stability in the hospitality sector, research specifically targeting real estate firms remains limited.

This study addresses this gap by focusing on financial stability within Indonesia's real estate sector. Furthermore, while several prior studies explore the link between capital structure and financial distress, few analyze its relationship with financial stability (Muigai, 2016; Fredrick, 2018; Fahlevi & Marlinah, 2018; Abdioğlu, 2019; Lee & Manual, 2019). Internationally, most research tends to relate capital structure to financial performance rather than financial stability, particularly in real estate contexts (Feng & Guo, 2015; Yabs, 2015; Ioana, 2020; Ngoc et al., 2021). To fill this research gap, this study examines how profitability, leverage, liquidity, firm age, interest rates, firm value, and firm size influence financial stability in real estate companies. While capital structure is often studied in relation to performance and distress, its role in ensuring financial stability in the property sector remains underexplored (Hasbi, 2015; Nishihara & Shibata, 2021; Supyan & Kuswanto, 2023; Suzulia & Saluy, 2020).

The research draws on two key financial theories: the Trade-Off Theory (TOT) and the Pecking Order Theory (POT). According to TOT, firms can optimize capital structure by balancing the tax benefits of debt against the costs of financial distress and agency problems (Aini et al., 2022). In contrast, POT suggests that firms follow a funding hierarchy, preferring internal financing first, then debt, and finally equity, to minimize information asymmetry (Myers, 1977; Aini et al., 2022; Megginson et al., 2007). Myers and Majluf (1984) argue that firms should avoid issuing new securities when facing significant information asymmetry, as it may lead to undervaluation. Instead, they recommend relying on retained earnings or debt. This approach helps reduce stock issuance costs and mitigates valuation risks in capital markets.

In line with these theories, this study investigates how capital structure and firm value contribute to financial stability in Indonesian real estate companies listed on the Indonesia Stock Exchange from 2012 to 2022. By developing a model that integrates multiple financial determinants, including profitability, leverage, liquidity, firm age, interest rates, firm value, and firm size, this research aims to fill the current gaps in financial stability literature. The structure of the paper is as follows: Section 2 outlines the theoretical framework; Section 3 reviews related literature; Section 4 explains the methodology; Section 5 presents and discusses the results; and Section 6 concludes with key findings and recommendations.

THEORETICAL FRAMEWORK

Trade-off Theory

The Trade-Off Theory (TOT) originated from the foundational work of Modigliani and Miller (1958) and was later refined by Kraus and Litzenberger (1973) as well as Myers and Majluf (1984). The theory posits that firms use debt financing up to an optimal point, at which the tax advantages of additional debt are exactly offset by the associated costs of financial distress. In essence, TOT explains how capital structure decisions impact firm value (Sudiyatno et al., 2020). According to the theory, firm value increases with higher debt levels due to tax shields, but beyond a certain

threshold, excessive debt raises interest obligations and default risk, ultimately undermining financial stability. TOT suggests that an optimal capital structure is achieved by balancing the benefits of debt—primarily tax deductibility—against its costs, including bankruptcy and agency risks (Wijaya & Cen, 2021). This equilibrium occurs when the marginal benefit of additional debt equals its marginal cost. Firms can attain this ideal structure by strategically adjusting the mix of debt and equity. However, scholars continue to debate what constitutes the definitive set of costs and benefits in this balancing act (Abeywardhana, 2017).

Myers (1984) applied TOT to address the “capital structure puzzle,” challenging the capital structure irrelevance proposition of Modigliani and Miller (1963). He argued that using moderate levels of debt could enhance liquidity, reduce financial distress costs, and create tax advantages. However, excessive debt can strain liquidity and increase financial vulnerability, impairing a firm’s ability to meet its obligations and threatening long-term stability. Similarly, Fama and French (2002) emphasized that the optimal capital structure arises from balancing the tax benefits of interest deductibility with the risks of financial distress and agency costs. TOT is particularly useful in analyzing bankruptcy risk, as over-reliance on debt can lead to insolvency. Kraus and Litzenberger (1973), Scott (1977), and Kim (1978) demonstrated how TOT informs bankruptcy dynamics, suggesting firms must cautiously manage their debt levels to maximize tax advantages while avoiding excessive risk. As debt obligations grow, so does the likelihood of default, especially if a firm’s cash flows are inadequate to meet interest and principal payments—potentially resulting in financial collapse and constrained future growth (Kim, 1978).

Moreover, firms with high growth expectations face heightened financial risk. Growth often demands significant capital, which may come from debt or equity. However, future cash flows are not guaranteed. If financing relies heavily on debt, the burden of interest payments becomes substantial. In cases where growth does not translate into sufficient returns, firms may struggle to service their debt, increasing the risk of financial failure and limiting future expansion opportunities (Myers, 1984; Serrasqueiro & Caetano, 2015). Hackbarth et al. (2007) further reinforced the relevance of TOT in identifying optimal debt levels and explaining corporate debt policies. Their findings show that TOT effectively captures key aspects of debt management and provides robust insights into constructing a sustainable capital structure.

Pecking Order Theory

The Pecking Order Theory (POT), initially introduced by Donaldson (1961) and further developed by Myers and Majluf (1984), proposes that firms follow a specific hierarchy when selecting financing sources. According to this theory, companies prefer internal financing, primarily retained earnings generated from operational activities, over external sources. When external funding is necessary, firms typically prioritize debt before issuing new equity (Wijaya & Cen, 2021). As a result, highly profitable firms tend to carry lower levels of debt, as strong earnings provide sufficient liquidity and financial flexibility to rely predominantly on internal resources (Hirdinis, 2019; Megginson et al., 2007). The core premise of POT lies in addressing information asymmetry between managers (insiders) and investors (outsiders) (Myers, 1984; Myers & Majluf, 1984; Cotei & Farhat, 2009). Since managers have superior insight into a firm’s true value and risk profile, they may avoid issuing new equity that the market could undervalue due to lack of information. To prevent adverse selection and underinvestment, firms prefer financing sources that do not require external valuation—such as retained earnings or low-risk debt (Cotei & Farhat, 2009).

Myers and Majluf (1984) explained that firms typically first utilize internal funds (reserves and retained earnings), followed by debt, and consider issuing equity only as a last resort. This financing behavior helps protect existing shareholders from dilution, as managers, acting in shareholders’ interests, avoid issuing equity when the firm’s intrinsic value is not fully reflected in the market. Myers (1977) also emphasized that POT implies there is no optimal capital structure; instead, firms

respond dynamically to their financing needs within a hierarchy of preferences. Megginson et al. (2007) reinforced this view, stating that firms inherently prefer internal over external financing, aligning with the central tenets of POT. In contrast to the Trade-Off Theory (TOT), which does not address information asymmetry, POT explicitly incorporates the implications of insider–outsider knowledge gaps. Shahar et al. (2015) observed that this distinction makes POT especially relevant in scenarios where information asymmetry is significant. However, POT also dismisses the notion of a target capital structure altogether, asserting that firms' capital decisions are situational rather than optimized toward a fixed debt–equity ratio (Luigi & Sorin, 2009; Mostafa & Boregowda, 2014).

Under the POT framework, companies adhere to a financing hierarchy: internal financing is preferred first, followed by debt, and finally equity issuance (Chen & Chen, 2011). Myers and Majluf (1984) argued that this sequence stems directly from the information gap between firms and capital markets. Moreover, when debt becomes necessary, firms prefer short-term debt over long-term obligations to limit exposure and maintain flexibility. Ultimately, the POT highlights that corporate financing decisions are shaped not only by costs and benefits but also by the degree of trust and information transparency between firms and external stakeholders.

Related Literature

Most previous studies on financial stability have primarily concentrated on the banking sector and other non-real estate industries. For instance, Madi (2016), Alfiano (2018), Vo et al. (2019), Rubio-Misas (2020), Al Salamat and Al-Kharouf (2021), Karim et al. (2022), Kharabsheh and Gharaibeh (2022), and Hudaya and Firmansyah (2023) all focused their analyses on financial institutions and other industrial sectors. Although Nguyen et al. (2023) expanded the scope by exploring financial stability within the hotel industry, research specifically targeting the real estate sector remains scarce. In the Indonesian context, studies have tended to explore the relationship between capital structure and financial distress rather than financial stability. Works by Muigai (2016), Fredrick (2018), Fahlevi and Marlinah (2018), Abdioğlu (2019), and Lee and Manual (2019) illustrate this focus, often omitting financial stability as a core variable of interest.

On the international front, most of the research linking capital structure with real estate companies has typically examined its impact on financial performance rather than financial stability. Notable examples include studies by Feng and Guo (2015), Yabs (2015), Ioana (2020), and Ngoc et al. (2021), which emphasize profitability and performance metrics over systemic resilience. To fill these evident gaps in the literature, the present study focuses explicitly on financial stability in real estate companies, positioning it as the dependent variable. The analysis investigates how financial stability is influenced by profitability, leverage, liquidity, firm age, interest rates, firm value, and firm size. By doing so, this research aims to contribute a more nuanced and comprehensive understanding of financial stability within the real estate sector, a domain that remains underexplored in both domestic and international scholarship.

Explanatory Variables and Hypothesis Development

Financial Stability as Dependent Variable

Financial stability reflects a company's ability to sustain liquidity, as insufficient liquidity significantly heightens the risk of bankruptcy (Jakubík & Teplý, 2008). According to Dolgikh and Slepuhina (2019), financial stability is not only essential but also a critical determinant of an enterprise's long-term operational continuity. A financially stable company enjoys several strategic advantages, including easier access to credit, reduced vulnerability to fluctuations in commodity and financial markets, and the ability to foster sustainable business practices. Such companies can serve as foundational pillars in supporting national economic resilience. Savina (2020) emphasized that financial stability involves assessing a company's dependency on external capital, namely, creditors and investors, often measured using the debt-to-equity ratio. It also hinges on stable and efficient

operational performance. Furthermore, she argued that financial stability must encompass both present and anticipated financial conditions to ensure long-term sustainability.

[Drobyazko et al. \(2020\)](#) defined financial stability as a company's ability to consistently maintain a surplus of income over expenditures. This surplus facilitates unrestricted allocation of funds, ensuring uninterrupted production and sales activities. Financial stability, therefore, underpins overall enterprise resilience by enabling firms to meet obligations to creditors, the government, and shareholders, while maintaining a balance between internal financing and external debt. In a competitive market economy, financial stability provides a significant advantage by attracting investment, enhancing creditworthiness, building supplier confidence, and enabling the recruitment of high-quality human resources. [Jakubík and Teplý \(2008\)](#) also noted that firms with higher liquidity face a lower likelihood of default, further reinforcing the importance of liquidity as a cornerstone of financial stability.

This study positions financial stability as the dependent variable and explores its behavior during the financial distress triggered by the COVID-19 pandemic in Indonesian real estate companies. Despite the high pricing of real estate products, many firms in this sector demonstrated strong financial performance during the pandemic, indicating robust market absorption and resilience. As [Putri and Lestari \(2021\)](#) noted, financial stability reflects a company's capacity to remain financially sound across varying economic conditions. Given its direct relationship to liquidity—and the heightened bankruptcy risk stemming from liquidity shortfalls—understanding the determinants of financial stability is both relevant and necessary.

To measure financial stability, this study adopts the Z-score, distinct from the Altman Z-score, based on its widespread use and recommendation by the World Bank. The Z-score has been broadly applied in assessing financial stability at the firm level and is considered a robust indicator of insolvency risk ([World Bank, 2016](#)). The theoretical foundation of the Z-score traces back to Roy (1952), who introduced the concept in the context of risk measurement. In academic literature, insolvency is often defined as a condition in which the sum of a company's equity-to-assets (EA) ratio and return on assets (ROA) is zero or negative ([Mare et al., 2017](#)). Accordingly, this study utilizes the Z-score as a proxy for financial stability, operationalizing it as the key dependent variable in the research framework.

$$\text{Z-Score} = \frac{ROA + \left(\frac{\text{Equity}}{\text{Assets}}\right)}{\sigma(ROA_t)}$$

Profitability as Independent Variable

Profitability serves as a key indicator of a company's financial health and the ultimate outcome of its policies and actions ([Jasmani, 2019](#)). A company that achieves higher profitability generally enjoys a stronger cash position, thereby enhancing its overall financial stability. This view is consistent with [Madushanka and Jathurika \(2018\)](#), who argued that a company unable to generate profits is in a vulnerable position, lacking the liquidity necessary for its survival. Therefore, profitability is treated as an independent variable in this study, aiming to explore its relationship with financial stability. The profitability ratio is commonly used to assess a company's ability to generate profits ([Moch et al., 2019](#); [Kasmir, 2014](#); [Sudana, 2015](#)). Higher profitability allows a company to accumulate cash reserves, which, in turn, contribute to greater financial stability. In line with the perspective of [Madushanka and Jathurika \(2018\)](#), companies that fail to generate profits are considered financially unstable, as they lack the liquidity and financial stability required to weather economic challenges. In this study, the profitability ratio serves as the proxy for measuring profitability.

$$\text{Profitability} = \frac{\text{Net Income}}{\text{Total Assets}}$$

The hypothesis is as follows:

H₁: Profitability has a positive impact on financial stability.

Leverage as Independent Variable

The leverage ratio is a crucial indicator for measuring the extent to which a company's assets are financed through debt (Nugraha et al., 2020). Leverage enables companies to secure the necessary funds for operational activities (Margono and Gantino, 2021), thereby supporting business operations and contributing to financial stability. It is hypothesized that leverage can enhance profitability by facilitating new business opportunities that generate increased revenue. In turn, higher profitability strengthens liquidity, as it results in greater cash flow, significantly impacting the company's financial resilience (Alkhatib, 2012). A stronger financial position, bolstered by effective leverage, contributes to a more stable financial condition. In this study, leverage is treated as an independent variable to evaluate its impact on financial stability. Leverage measures the extent to which a company uses a combination of debt and equity to finance its assets. An increase in debt typically results in higher leverage (Enekwe et al., 2014; Abubakar, 2015). It reflects how businesses use debt and preferred stock to fund their assets, usually in the form of loans or other liabilities (Abubakar, 2015). The decision regarding leverage is crucial for management, as it significantly influences shareholder returns and the firm's market value (Banafa, 2015).

The proxy of leverage is as follows:

$$\text{Debt-Equity Ratio (DER)} = \frac{\text{Total Debt}}{\text{Total Equity}}$$

The corresponding hypothesis is as follows:

H₂: Leverage has a negative impact on financial stability.

Liquidity as Independent Variable

Liquidity provides financial flexibility, enabling individuals and businesses to address unexpected expenses, emergencies, or opportunities quickly. Sufficient cash or readily tradable assets allow businesses to maintain financial stability without having to sell long-term investments under unfavorable conditions. For businesses, liquidity is essential for survival, acting as a key indicator of their ability to meet short-term obligations due within a year (Beaver, 2020). Based on this premise, the researcher seeks to evaluate the extent to which liquidity significantly impacts financial stability, with liquidity considered an independent variable. Liquidity ratios are commonly used to monitor liquidity levels and assess a company's financial well-being (Blessing and Sakouvogui, 2023; Salem and Rehman, 2011). The proxy for liquidity in this study is as follows:

$$\text{Current Ratio (CR)} = \frac{\text{Total Current Assets}}{\text{Total Current Liabilities}}$$

The hypothesis is as follows:

H₃: Liquidity has a positive impact on financial stability.

Firm Size as Moderating Variable

Firm size is utilized as a moderating variable to assess the extent to which a company's scale influences its financial stability. According to Margono and Gantino (2021), larger companies

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typically have greater access to funding, which enhances their financial stability. Building on this notion, this study examines the role of firm size as a moderating factor in the relationship between various financial indicators and financial stability. Firm size is positioned as the moderating variable in this context. The proxy for firm size is as follows:

Firm Size = $\text{Log}(\text{Total Assets})$

The hypothesis is as follows:

H_{4a}: Firm size moderates positively profitability and financial stability.

H_{4b}: Firm size moderates positively leverage and financial stability.

H_{4c}: Firm size moderates positively liquidity and financial stability.

Firm Value as Mediating Variable

Firm value reflects the market's overall perception of a company (Markonah et al., 2020). A higher firm value enhances shareholder wealth, as it is often linked to increased stock prices and a higher overall company valuation (Tui et al., 2017). Profitability plays a crucial role in increasing firm value, while also contributing to financial stability within the company (Sudiyatno, 2020). Additionally, a high firm value is an indicator of strong business performance (Sampurna and Romawati, 2020). Based on this understanding, this study aims to evaluate the extent to which firm value significantly impacts financial stability, positioning firm value as a mediating variable. The proxy for firm value is as follows:

Firm Value = Tobin's Q

The hypothesis is as follows:

H_{5a}: Firm value mediates positively profitability to financial stability.

H_{5b}: Firm value mediates positively leverage to financial stability.

H_{5c}: Firm value mediates positively liquidity to financial stability.

Firm Age as Control Variable

Firm age represents the duration of a company's existence, typically measured by the number of years since its incorporation (Ilabaya & Ohiokha, 2016). However, as Shumway (2001) highlights, a firm's age since incorporation may be less economically relevant compared to its age since listing, as a company may start as either a small speculative entity or a large holding organization. Research by Rahman and Yilun (2021) and Samosir (2018) suggests that firm age positively influences profitability, as companies with longer histories are better positioned to attract investors, which enhances profitability and financial stability. Merry (2013) further argues that older companies tend to outperform newer ones due to their management's expertise, which translates into higher profitability and a more stable financial position.

In this study, firm age is determined using the natural logarithm of the listing date on the Indonesian Stock Exchange. According to Al Nawaiseh (2020), firm age is a critical factor in performance, as long-established companies benefit from accumulated resources, extensive experience, a strong reputation, and abundant information. These advantages enable them to navigate challenges effectively and operate efficiently. As a company matures, its operational expertise increases, enhancing its ability to address challenges and fulfill its responsibilities.

Building on these arguments, this research aims to evaluate the impact of firm age on financial stability, using firm age as a control variable. The proxy for firm age is defined as follows:

Firm Age = The age of a firm, calculated based on the years since its listing on the Stock Exchange.

Interest Rate as Control Variable

The interest rate is a crucial determinant of financial stability, as its fluctuations—whether upward or downward—can either drive stability or contribute to instability (Gros, 2018). Morgan and Zhang (2018) assert that financial stability plays a significant role in decisions regarding mortgage lending rates. In the real estate sector, changes in mortgage interest rates have a notable impact. An increase in rates may discourage potential buyers from purchasing properties, leading to postponed or canceled decisions. This decline in demand can reduce revenue for real estate companies, ultimately resulting in financial instability. Interest rates are especially critical in the real estate industry, where some customers are highly sensitive to rate fluctuations. When mortgage rates rise, companies often face challenges in revenue generation, highlighting the pivotal role interest rates play in shaping financial outcomes and stability. Based on this premise, this study seeks to evaluate the influence of interest rates on financial stability, using the interest rate as a control variable. For this research, the mortgage interest rate will serve as the control variable. The proxy for the interest rate is defined as follows:

Interest Rate = The mortgage interest rate provided by the bank.

COVID-19 as Dummy Variable

The COVID-19 pandemic introduced unprecedented uncertainty into business operations (Mahdi & Nassar, 2021; Gu et al., 2020; Shen et al., 2021; Angelidou et al., 2022), resulting in a global economic downturn marked by supply chain disruptions, reduced consumption, and decreased investments (Zou et al., 2020). According to the World Health Organization (WHO), the pandemic led to approximately 583 million confirmed cases worldwide and over 6 million deaths. During this period, many individuals transitioned to remote work, and numerous companies faced production halts, putting their survival at risk. Despite these challenges, some businesses managed to adapt and continue operations.

Given this context, this research aims to evaluate the impact of COVID-19 on financial stability. For the purpose of this study, COVID-19 is treated as a dummy variable, defined as follows:

- Period from 2012 to 2019 = 0
- Period from 2020 to 2022 = 1

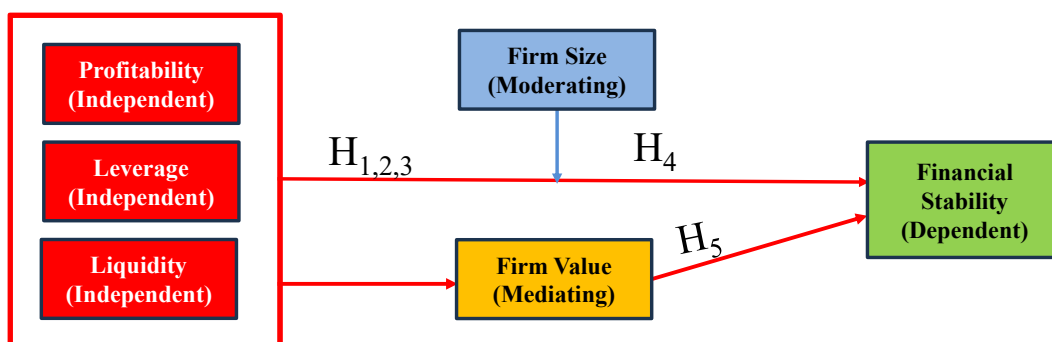


Figure 1. Research Framework

METHODOLOGY

Data Analysis Technique and Sample

This study employed multiple linear regression analysis to assess the impact of independent variables on the dependent variable. Panel data, which combines both time-series and cross-sectional data, was utilized for this analysis (Ghozali, 2017). As explained by Winarno (2009), time-series data involves observing a single subject over multiple time periods, while cross-sectional data examines multiple subjects at a specific point in time. The integration of these two types of data,

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known as panel data, allows for a more comprehensive dataset and enhances the robustness of the analysis. Statistical analysis was performed using EViews software.

The dataset consisted of data from 83 real estate companies listed on the Indonesian Stock Exchange, covering the period from 2012 to 2022.

Research Model

The research model demonstrates the relationship between the dependent variable and the independent variables. This study adopts a quantitative research approach, which, as [Sugiyono \(2013\)](#) explains, utilizes statistical methods to analyze numerical data. A quantitative approach is particularly suitable for this study, as it aims to evaluate the impact of capital structure on financial stability during the COVID-19 period for real estate companies listed on the Indonesian Stock Exchange from 2012 to 2022.

By utilizing panel data, which combines both time-series and cross-sectional data, the study models the relationship between the independent variables and the dependent variable as follows:

Model 1

The equation of Model 1 is as follows:

$$FSTA_{it} = \alpha_0 + \alpha_1 PRFT_{it} + \alpha_2 LEVG_{it} + \alpha_3 LIQD_{it} + \alpha_4 FAGE_{it} + \alpha_5 INTR_{it} + \alpha_6 FVAL_{it} + \alpha_7 FISZ_{it} + \alpha_8 COVD_{it} + \varepsilon_{it}$$

α_0 = Intercept

$\alpha_1 - \alpha_8$ = The Regression Coefficient

Model 1 is employed for testing the following hypothesis:

H₁: Profitability has a positive impact on financial stability

H₂: Leverage has a negative impact on financial stability.

H₃: Liquidity has a positive impact on financial stability

Model 2

The equation of Model 2 is as follows:

$$FSTA_{it} = \beta_0 + \beta_1 PRFT_{it} + \beta_2 LEVG_{it} + \beta_3 LIQD_{it} + \beta_4 FISZ_{it} + \beta_5 PRFT * FISZ_{it} + \beta_6 LEVG * FISZ_{it} + \beta_7 LIQD * FISZ_{it} + \beta_8 FAGE_{it} + \beta_9 INTR_{it} + \beta_{10} FVAL_{it} + \beta_{11} COVD_{it} + \varepsilon_{it}$$

β_0 = Intercept

$\beta_1 - \beta_{11}$ = The Regression Coefficient

After testing hypotheses 1, 2, and 3, Model 2 will be used to test hypothesis 4.

Model 2 is employed for testing the following hypothesis:

H_{4a}: Firm size moderates positively profitability and financial stability.

H_{4b}: Firm size moderates positively leverage and financial stability.

H_{4c}: Firm size moderates positively liquidity and financial stability.

Model 3 – Two-stage Least Square

Model 3 is employed for testing the following hypothesis:

H_{5a}: Firm value mediates positively profitability to financial stability.

H_{5b}: Firm value mediates positively leverage to financial stability.

H_{5c}: Firm value mediates positively liquidity to financial stability.

Model 3 – Step 1

The equation of Model 3 – Step 1 is as follows:

$$FVAL_{it} = \gamma_0 + \gamma_1 PRFT_{it} + \gamma_2 LEVG_{it} + \gamma_3 LIQD_{it} + \gamma_4 FAGE_{it} + \gamma_5 INTR_{it} + \gamma_6 FISZ_{it} + \gamma_7 COVD_{it} + \varepsilon_{it}$$

γ_0 = Intercept

$\gamma_1 - \gamma_{11}$ = The Regression Coefficient

Model 3 - Step 2

The equation of Model 3 – Step 2 is as follows:

$$FSTA_{it} = \delta_0 + \delta_1 FVAL_{it} + \delta_2 FAGE_{it} + \delta_3 INTR_{it} + \delta_4 FISZ_{it} + \delta_5 COVD_{it} + \varepsilon_{it}$$

δ_0 = Intercept

$\delta_1 - \delta_5$ = The Regression Coefficient

The abbreviations for dependent and independent variables are as follows:

FSTA = Financial Stability

PRFT = Profitability

LEVG = Leverage

LIQD = Liquidity

FAGE = Firm Age

INTR = Interest Rate

FVAL = Firm Value

FISZ = Firm Size

COVD = COVID 19, is a dummy variable, zero (0) for the period from 2012 to 2020, and one (1) for the period from 2020 to 2022

i = The company

t = The year

ε = The error term

RESEARCH RESULTS AND DISCUSSION***Selection of Regression Model and Classical Assumption Test***

The selection of the regression model in this study involved three key tests: the Chow test, the Hausman test, and the Lagrange Multiplier test. Based on the results of these tests, the Random Effects Model (REM) was determined to be the most suitable model for the analysis. Regarding the classical assumption tests, the data in this model were confirmed to be normally distributed based on the normality test. Furthermore, the model exhibited no signs of multicollinearity or heteroscedasticity, which ensures the reliability of the regression results.

Model 1

As presented in Table 1, the probability value of the F-statistic is 0.0000, which is below the significance threshold of 0.05. This indicates that all independent variables, Profitability (PRFT), Leverage (LEVG), Liquidity (LIQD), Firm Age (FAGE), Interest Rate (INTR), Firm Value (FVAL), Firm Size (FISZ), and COVID-19 (COVD), collectively have a significant impact on the dependent variable, Financial Stability (FSTA), in Model 1.

The R-squared value is 0.8070, or 80.70%, meaning that the independent variables explain 80.70% of the variation in Financial Stability (FSTA). The remaining 19.30% is attributed to other factors not included in the study. The independent variables LEVG, LIQD, FAGE, INTR, FVAL, and FISZ have probability values of 0.0000, 0.0000, 0.0005, 0.0000, 0.0072, and 0.0000, respectively, all of which are below the 5% significance level. This indicates that each of these variables significantly affects Financial Stability (FSTA). In contrast, PRFT and COVD have probability values of 0.4071 and 0.4013, respectively, which exceed the 5% significance level. This suggests that neither PRFT nor COVD have a statistically significant impact on Financial Stability (FSTA).

Results of hypothesis are as follows:

H₁ is rejected as P value > 0.05

H₂ is accepted as P value < 0.05 and t value < 0

H₃ is accepted as P value < 0.05 and t value > 0

Table 1. Result of Model 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRFT	-0.0235	0.0283	-0.8293	0.4071
LEVG	-0.1341	0.0143	-9.4086	0.0000
LIQD	0.1079	0.0170	6.3567	0.0000
FAGE	-0.0646	0.0184	-3.5170	0.0005
INTR	0.1221	0.0288	4.2360	0.0000
FVAL	-0.0387	0.0144	-2.6914	0.0072
FISZ	1.0678	0.0241	44.3528	0.0000
COVD	-0.0111	0.0132	-0.8397	0.4013
C	0.0724	0.0158	4.5976	0.0000
R-squared	0.8070	Mean dependent var		0.0879
Adjusted R-squared	0.8053	S.D. dependent var		0.2817
S.E. of regression	0.1243	Sum squared resid		13.9665
F-statistic	472.6233	Durbin-Watson stat		1.5826
Prob(F-statistic)	0.0000			

Source: Eviews Processing Data Results

Model 2

As shown in Table 2, the probability value of the F-statistic is 0.0000, which is below the 0.05 threshold. This indicates that all independent variables, control variables, the mediating variable, and the moderating variable (PRFT, LEVG, LIQD, FAGE, INTR, FVAL, FISZ, and COVD) collectively have a significant impact on the dependent variable, Financial Stability (FSTA), in Model 2. The R-squared value is 0.8157, or 81.57%, meaning that the independent variables (PRFT, LEVG, LIQD, FAGE, INTR, FVAL, FISZ, and COVD) explain 81.57% of the variance in Financial Stability (FSTA). The remaining 18.43% is attributed to other factors not included in the study. The independent variables PRFT, LEVG, LIQD, FAGE, FVAL, and FISZ have probability values of 0.0474, 0.0000, 0.0000, 0.0013, and 0.0000, respectively, all of which are below the 5% significance level. This indicates that these variables significantly impact on Financial Stability (FSTA). In contrast, INTR and COVD, with probability values of 0.1424 and 0.1325 respectively, exceed the 5% threshold, suggesting that they do not significantly influence FSTA. Additionally, the interaction term PRFTFISZ has a probability value of 0.0000, which is below the 0.05 significance level, indicating that Firm Size (FISZ) moderates the relationship between Profitability (PRFT) and Financial Stability (FSTA). However, the interaction terms LEVG*FISZ and LIQD*FISZ have probability values of 0.1866 and 0.5833, respectively, both above the 0.05 threshold, suggesting that Firm Size (FISZ) does not moderate the relationships between Leverage (LEVG), Liquidity (LIQD), and Financial Stability (FSTA).

Results of hypothesis are as follows:

H_{4a} is accepted as P value < 0.05 and t value > 0

H_{4b} is rejected as P value > 0.05

H_{4c} is rejected as P value > 0.05

Table 2. Result of Model 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRFT	0.0617	0.0311	1.9852	0.0474
LEVG	-0.1289	0.0141	-9.1178	0.0000
LIQD	0.1092	0.0173	6.3273	0.0000
FAGE	-0.0586	0.0182	-3.2268	0.0013
INTR	0.0452	0.0308	1.4682	0.1424
FVAL	-0.0473	0.0142	-3.3339	0.0009
FISZ	1.0550	0.0238	44.3912	0.0000
COVD	-0.0195	0.0130	-1.5056	0.1325
PRFT*FISZ	0.0675	0.0109	6.1845	0.0000
LEVG*FISZ	0.0000	0.0000	-1.3217	0.1866
LIQD*FISZ	0.0000	0.0000	-0.5488	0.5833
C	0.0525	0.0162	3.2464	0.0012
R-squared	0.8157	Mean dependent var		0.0849
Adjusted R-squared	0.8134	S.D. dependent var		0.2812
S.E. of regression	0.1215	Sum squared resid		13.2917
F-statistic	362.4075	Durbin-Watson stat		1.5337
Prob(F-statistic)	0.0000			

Source: Eviews Processing Data Results

Model 3 – Step 1 and Step 2

In Model 3, the Sobel Test was conducted to assess the indirect effect of an independent variable on a dependent variable through a mediating variable. This test calculates the standard error of the indirect effect and determines whether it significantly deviates from zero. The formula used incorporates the regression coefficients and standard errors from both pathways involved in the mediation.

- Independent variable to mediator
- Mediator to dependent variable.

The formula is as follows:

$$Z = \frac{a.b}{\sqrt{b^2.s_a^2 + a^2.s_b^2}}$$

Result of Model 3 – Step 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRFT	0.0468	0.0647	0.7234	0.4696
LEVG	0.0744	0.0323	2.3041	0.0214
LIQD	0.0614	0.0361	1.6995	0.0896
FAGE	0.0842	0.0371	2.2710	0.0234
INTR	0.2463	0.0655	3.7623	0.0002
FISZ	0.1288	0.0536	2.4026	0.0165
COVD	0.1220	0.0302	4.0355	0.0001
C	-0.1960	0.0243	-8.0552	0.0000
R-squared	0.3055	Mean dependent var		-0.1961
Adjusted R-squared	0.3001	S.D. dependent var		0.3654
S.E. of regression	0.3057	Sum squared resid		84.5701
F-statistic	56.8618	Durbin-Watson stat		1.4468
Prob(F-statistic)	0.0000	Second-Stage SSR		84.5701
Instrument rank	8			

Result of Model 3 – Step 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAGE	-0.0530	0.0193	-2.7511	0.0061
INTR	0.0210	0.0142	1.4819	0.1387
FVAL	-0.0411	0.0153	-2.6965	0.0071
FSIZ	1.1156	0.0223	50.0999	0.0000
COVD	-0.0141	0.0139	-1.0155	0.3101
C	0.0638	0.0151	4.2291	0.0000
R-squared	0.7802	Mean dependent var		0.0926
Adjusted R-squared	0.7790	S.D. dependent var		0.2826
S.E. of regression	0.1328	Sum squared resid		16.0043
F-statistic	644.0739	Durbin-Watson stat		1.3815
Prob(F-statistic)	0.0000	Second-Stage SSR		16.0043
Instrument rank	6			

Table 3. Result of Model 3

The results of Sobel Test are as follows:

Independent Variables	t-Statistic	Probability Value	Hyphotesis	Conclusion
PRFT	-0.6986	0.4848	H5a. Firm value mediates positively profitability to financial stability.	P value > 0.05, rejected
LEVG	-1.7516	0.0798	H5b. Firm value mediates positively leverage to financial stability.	P value > 0.05, rejected
LIQD	-1.4375	0.1506	H5c. Firm value mediates positively liquidity to financial stability.	P value > 0.05, rejected

Source: Eviews Processing Data Results

Robustness

Robustness checks were performed to verify the stability and reliability of the model. The robustness testing involved the following steps:

1. **Inclusion of a New Variable:** The Financial Service Index (FISI) was added to the model to assess its impact on the dependent variable.
2. **Modification of Variables:** The Financial Service Index (FISI) was introduced, while the COVID-19 (COVID) variable was removed, to examine how these adjustments affect the model's behavior.

Inclusion of a New Variable

Model 1

Model 1 introduces a new variable, FISI (Financial Stress Index). The equation of Model 1 is as follows:

$$FSTA_{it} = \alpha_0 + \alpha_1 PRFT_{it} + \alpha_2 LEVG_{it} + \alpha_3 LIQD_{it} + \alpha_4 FAGE_{it} + \alpha_5 INTR_{it} + \alpha_6 FVAL_{it} + \alpha_7 FISZ_{it} + \alpha_8 FISI_{it} + \alpha_9 COVID_{it} + \varepsilon_{it}$$

As shown in Table 4, the probability value of the F-statistic is 0.0000, which is below the 0.05 significance threshold. This indicates that all independent variables (PRFT, LEVG, LIQD, FAGE, INTR, FVAL, FISZ, FISI, and COVID) together have a significant impact on the dependent variable, FSTA, in Model 1. Table 4 also shows an R-squared value of 0.7680, or 76.80%, meaning that the independent variables (PRFT, LEVG, LIQD, FAGE, INTR, FVAL, FISZ, FISI, and COVID) explain 76.80% of the variation in FSTA. The remaining 23.20% is attributed to other factors not included in this study.

Furthermore, Table 4 reveals that the independent variables LEVG, LIQD, FAGE, INTR, FVAL, and FISZ have probability values of 0.0000, 0.0000, 0.0005, 0.0000, 0.0073, and 0.0000, respectively, all of which are below the 5% significance threshold. This indicates that these variables significantly affect FSTA. In contrast, PRFT, FISI, and COVID have probability values of 0.4020, 0.7141, and 0.4216, respectively, which exceed the 5% significance level, suggesting that these variables do not significantly influence FSTA.

Results of hypothesis are as follows:

H₁ is rejected as P value > 0.05

H₂ is accepted as P value < 0.05 and t value < 0

H₃ is accepted as P value < 0.05 and t value > 0

Table 4. Result of Model 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRFT	-0.0238	0.0284	-0.8385	0.4020
LEVG	-0.1340	0.0143	-9.4019	0.0000
LIQD	0.1078	0.0170	6.3470	0.0000
FAGE	-0.0646	0.0184	-3.5147	0.0005
INTR	0.1223	0.0288	4.2409	0.0000
FVAL	-0.0386	0.0144	-2.6877	0.0073
FISZ	1.0678	0.0241	44.3323	0.0000
FISI	0.0032	0.0087	0.3665	0.7141
COVID	-0.0106	0.0132	-0.8040	0.4216
C	0.0738	0.0162	4.5487	0.0000
R-squared	0.8071	Mean dependent var		0.0880
Adjusted R-squared	0.8051	S.D. dependent var		0.2817
S.E. of regression	0.1244	Sum squared resid		13.9657
F-statistic	419.7031	Durbin-Watson stat		1.5846
Prob(F-statistic)	0.0000			

Source: Eviews Processing Data Results

Model 2

The equation of Model 2 is as follows:

$$FSTA_{it} = \beta_0 + \beta_1 PRFT_{it} + \beta_2 LEVG_{it} + \beta_3 LIQD_{it} + \beta_4 FAGE_{it} + \beta_5 INTR_{it} + \beta_6 FVAL_{it} + \beta_7 FISZ_{it} + \beta_8 FISI_{it} + \beta_9 COVD_{it} + \beta_{10} PRFT_{it} * FISZ_{it} + \beta_{11} LEVG_{it} * FISZ_{it} + \beta_{12} LIQD_{it} * FISZ_{it} + \varepsilon_{it}$$

As shown in Table 5, the probability value of the F-statistic is 0.0000, which is below the 0.05 significance threshold. This indicates that all independent variables (PRFT, LEVG, LIQD, FAGE, INTR, FVAL, FISZ, FISI, and COVD) together have a significant impact on the dependent variable, FSTA, in Model 2. Table 5 shows an R-squared value of 0.8158, or 81.58%, indicating that the independent variables (PRFT, LEVG, LIQD, FAGE, INTR, FVAL, FISZ, FISI, and COVD) account for 81.58% of the variance in FSTA. The remaining 18.42% is attributed to factors not included in the study. Furthermore, Table 5 highlights that the independent variables PRFT, LEVG, LIQD, FAGE, FVAL, and FISZ have probability values of 0.0469, 0.0000, 0.0013, 0.0009, and 0.0000, respectively, all of which are below the 5% significance threshold. This suggests that these variables significantly affect FSTA. In contrast, the variables INTR, FISI, and COVD have probability values of 0.1441, 0.4322, and 0.1509, respectively, all exceeding the 5% significance level, indicating that they do not significantly influence FSTA. Additionally, the interaction term PRFT*FISZ has a probability value of 0.0000, below 0.05, suggesting that FISZ moderates the relationship between PRFT and FSTA. However, the interaction terms LEVG*FISZ and LIQD*FISZ have probability values of 0.1883 and 0.5684, respectively, both above 0.05, indicating that FISZ does not moderate the relationships between LEVG, LIQD, and FSTA.

Results of hypothesis are as follows:

H_{4a} is accepted as P value < 0.05 and t value > 0

H_{4b} is rejected as P value > 0.05

H_{4c} is rejected as P value > 0.05

Table 5. Result of Model 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRFT	0.0618	0.0311	1.9903	0.0469
LEVG	-0.1288	0.0141	-9.1118	0.0000
LIQD	0.1091	0.0173	6.3192	0.0000
FAGE	-0.0585	0.0182	-3.2221	0.0013
INTR	0.0451	0.0308	1.4620	0.1441
FVAL	-0.0473	0.0142	-3.3336	0.0009
FISZ	1.0550	0.0238	44.3803	0.0000
FISI	0.0067	0.0086	0.7857	0.4322
COVD	-0.0187	0.0130	-1.4376	0.1509
PRFT*FISZ	0.0681	0.0109	6.2220	0.0000
LEVG*FISZ	0.0000	0.0000	-1.3167	0.1883
LIQD*FISZ	0.0000	0.0000	-0.5706	0.5684
C	0.0553	0.0166	3.3393	0.0009
R-squared	0.8158	Mean dependent var		0.0849
Adjusted R-squared	0.8133	S.D. dependent var		0.2812
S.E. of regression	0.1215	Sum squared resid		13.2831
F-statistic	332.1106	Durbin-Watson stat		1.5368
Prob(F-statistic)	0.0000			

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Model 3

The equation of Model 3 – Step 1 is as follows:

$$FVAL_{it} = \gamma_0 + \gamma_1 PRFT_{it} + \gamma_2 LEVG_{it} + \gamma_3 LIQD_{it} + \gamma_4 FAGE_{it} + \gamma_5 INTR_{it} + \gamma_6 FISZ_{it} + \gamma_7 FISI_{it} + \gamma_8 COVD_{it} + \varepsilon_{it}$$

The equation of Model 3 – Step 2 is as follows:

$$FSTA_{it} = \delta_0 + \delta_1 FAGE_{it} + \delta_2 INTR_{it} + \delta_3 FVAL_{it} + \delta_4 FISZ_{it} + \delta_5 FISI_{it} + \delta_6 COVD_{it} + \varepsilon_{it}$$

Result of Model 3 – Step 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRFT	0.0472	0.0647	0.7296	0.4658
LEVG	0.0744	0.0323	2.3035	0.0215
LIQD	0.0615	0.0361	1.7026	0.0890
FAGE	0.0840	0.0371	2.2658	0.0237
INTR	0.2459	0.0655	3.7533	0.0002
FISZ	0.1287	0.0536	2.3995	0.0166
FISI	-0.0049	0.0204	-0.2414	0.8093
COVD	0.1214	0.0304	3.9968	0.0001
C	-0.1982	0.0260	-7.6229	0.0000
R-squared	0.3055	Mean dependent var		-0.1962
Adjusted R-squared	0.2993	S.D. dependent var		0.3654
S.E. of regression	0.3059	Sum squared resid		84.5790
F-statistic	49.6985	Durbin-Watson stat		1.4465
Prob(F-statistic)	0.0000	Second-Stage SSR		84.5790
Instrument rank	9.0000			

Result of Model 3 – Step 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAGE	-0.0530	0.0193	-2.7506	0.0061
INTR	0.0210	0.0142	1.4814	0.1388
FVAL	-0.0411	0.0153	-2.6930	0.0072
FISZ	1.1156	0.0223	50.0748	0.0000
FISI	0.0038	0.0093	0.4052	0.6854
COVD	-0.0136	0.0140	-0.9773	0.3287
C	0.0655	0.0157	4.1837	0.0000
R-squared	0.7803	Mean dependent var		0.0927
Adjusted R-squared	0.7788	S.D. dependent var		0.2826
S.E. of regression	0.1329	Sum squared resid		16.0029
F-statistic	536.2380	Durbin-Watson stat		1.3845
Prob(F-statistic)	0.0000	Second-Stage SSR		16.0029
Instrument rank	7.0000			

Table 6. Result of Model 3

The results of Sobel Test are as follows:

Independent Variables	t-Statistic	Probability Value	Hypothesis	Conclusion
PRFT	-0.7042	0.4813	H5a. Firm value mediates positively profitability to financial stability.	P value >0.05, rejected
LEVG	-1.7505	0.0800	H5b. Firm value mediates positively leverage to financial stability.	P value >0.05, rejected
LIQD	-1.4391	0.1501	H5c. Firm value mediates positively liquidity to financial stability.	P value >0.05, rejected

Modification of Variables**Model 1**

In Model 1, a new variable, FISI (Financial Stress Index), is introduced, while COVD is excluded from the equation. The equation for Model 1 is as follows:

$$FSTA_{it} = \alpha_0 + \alpha_1 PRFT_{it} + \alpha_2 LEVG_{it} + \alpha_3 LIQD_{it} + \alpha_4 FAGE_{it} + \alpha_5 INTR_{it} + \alpha_6 FVAL_{it} + \alpha_7 FISZ_{it} + \alpha_8 FISI_{it} + \varepsilon_{it}$$

As shown in Table 7, the probability value of the F-statistic is 0.0000, which is below the 0.05 significance threshold. This indicates that all independent variables (PRFT, LEVG, LIQD, FAGE, INTR, FVAL, FISZ, and FISI) collectively have a significant influence on the dependent variable, FSTA, in

Model 1.

Table 7 reveals an R-squared value of 0.8069, or 80.69%, meaning that the independent variables (PRFT, LEVG, LIQD, FAGE, INTR, FVAL, FISZ, and FISI) explain 80.69% of the variation in FSTA. The

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remaining 19.31% is attributable to other factors not included in the study. Further analysis of Table 7 shows that the independent variables LEVG, LIQD, FAGE, INTR, FVAL, and FISZ have probability values of 0.0000, 0.0000, 0.0003, 0.0053, and 0.0000, respectively, all of which are below the 5% significance level. This indicates that these variables significantly impact the dependent variable, FSTA. In contrast, PRFT and FISI have probability values of 0.3409 and 0.6608, respectively, which exceed the 5% significance threshold, suggesting that they do not significantly affect FSTA.

Results of hypothesis are as follows:

H₁ is rejected as P value > 0.05

H₂ is accepted as P value < 0.05 and t value < 0

H₃ is accepted as P value < 0.05 and t value > 0

Table 7. Result of Model 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRFT	-0.0268	0.0281	-0.9529	0.3409
LEVG	-0.1343	0.0142	-9.4221	0.0000
LIQD	0.1071	0.0170	6.3145	0.0000
FAGE	-0.0664	0.0182	-3.6445	0.0003
INTR	0.1208	0.0288	4.1973	0.0000
FVAL	-0.0399	0.0143	-2.7953	0.0053
FISZ	1.0679	0.0241	44.3509	0.0000
FISI	0.0038	0.0087	0.4389	0.6608
C	0.0753	0.0161	4.6700	0.0000
R-squared	0.8069	Mean dependent var		0.0880
Adjusted R-squared	0.8052	S.D. dependent var		0.2817
S.E. of regression	0.1243	Sum squared resid		13.9752
F-statistic	472.2789	Durbin-Watson stat		1.5858
Prob(F-statistic)	0.0000			

Model 2

The equation of Model 2 is as follows:

$$FSTA_{it} = \beta_0 + \beta_1 PRFT_{it} + \beta_2 LEVG_{it} + \beta_3 LIQD_{it} + \beta_4 FAGE_{it} + \beta_5 INTR_{it} + \beta_6 FVAL_{it} + \beta_7 FISZ_{it} + \beta_8 FISI_{it} + \beta_9 PRFT_{it} * FISZ_{it} + \beta_{10} LEVG_{it} * FISZ_{it} + \beta_{11} LIQD_{it} * FISZ_{it} + \epsilon_{it}$$

As shown in Table 8, the probability value of the F-statistic is 0.0000, which is below the 0.05 threshold. This indicates that all the independent variables (PRFT, LEVG, LIQD, FAGE, INTR, FVAL, FISZ, and FISI) collectively have a significant impact on the dependent variable, FSTA, in Model 2. Table 8 reveals an R-squared value of 0.8153, or 81.53%, indicating that the independent variables (PRFT, LEVG, LIQD, FAGE, INTR, FVAL, FISZ, and FISI) account for 81.53% of the variation in FSTA. The remaining 18.47% is explained by factors not included in this study.

The analysis in Table 8 shows that the independent variables LEVG, LIQD, FAGE, FVAL, and FISZ have probability values of 0.0000, 0.0000, 0.0006, 0.0005, and 0.0000, respectively, all of which are below the 5% significance level. This indicates that these variables significantly affect the dependent variable, FSTA. On the other hand, PRFT, INTR, and FISI have probability values of 0.0754, 0.1529, and 0.3666, respectively, which exceed the 5% significance threshold, suggesting they do not significantly influence FSTA. Additionally, the interaction term PRFT*FISZ has a probability value of 0.0000, below the 0.05 threshold, indicating that FISZ moderates the relationship between PRFT and FSTA. However, the interaction terms LEVG*FISZ and LIQD*FISZ have probability values of 0.1913 and 0.5926, respectively, both above 0.05, suggesting that FISZ does not moderate the relationships between LEVG, LIQD, and FSTA.

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Results of hypothesis are as follows:

H_{4a} is accepted as P value < 0.05 and t value > 0

H_{4b} is rejected as P value > 0.05

H_{4c} is rejected as P value > 0.05

Table 8. Result of Model 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRFT	0.0546	0.0307	1.7800	0.0754
LEVG	-0.1293	0.0141	-9.1417	0.0000
LIQD	0.1076	0.0172	6.2436	0.0000
FAGE	-0.0618	0.0180	-3.4358	0.0006
INTR	0.0441	0.0308	1.4306	0.1529
FVAL	-0.0494	0.0141	-3.4927	0.0005
FISZ	1.0554	0.0238	44.3897	0.0000
FISI	0.0077	0.0085	0.9033	0.3666
PRFT*FISZ	0.0665	0.0109	6.1062	0.0000
LEVG*FISZ	0.0000	0.0000	-1.3077	0.1913
LIQD*FISZ	0.0000	0.0000	-0.5353	0.5926
C	0.0583	0.0164	3.5493	0.0004
R-squared	0.8153	Mean dependent var		0.0851
Adjusted R-squared	0.8131	S.D. dependent var		0.2812
S.E. of regression	0.1216	Sum squared resid		13.3187
F-statistic	361.6174	Durbin-Watson stat		1.5387
Prob(F-statistic)	0.0000			

Source: Eviews Processing Data Results

Model 3

The equation of Model 3 – Step 1 is as follows:

$$FVAL_{it} = \gamma_0 + \gamma_1 PRFT_{it} + \gamma_2 LEVG_{it} + \gamma_3 LIQD_{it} + \gamma_4 FAGE_{it} + \gamma_5 INTR_{it} + \gamma_6 FISZ_{it} + \gamma_7 FISI_{it} + \varepsilon_{it}$$

The equation of Model 3 – Step 2 is as follows:

$$FSTA_{it} = \delta_0 + \delta_1 FAGE_{it} + \delta_2 INTR_{it} + \delta_3 FVAL_{it} + \delta_4 FISZ_{it} + \delta_5 FISI_{it} + \varepsilon_{it}$$

Result of Model 3 – Step 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRFT	0.0838	0.0644	1.3024	0.1931
LEVG	0.0777	0.0325	2.3927	0.0169
LIQD	0.0706	0.0362	1.9474	0.0518
FAGE	0.1034	0.0370	2.7921	0.0053
INTR	0.2677	0.0656	4.0820	0.0000
FISZ	0.1313	0.0539	2.4370	0.0150
FISI	-0.0122	0.0205	-0.5945	0.5523
C	-0.2179	0.0257	-8.4744	0.0000
R-squared	0.2947	Mean dependent var		-0.1954
Adjusted R-squared	0.2893	S.D. dependent var		0.3653
S.E. of regression	0.3079	Sum squared resid		85.8225
F-statistic	54.0282	Durbin-Watson stat		1.4523
Prob(F-statistic)	0.0000	Second-Stage SSR		85.8225
Instrument rank	8.0000			

Result of Model 3 – Step 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAGE	-0.0556	0.0190	-2.9164	0.0036
INTR	0.0154	0.0130	1.1861	0.2359
FVAL	-0.0429	0.0151	-2.8346	0.0047
FISZ	1.1149	0.0223	50.0885	0.0000
FISI	0.0045	0.0093	0.4897	0.6245
C	0.0673	0.0155	4.3415	0.0000
R-squared	0.7800	Mean dependent var		0.0930
Adjusted R-squared	0.7788	S.D. dependent var		0.2827
S.E. of regression	0.1329	Sum squared resid		16.0302
F-statistic	643.1465	Durbin-Watson stat		1.3845
Prob(F-statistic)	0.0000	Second-Stage SSR		16.0302
Instrument rank	6.0000			

Table 9. Result of Model 3

The results of Sobel Test are as follows:

Independent Variables	t-Statistic	Probability Value	Hyphothesis	Conclusion
PRFT	-0.7042	0.4813	H5a. Firm value mediates positively profitability to financial stability.	P value >0.05, rejected
LEVG	-1.7505	0.0800	H5b. Firm value mediates positively leverage to financial stability.	P value >0.05, rejected
LIQD	-1.4391	0.1501	H5c. Firm value mediates positively liquidity to financial stability.	P value >0.05, rejected

CONCLUSION

Based on the results of data analysis and discussions, the conclusions are as follows:

1. F-statistic Test:

The results from both Model 1 and Model 2 of the original model are consistent, indicating that all independent variables (PRFT, LEVG, LIQD, FAGE, INTR, FVAL, FISZ, and COVD) jointly influence the dependent variable (FSTA).

2. Individual Significance Test:

- **Model 1:** The individual significance test (t-test or partial test) reveals that LEVG, LIQD, FAGE, INTR, FVAL, and FISZ significantly affect FSTA, while PRFT and COVD do not.
- **Model 2:** PRFT, LEVG, LIQD, FAGE, FVAL, and FISZ have a significant impact on FSTA, whereas INTR and COVD do not.

3. Model 3 (Two-Stage Least Squares):

The results from the original Model 3 indicate that PRFT, LEVG, and LIQD do not mediate the effects of profitability, leverage, and liquidity on financial stability, respectively.

4. Summary from Models 1, 2, and 3:

- **H1** is rejected.
- **H2** and **H3** are accepted.
- **H4a** is accepted, while **H4b** and **H4c** are rejected.
- **H5a**, **H5b**, and **H5c** are rejected.

5. Robustness Test:

The robustness test confirms that the model remains stable despite adjustments through two schemes. In the first scheme, the model includes the new variable FISI, and in the second scheme, FISI is added, and COVD is excluded. Both schemes yield consistent results:

- **H1** is rejected.
- **H2** and **H3** are accepted.
- **H4a** is accepted, while **H4b** and **H4c** are rejected.
- **H5a**, **H5b**, and **H5c** are rejected.

These results demonstrate that the conclusions for all hypotheses remain consistent across models, confirming the robustness of the model under varying conditions.

RECOMMENDATIONS

Since this study focused exclusively on the real estate industry, its findings may not be directly applicable to other sectors. Future research should consider including additional industries to assess the factors influencing financial stability across a wider range of sectors. Additionally, this study examined only eight variables, alongside the dependent variable, to analyze the relationships between the dependent variable and the independent variables, control variables, mediating variable, moderating variable, and dummy variable. Future research should consider incorporating more variables into the analysis to provide a more comprehensive understanding of the determinants of financial stability.

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