

Reading the Warning Signs: A PRISMA-Guided Systematic Review of Liquidity, Leverage, Profitability, and Firm Size as Determinants of Financial Distress

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ABSTRACT

Purpose: This study systematically reviews recent empirical evidence on four financial characteristics that are widely used to anticipate corporate financial distress, namely liquidity, leverage, profitability, and firm size, with particular attention to Indonesian listed companies and the food and beverage sub-sector. It responds to the contradictory findings that make it difficult for managers, investors, and regulators to know which warning signals deserve the most weight.

Method: The review follows the PRISMA 2020 statement. Eight search strings were run in the Crossref database for peer-reviewed journal articles published between 2020 and 2024 with abstracts available, and citation tracking added key studies cited in the original research proposal. Records were de-duplicated, screened by title, and assessed for eligibility against predefined criteria. Included studies were coded by country, sector, period, analytical technique, distress proxy, and the direction of each determinant, and the evidence was synthesised through vote counting and thematic analysis framed by signalling theory.

Findings: Leverage emerges as the most consistent warning signal, since higher debt is more often associated with greater distress than with less. Profitability is the strongest protective factor whenever a direction is reported, although part of this strength reflects its overlap with the profit-based components of common distress models. Liquidity is frequently insignificant and occasionally reversed, suggesting that static current-asset ratios are a weak signal when assets are tied up in inventory and receivables. Firm size rarely has a direct effect and appears to work mainly as a condition that changes the influence of other ratios. Food and beverage studies confirm the importance of profitability but provide limited evidence for liquidity and size.

Implication: Managers and analysts should give priority to leverage and profitability when monitoring distress risk, complement liquidity ratios with cash-flow and working-capital indicators, and interpret firm size in relation to sector conditions. Researchers should report the distress proxy and direction of effects explicitly, avoid models in which predictors and proxies overlap mechanically, and use longer panels and sector-specific designs.

Originality: The review provides an integrated, direction-focused synthesis of the four most commonly tested financial ratios, shows how measurement choices and sector characteristics produce contradictory findings, and draws out implications for the fast-growing but competitive food and beverage sub-sector listed on the Indonesia Stock Exchange.

Keywords: Financial Distress, Firm Size, Food and Beverage, Leverage, Liquidity, Profitability.

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INTRODUCTION

Indonesia is the world's fourth most populous country, and its population continues to grow steadily. Official statistics show that the mid-year population increased from about 266.9 million in 2019 to about 278.7 million in 2023 (Badan Pusat Statistik, 2024), as shown in Figure 1. A larger population means larger and more diverse consumption needs, especially for primary goods such as food and beverages. This demand has created opportunities for entrepreneurs and investors and is reflected in the rapid



growth of companies listed on the Indonesia Stock Exchange (IDX). The number of listed companies rose from 671 in 2019 to 903 in 2023, while the number of food and beverage companies listed on the exchange increased from 30 to 95 over the same period (Indonesia Stock Exchange, 2024), as shown in Figure 2. Part of the jump in 2021 reflects the introduction of a new industrial classification on the exchange, but the trend clearly indicates that the sub-sector has become more crowded and more competitive.

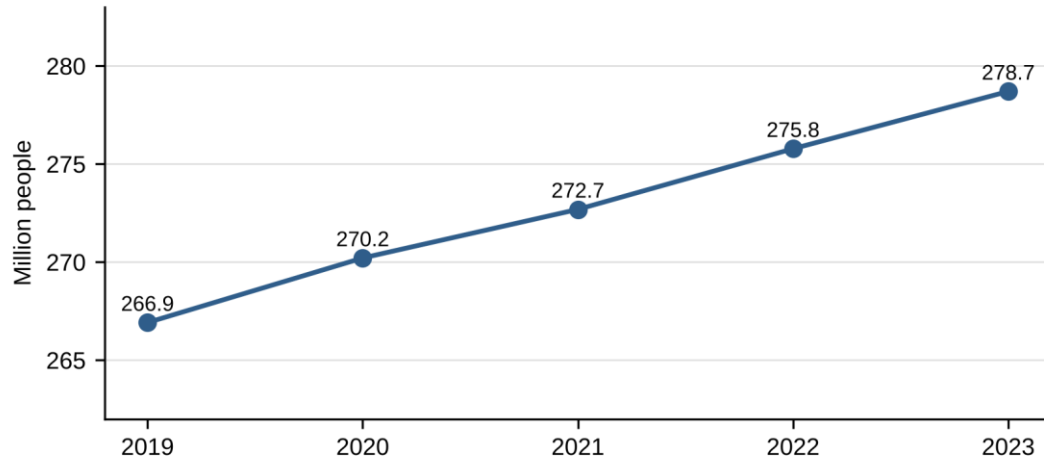


Figure 1. Indonesia's Mid-Year Population, 2019–2023

Source: Redrawn from the research proposal based on Badan Pusat Statistik (2024)

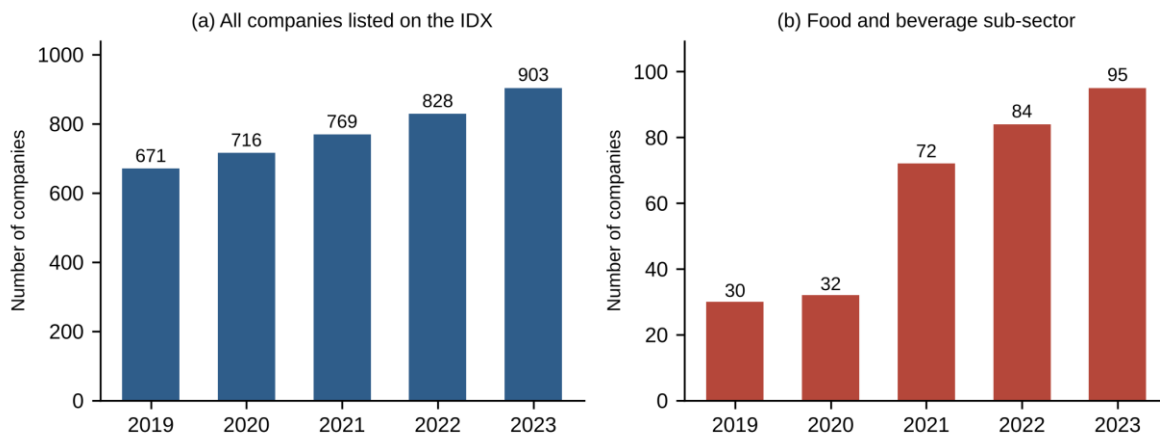


Figure 2. Companies Listed on the Indonesia Stock Exchange, 2019–2023

Source: Redrawn from the research proposal based on Indonesia Stock Exchange (2024)

The food and beverage sub-sector is often described as resilient. It continued to grow during and after the COVID-19 pandemic, and in the first quarter of 2023 its growth outpaced that of the national economy (Fahmi, 2024). Resilience at the sector level, however, does not guarantee the health of individual firms. Some listed food and beverage companies have recently reported falling sales and losses. PT Wahana Interfood Nusantara Tbk, for example, recorded a sharp decline in net sales and a loss in the first half of 2023, which management attributed to changes in consumer spending after the pandemic (Elvira, 2023), while PT Buyung Poetra Sembada Tbk reported a loss for 2023 that it linked to rising raw material prices (Ramadhani, 2024). These cases illustrate that firms in a growing sector can still slide into financial difficulty when competition intensifies, input costs rise, or demand shifts.

Financial distress is the stage of declining financial condition that precedes insolvency, bankruptcy, or liquidation. It is commonly signalled by consecutive losses, an inability to meet obligations to creditors, or low scores on bankruptcy prediction models. Because distress is usually preceded by a gradual deterioration in financial ratios, early detection through financial statement analysis is of considerable value to managers, investors, creditors, and regulators. Studies of Indonesian food and beverage companies that apply the modified Altman model, for instance, show

that some listed firms fall into the grey or distress zone even in periods of sectoral growth (Nandini & Mudjiijah, 2023). Signalling theory provides a useful explanation for why financial ratios matter: published financial information conveys signals about a firm's resilience or vulnerability, and stakeholders respond to these signals in their investment and lending decisions (Wijaya & Suhendah, 2023).

Among the many ratios that can serve as warning signals, four dominate empirical research: liquidity, leverage, profitability, and firm size. These were also the focus of the research proposal from which this article originates, which planned to examine their effect on financial distress among food and beverage companies listed on the IDX between 2021 and 2023. The findings of previous studies, however, are strikingly inconsistent. Some studies find that leverage has no effect on distress (Muzharoatiningsih & Hartono, 2022; Septiani et al., 2021), whereas others report a significant effect (Wijaya & Suhendah, 2023). Profitability is reported to increase distress in one study (Septiani et al., 2021) and to reduce it in many others (Aryani & Sihono, 2024; Qathrunnada et al., 2024). Firm size is found to have no effect (Mahera & Hartono, 2022) or to reduce distress (Syuhada et al., 2020). Liquidity has been found to reduce distress (Hastiarto, 2021), to have no effect (Sugiarto & Mahanani, 2020), and even to increase it (Suwandi & Tanusdjaja, 2021).

Existing reviews do not resolve these contradictions. A systematic review of Indonesian distress prediction studies concludes that financial ratios are the most influential predictors across models (Primawan, 2023), and a review of Pakistani studies highlights profitability, solvency, and liquidity indicators and the shift towards machine learning methods (Kamran & Saleem, 2023). However, these reviews focus on the predictive power of models rather than on the direction and consistency of individual determinants, and they do not examine why the same ratio produces different results in different studies. For the food and beverage sub-sector specifically, no systematic synthesis is available.

This study addresses these gaps through a systematic literature review guided by the PRISMA 2020 statement (Page et al., 2021). It is organised around three research questions:

RQ1: What are the characteristics of recent empirical studies (2020–2024) on liquidity, leverage, profitability, and firm size as determinants of financial distress?

RQ2: What is the direction and consistency of the evidence for each of the four determinants, overall and in the food and beverage sub-sector?

RQ3: What explains the inconsistent findings, and what should future research and practice prioritise?

The review contributes in three ways. Theoretically, it clarifies which financial signals are consistent and which depend on context, refining the application of signalling theory to distress. Methodologically, it shows how the choice of distress proxy, the overlap between predictors and proxies, and small samples contribute to inconsistent results. Practically, it offers guidance for managers, investors, and regulators who monitor the financial health of listed companies, including the increasingly competitive food and beverage sub-sector.

LITERATURE REVIEW

Financial Distress: Concept and Measurement

Financial distress describes a condition in which a firm's operating cash flows are insufficient to meet its current obligations, forcing it to take corrective action such as restructuring debt, selling assets, or seeking new capital. It is a process rather than an event: profitability usually declines first, followed by liquidity pressure and rising reliance on debt, and finally by default or delisting if the deterioration is not reversed. This process view explains why financial ratios are used as early warning indicators.

Empirical studies operationalise distress in several ways. Accounting-based definitions classify a firm as distressed when it reports negative net income, negative operating profit, or an interest coverage ratio below one for one or more years (Qathrunnada et al., 2024; Dahlia, 2021). Model-based definitions use bankruptcy prediction scores such as the Altman Z-score, the Zmijewski X-score, the Springate S-score, and the Grover G-score (Atang et al., 2022; Saraswati et al., 2024). Comparative studies show that these models can classify the same firms differently; in one Indonesian comparison the Altman model was considerably more accurate than the Zmijewski model (Ramly & Amilia, 2023). Market-based definitions use delisting or share price declines, and newer studies apply machine

learning methods such as neural networks and support vector machines, which often improve predictive accuracy (Nguyen et al., 2024; Sehgal et al., 2021). This diversity of definitions is important for interpreting the literature, because a determinant can appear to have different effects depending on how distress is measured.

Signalling Theory

Signalling theory holds that, under information asymmetry, management uses financial reports to send signals to outsiders about the firm's prospects. Good financial performance signals resilience and lowers the perceived risk of failure, while deteriorating ratios signal vulnerability. Investors and creditors interpret these signals when pricing securities and extending credit, which in turn affects the firm's access to finance and its ability to avoid distress (Wijaya & Suhendah, 2023). In the context of this review, signalling theory explains why the ratios that summarise a firm's capacity to pay, its debt burden, its earning power, and its scale are expected to predict distress. It also implies that the strength of a signal depends on its credibility and on how directly it reflects the underlying risk.

Liquidity

Liquidity reflects a firm's ability to meet short-term obligations with current assets and is commonly measured by the current ratio or the quick ratio. A highly liquid firm is expected to withstand temporary shocks without defaulting, so liquidity should reduce the probability of distress (Hastiarto, 2021; Aryani & Sihono, 2024). However, a high current ratio may also signal inefficiency when current assets consist largely of slow-moving inventory or doubtful receivables, which weakens the expected protective effect.

Leverage

Leverage measures the extent to which a firm's assets are financed by debt, typically through the debt-to-assets ratio or the debt-to-equity ratio. High leverage increases fixed interest and principal obligations and raises the risk that the firm will be unable to meet them, so leverage is expected to increase distress (Rarassati & Bustaman, 2021; Wijaya & Suhendah, 2023). Moderate debt can also signal creditworthiness and provide funds for growth, which means the relationship may not be linear.

Profitability

Profitability reflects a firm's ability to generate earnings from its normal activities and is commonly measured by return on assets, return on equity, or net profit margin. Profitable firms generate internal funds, maintain creditor confidence, and are less likely to default, so profitability is expected to reduce distress (Qathrunnada et al., 2024; Juliani & Muslihat, 2021). Because most distress definitions are themselves based on profits or include profit components, profitability is also the determinant most exposed to mechanical overlap with the outcome.

Firm Size

Firm size, usually measured by the natural logarithm of total assets or sales, distinguishes large from small companies. Larger firms tend to have more diversified operations, better access to capital markets, and more bargaining power with creditors, which should reduce distress (Syuhada et al., 2020; Arya & Suhendah, 2024). At the same time, size may be associated with greater complexity and higher fixed costs, and its effect may depend on sector conditions. Several studies therefore treat size as a moderating variable rather than as a direct determinant (Ramadani & Ratmono, 2023; Suharti, 2023).

Financial Distress Risk in the Food and Beverage Sub-sector

The food and beverage sub-sector has several characteristics that make the study of distress particularly relevant. Demand for food and beverages is relatively stable because these products are primary needs, which is why the sub-sector is often regarded as defensive during economic downturns (Fahmi, 2024). However, margins are frequently thin, competition is intense, and many firms depend on imported or commodity-based raw materials whose prices fluctuate with exchange rates and global markets. A sudden increase in input costs can therefore turn a profitable firm into a loss-making one within a single year, as the case of a listed snack and beverage producer illustrates (Ramadhani, 2024). Food and beverage firms also hold substantial inventories of perishable or seasonal goods, which means that a high current ratio does not necessarily indicate that cash is available to pay creditors. Finally, the rapid increase in the number of listed food and beverage companies since 2021 has brought many smaller and younger firms to the exchange, whose financial resilience has not yet been tested over a full economic cycle. These characteristics suggest that profitability and cash-generating capacity

should be especially important determinants of distress in the sub-sector, while static liquidity measures may be less informative.

Integrative Framework

Figure 3 presents the framework used to code the evidence. It adapts the conceptual model of the original research proposal, in which liquidity, leverage, profitability, and firm size were hypothesised to affect financial distress (H1–H4), and adds the contextual factors that the review uses to explain inconsistent findings: sector, period, and distress proxy.

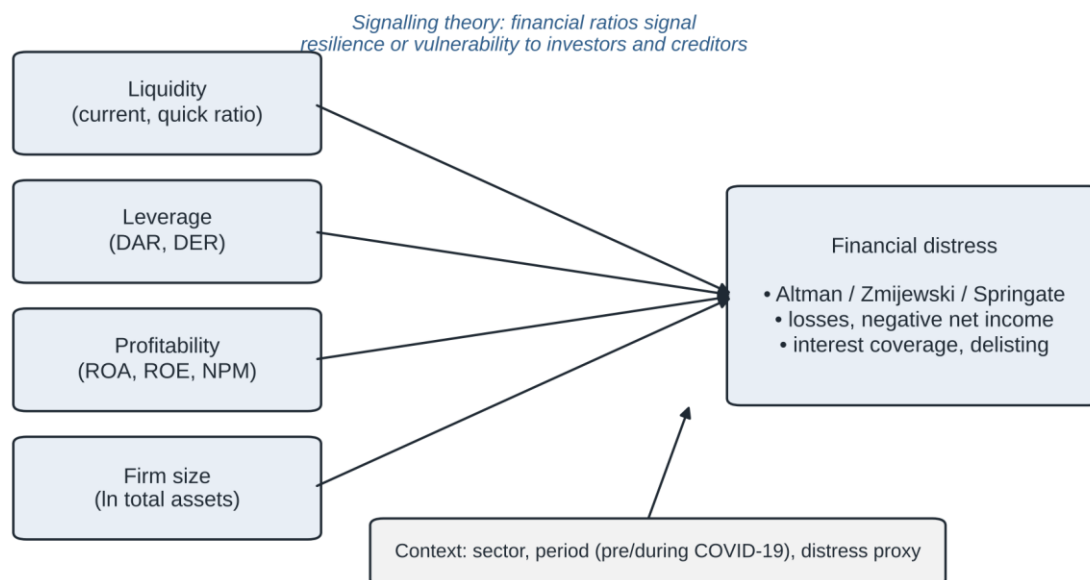


Figure 3. Integrative Framework of Financial Ratio Determinants of Financial Distress

Source: Adapted from the research proposal framework and signalling theory (Wijaya & Suhendah, 2023)

RESEARCH METHOD

Review Design

This study is a systematic literature review reported in line with the PRISMA 2020 statement (Page et al., 2021). A systematic design was selected because the research questions concern the direction and consistency of evidence across a large number of primary studies, which requires a transparent and replicable procedure for identifying, selecting, and synthesising the literature (Kraus et al., 2020). The protocol is summarised in Table 1.

Information Source and Search Strategy

The primary information source was Crossref, a multidisciplinary metadata index that covers international and Indonesian journals registered with digital object identifiers, including many journals indexed in Scopus, Web of Science, and SINTA. The search was carried out in October 2026 with eight search strings that combined financial distress with liquidity, leverage, profitability, firm size, the food and beverage sector, prediction models, the COVID-19 pandemic, and signalling theory. Results were restricted to journal articles published between 1 January 2020 and 31 December 2024 with an abstract available in the metadata. For each string, the records returned by the relevance ranking were exported and screened. Backward citation tracking was then applied to the original research proposal to capture key Indonesian studies that the database query did not retrieve; these were treated as records identified through other methods.

Table 1. Review Protocol: Search Strategy and Eligibility Criteria

Component	Specification
Database	Crossref (journal articles with DOI and abstract metadata); citation tracking as a supplementary method
Search strings	"liquidity" + "leverage" + "profitability" + "financial distress"; "firm size" + "financial distress" + "manufacturing"; "financial distress prediction" + "financial ratios" + "Altman Z-score"; "financial distress" + "food and beverage companies"; "financial distress" + "COVID-19 pandemic" + "listed firms"; "determinants" + "financial distress" + "listed companies"; "signalling theory" + "financial distress" + "profitability"; "corporate financial distress prediction" + "review"
Time window	2020–2024
Inclusion criteria	(1) peer-reviewed journal article; (2) empirical study of non-financial companies; (3) financial distress (score, classification, or accounting definition) is the dependent variable; (4) reports the effect of at least one of liquidity, leverage, profitability, or firm size; (5) abstract available
Exclusion criteria	banking and insurance samples; studies in which distress is a predictor of another outcome (e.g., firm value, audit delay, earnings management); purely descriptive applications of bankruptcy models; algorithm comparisons without determinant tests; secondary reviews
Coding	country, sector, and period; analytical technique; distress proxy; direction of each determinant (reduces distress, increases distress, not significant, significant with unspecified direction, moderating)

Source: Developed by the authors following [Page et al. \(2021\)](#) and [Kraus et al. \(2020\)](#)

Study Selection, Data Extraction, and Synthesis

Records were de-duplicated by DOI, including a record deposited twice under two DOIs. Titles were screened to remove studies that were clearly outside the scope, such as studies of dividend policy, share prices, banking, and insurance. Abstracts and metadata of the remaining records were assessed against the eligibility criteria, and screening decisions and reasons for exclusion were recorded in a screening log. Uncertain cases were resolved through discussion between the authors.

For each included study, the authors extracted the country and sector, the sample and period, the analytical technique, the distress proxy where reported, and the direction and significance of each determinant. Effects were coded from the perspective of distress risk. When a study used a score in which higher values indicate better health, such as the Altman Z-score, a positive association between a ratio and the score was coded as reducing distress. When an abstract reported a significant effect without a clear direction or without identifying the distress proxy, the effect was coded as significant with unspecified direction. Because the studies used heterogeneous proxies and models, a meta-analysis was not feasible, and the evidence was synthesised through vote counting complemented by thematic analysis.

RESULTS AND DISCUSSION

Study Selection

The database search identified 111 records. After the removal of eight duplicates, 103 unique records were screened by title, and 12 were excluded because they addressed unrelated outcomes or sectors, such as share prices, dividend policy, banking, and insurance. The abstracts and metadata of 91 records were assessed for eligibility. Thirty-nine records were excluded: 16 were descriptive applications of bankruptcy models or comparisons of prediction algorithms without determinant tests; 12 did not examine any of the four ratios; five used distress as a predictor of another outcome; four did not report directional results; and two were secondary reviews. Fifty-two studies from the database met all criteria, and citation tracking of the research proposal added five Indonesian studies. In total, 57 studies were included in the synthesis ([Figure 4](#)).

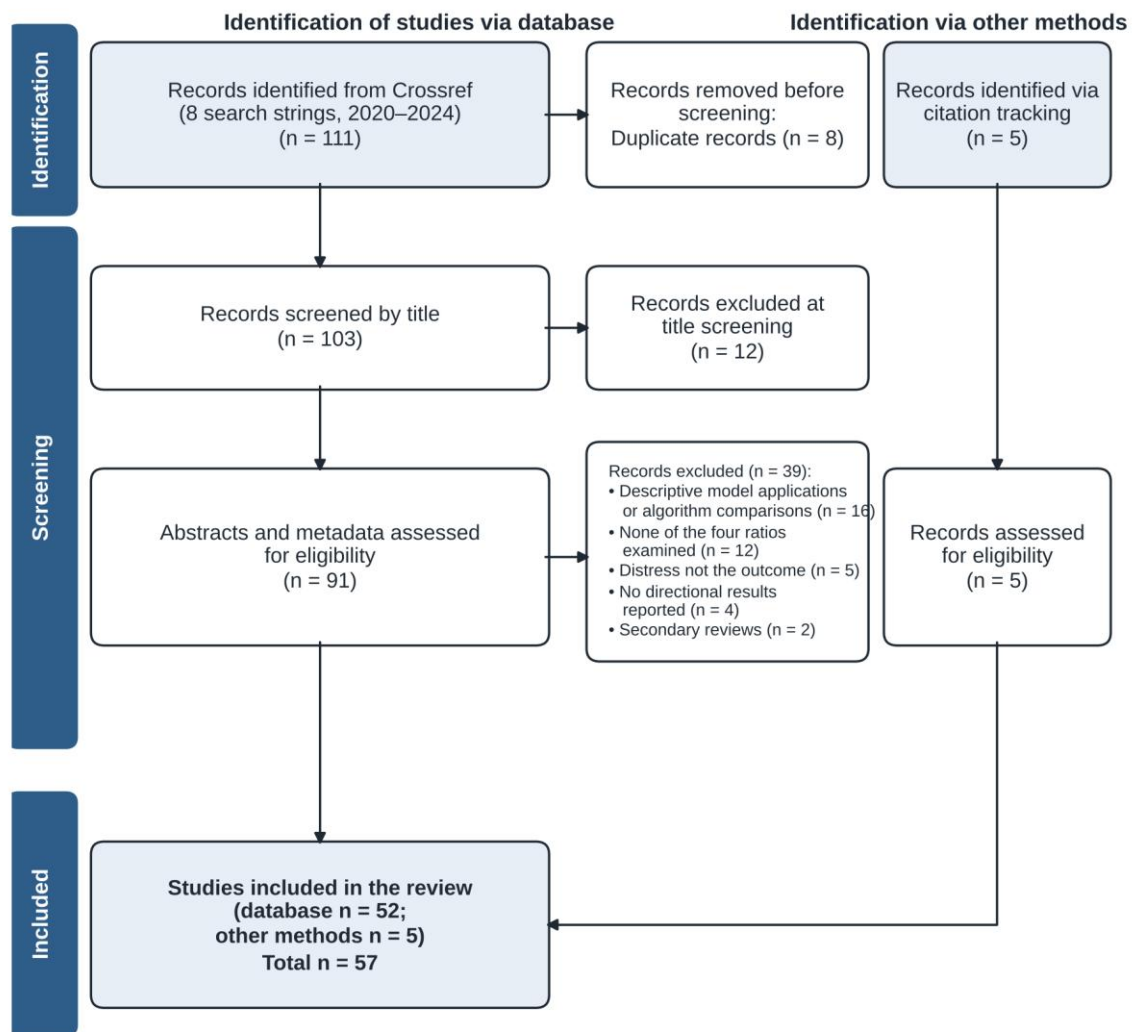


Figure 4. PRISMA 2020 Flow Diagram of Study Selection

Source: Developed by the authors based on [Page et al. \(2021\)](#)

Characteristics of the Included Studies (RQ1)

[Table 2](#) summarises the 57 included studies. The evidence base is overwhelmingly Indonesian: 53 studies examine companies listed on the IDX or manufacturing firms in Indonesian provinces, while the remaining four come from China, India, Kenya, and Taiwan ([Zhao & Choi, 2022](#); [Sehgal et al., 2021](#); [Kibe et al., 2024](#); [Chen et al., 2020](#)). Manufacturing companies are the most frequently studied group, followed by property and real estate, transportation, trade, mining, and consumer goods. Nine studies focus specifically on the food and beverage sub-sector ([Azis, 2021](#); [Efriyenty & Purba, 2022](#); [Juliani & Muslihat, 2021](#); [Kusdiana et al., 2024](#); [Muttia & Sutrisno, 2022](#); [Qathrunnada et al., 2024](#); [Saraswati & Njotoprajitno, 2022](#); [Sudaryono et al., 2023](#); [Sudirman & Mahwiyah, 2023](#)).

Methodologically, the studies rely on the regression family. Multiple linear regression, panel regression, and logistic regression account for the majority, while a smaller group uses partial least squares structural equation modelling or moderated regression analysis. Only a few studies use machine learning approaches such as artificial neural networks and support vector machines ([Dewi & Rikumahu, 2024](#); [Sehgal et al., 2021](#)). Samples are typically small, often between eight and 30 firms observed over three to five years, which limits statistical power. Distress proxies vary widely and are frequently not reported in abstracts. Where they are reported, the Altman Z-score and its variants are the most common, followed by the Zmijewski score and accounting definitions based on losses.

Table 2. Summary of the Included Studies

Study	Context and sample	Method	LIQ	LEV	PRO	SIZE
Hastiarto (2021)	IDX manufacturing; 33 firms, 2016–2019	Logistic/MRA	D	R	D	–
Umamah & Nurasik (2023)	IDX mining; 2018–2020	Regression	N	U	N	–
Pebrianti et al. (2023)	IDX tourism services; 55 firms, 2019–2021	MRA	U	N	M	–
Aryani & Sihono (2024)	IDX consumer goods; 20 firms, 2020–2022	MLR	D	N	D	–
Suwandi & Tanusdjaja (2021)	IDX manufacturing; 20 firms, 2017–2019	MLR (EViews)	R	–	D	–
Rahmawati et al. (2023)	IDX property; 47 firms, 2019–2021	Path analysis	N	U	U	–
Diyanto (2020)	Riau manufacturing; 129 firms	MLR	U	U	U	–
Achyani & Kusumawati (2023)	IDX non-financial; 771 firm-years, 2020–2022	MLR	N	U	U	–
Sugiarto & Mahanani (2020)	IDX manufacturing; 2018	Logistic regression	N	R	D	–
Hidayat et al. (2024)	IDX energy; 2019–2022	Panel/MRA	N	–	R	–
Suhartono et al. (2024)	IDX transportation; 2018–2022	MLR	D	D	R	R
Handayani & Yusran (2024)	IDX property; 2018–2022	MLR	U	U	U	N
Umam & Yusuf (2024)	IDX wholesale/retail; 29 firms, 145 obs.	Panel FEM (Z-score)	N	D	D	–
Wijaya et al. (2024)	IDX transportation; 8 firms, 2018–2022	MLR	N	U	U	–
Hwang & Viriany (2023)	IDX plastics & packaging; 38 firm-years, 2019–2022	MLR	–	R	–	N
Ramadani & Ratmono (2023)	IDX manufacturing; 128 firms, 2018–2020	SEM-PLS	D	D	–	M
Kibe et al. (2024)	Kenya; 25 state corporations, 2015–2021	Logit	–	–	–	N
Arya & Suhendah (2024)	IDX manufacturing; 69 firms, 2017–2019	Panel (EViews)	–	N	N	D
Mala Sari & Isbanah (2024)	IDX healthcare; 17 firms, 2018–2022	Logistic regression	D	–	–	N
Tania & Wijaya (2021)	IDX manufacturing; 16 firms, 2017–2019	MRA (EViews)	R	R	–	R
Saputra & Salim (2020)	IDX manufacturing; 109 samples, 2015–2017	Panel (EViews)	–	N	U	N
Rizai et al. (2023)	IDX manufacturing hedgers; 17 firms, 2020–2022	SEM-PLS	U	–	–	U
Suharti (2023)	IDX infrastructure; 177 obs., 2018–2021	MRA	–	R	D	M
Elviyo & Nugroho (2024)	IDX mining; 18 firms, 2017–2020	MLR (EViews)	U	–	–	U
Agatha & Wijaya (2022)	IDX manufacturing; 14 firms, 2017–2019	MRA (EViews)	N	N	–	R
Chai & Sudirgo (2021)	IDX manufacturing; 60 firm-years, 2017–2019	Panel (EViews)	N	R	–	N
Atang et al. (2022)	IDX hotels & tourism; 16 firms, 2015–2020	Panel (Z-score)	D	R	D	–
Utami et al. (2021)	IDX agriculture, basic industry & chemicals; 380 obs.	Logistic regression	U	U	U	–
Efriyenty & Purba (2022)	IDX food & beverage; 10 firms, five years	Regression	–	–	U	–
Azis (2021)	IDX food & beverage; 6 firms, 2017–2020	Logistic regression	N	U	N	–
Muttia & Sutrisno (2022)	IDX food & beverage; 27 firms	MLR (Z-score)	U	N	U	–
Sudirman & Mahwiyah (2023)	IDX food & beverage; 2018–2021	MLR	N	D	N	–
Saraswati & Njotoprajitno (2022)	IDX food & beverage; 18 firms, 2015–2019	Logistic regression	N	U	N	–
Sudaryono et al. (2023)	IDX food & beverage; 12 firms, 2016–2020	Panel (Altman classification)	U	–	U	–
Qathrunnada et al. (2024)	IDX food & beverage; 20 firms, 100 obs.	Logistic regression	–	N	D	–

Study	Context and sample	Method	LIQ	LEV	PRO	SIZE
Kusdiana et al. (2024)	IDX food & beverage; 84 firms, 235 obs., 2018–2022	SEM-PLS	–	–	–	N
Rarassati & Bustaman (2021)	IDX manufacturing; COVID-19 period	Panel regression	–	R	–	–
Dewi (2023)	IDX transportation; 7 firms, 2016–2020	Regression	U	N	N	–
Dewi & Rikumahu (2024)	IDX transport & logistics; 23 firms, 2019–2023	Artificial neural network	D	U	D	–
Zhao & Choi (2022)	China; non-financial listed firms, 2010–2020	Panel (inverted Z-score)	–	–	U	R
Setowening & Djuminah (2023)	IDX building construction; 16 firms, 2016–2021	Panel (EViews)	–	R	U	–
Saraswati et al. (2024)	IDX property; 15 firms, 2018–2022	Panel (Zmijewski)	U	U	U	–
Triliana & Sutrisno (2023)	IDX automotive & components; 12 firms	MLR (Z-score)	D	R	D	–
Fathurachman (2024)	IDX retail trade; 12 firms	MLR	D	–	N	–
Dahlia (2021)	IDX listed firms; 2013–2017	Logistic regression	–	N	–	–
Juliani & Muslihat (2021)	IDX food & beverage; 2014–2019	Descriptive- verificative regression	–	–	U	–
Wisnu & Astuti (2023)	IDX agriculture; 19 firms, 76 obs., 2018–2021	SEM-PLS	R	–	N	–
Betari & Hanif (2023)	IDX retail trade; 18 firms, 2017–2021	SEM-PLS	–	U	M	–
Lesmana & Damayanti (2021)	IDX property & construction; 17 firms, 2016–2018	MLR (Z-score)	U	U	U	–
Septarini (2022)	IDX property; 38 firms, 114 obs., 2018–2020	Logistic regression	–	N	–	–
Sehgal et al. (2021)	India; listed firms	Logit, SVM, ANN	–	U	U	U
Chen et al. (2020)	Taiwan; listed firms	Dynamic prediction models	–	R	–	–
Muzharoatiningsih & Hartono (2022)	IDX listed firms	Regression	–	N	–	–
Septiani et al. (2021)	IDX consumer goods	Regression	–	N	R	–
Wijaya & Suhendah (2023)	IDX listed firms	Regression	–	U	–	–
Mahera & Hartono (2022)	IDX manufacturing	Regression	–	–	–	N
Syuhada et al. (2020)	IDX property & real estate	Regression	–	–	–	D

Source: Authors' synthesis. LIQ = liquidity; LEV = leverage; PRO = profitability; SIZE = firm size. D = reduces distress; R = increases distress; N = not significant; U = significant, direction unspecified; M = moderating role; – = not examined. MLR = multiple linear regression; MRA = moderated regression analysis; F&B = food and beverage.

Quality and Reporting of the Evidence

Before turning to the direction of effects, it is useful to consider the quality and reporting of the evidence, because these shape how much confidence can be placed in the synthesis. Research output on the topic has grown steadily: five of the included studies were published in 2020, 12 in 2021, nine in 2022, 16 in 2023, and 15 in 2024. This growth reflects the continuing relevance of distress prediction after the pandemic, but it has not been accompanied by greater methodological diversity. Only two studies examined all four determinants simultaneously, while 12 examined only one, which makes it difficult to compare the relative importance of the ratios within the same sample.

Reporting practices are also a concern. In 26 of the 57 studies, at least one significant effect was reported in the abstract without a clear direction, and the distress proxy was frequently not identified. Readers of such abstracts cannot tell whether a significant coefficient indicates that a ratio increases or decreases distress, which is particularly problematic when the proxy is a score in which higher values indicate better health. In addition, most studies regress distress on ratios measured in the same year. Because a ratio that is part of the current year's financial statements is also part of the current year's distress score, such designs describe concurrent associations rather than the predictive relationships that early warning systems require. Studies that lag predictors by one or two years, or that compare forecasting horizons, provide stronger evidence; for example, forecasts one year ahead were found to be more accurate than forecasts two years ahead in a study of Indian firms (Sehgal et al., 2021). Finally, few studies address endogeneity or sample selection, even though firms that are already distressed may change their financing and liquidity policies in response. These limitations do not

invalidate the evidence, but they explain why vote counts should be read as indicators of consistency rather than as precise estimates of effect.

Direction and Consistency of the Evidence (RQ2)

Table 3 and Figure 5 summarise the coded effects. Leverage is the most frequently examined determinant (42 studies), followed by profitability (39), liquidity (35), and firm size (19). The profile of each determinant differs markedly.

Table 3. Vote Count of Effect Directions by Determinant

Determinant	Studies	Reduces distress	Increases distress	Not significant	Significant, unspecified	Moderating
Leverage	42	4	11	12	15	0
Profitability	39	10	3	8	16	2
Liquidity	35	9	3	12	11	0
Firm size	19	2	4	8	3	2

Source: Authors' coding of 57 included studies. A study may examine more than one determinant.

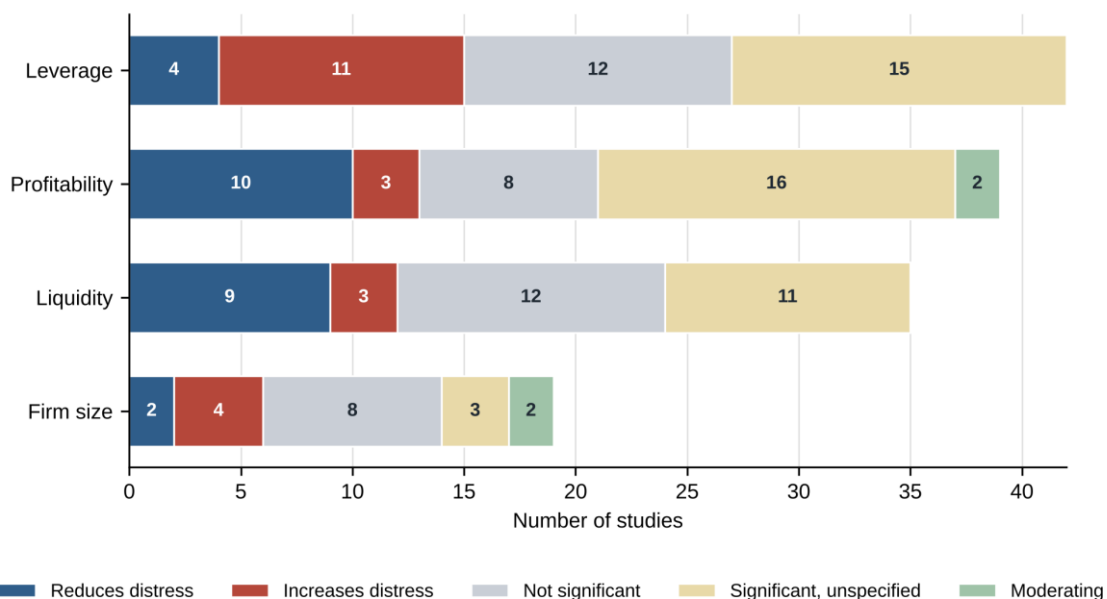


Figure 5. Distribution of Effect Directions across the Four Determinants

Source: Authors' coding of 57 included studies

Leverage: the most consistent warning signal

Among studies that report a clear direction, leverage increases distress far more often than it reduces it (11 versus four). Higher debt ratios were associated with greater distress among manufacturing firms (Hastiarto, 2021; Sugiarto & Mahanani, 2020; Chai & Sudirgo, 2021; Tania & Wijaya, 2021), plastic and packaging firms (Hwang & Viriany, 2023), infrastructure firms (Suharti, 2023), building construction firms (Setowening & Djuminah, 2023), and automotive and hotel firms measured with the Altman Z-score (Triliana & Sutrisno, 2023; Atang et al., 2022). The effect was also observed during the COVID-19 pandemic, when the debt-to-assets ratio increased distress among Indonesian manufacturers (Rarassati & Bustaman, 2021), and in Taiwan, where debt ratios were the main exception to the pattern of higher ratios in sound firms (Chen et al., 2020).

At the same time, 12 studies found no significant effect of leverage (Arya & Suhendah, 2024; Aryani & Sihono, 2024; Muzharoatiningsih & Hartono, 2022; Qathrunnada et al., 2024), and four reported that higher leverage reduced distress (Ramadani & Ratmono, 2023; Suhartono et al., 2024; Sudirman & Mahwiyah, 2023; Umam & Yusuf, 2024). Two of these contrary results come from transportation and trade companies, where debt financing is structurally high and access to credit itself can signal creditworthiness. In such settings, the ability to borrow may indicate that lenders consider the firm viable, consistent with the signalling interpretation that debt can convey positive information. Nevertheless, the overall pattern supports leverage as the most reliable warning signal.

Profitability: the strongest protective factor, with a caveat

Where a direction is reported, profitability reduces distress in ten studies and increases it in only three. Higher returns on assets or lower losses reduced distress in manufacturing (Hastiarto, 2021; Sugiarto & Mahanani, 2020; Suwandi & Tanusdjaja, 2021), consumer goods (Aryani & Sihono, 2024), infrastructure (Suharti, 2023), trade (Umam & Yusuf, 2024), automotive and hotel firms (Triliana & Sutrisno, 2023; Atang et al., 2022), transport and logistics (Dewi & Rikumahu, 2024), and food and beverage companies (Qathrunnada et al., 2024). A further 16 studies found significant effects without specifying the direction in their abstracts, which suggests that profitability is the determinant most often found to matter.

The strength of profitability must, however, be interpreted with care. Most distress proxies are built from profits: accounting definitions classify firms with negative net income as distressed, and the Altman Z-score includes earnings before interest and taxes and retained earnings among its components. When profitability is used to predict a profit-based proxy, part of the observed association is mechanical. The three studies that reported profitability increasing distress (Hidayat et al., 2024; Septiani et al., 2021; Suhartono et al., 2024) and the eight that found no effect (Arya & Suhendah, 2024; Wisnu & Astuti, 2023; Fathurachman, 2024) show that the relationship is not universal, particularly when distress is measured through liquidity-oriented or market-based indicators.

Liquidity: a frequently weak signal

Liquidity has the highest share of non-significant results. Of 35 studies, 12 found no effect, nine found that liquidity reduced distress, three found that it increased distress, and 11 reported unspecified significant effects. The protective effect appears in manufacturing, consumer goods, healthcare, retail, and transport firms (Aryani & Sihono, 2024; Fathurachman, 2024; Hastiarto, 2021; Mala Sari & Isbanah, 2024; Suhartono et al., 2024). However, liquidity was insignificant in several manufacturing, mining, and food and beverage studies (Chai & Sudirgo, 2021; Umamah & Nurasik, 2023; Azis, 2021; Sudirman & Mahwiyah, 2023), and it increased distress in three studies (Suwandi & Tanusdjaja, 2021; Tania & Wijaya, 2021; Wisnu & Astuti, 2023).

Two explanations stand out. First, the current ratio is a static stock measure that does not distinguish between cash and assets that are difficult to convert, such as inventories and receivables. A firm can therefore appear liquid while experiencing cash shortages. This is consistent with the finding that the quick ratio was significant whereas the current ratio was not in a study of transport companies during the pandemic (Dewi, 2023). Second, excessively high liquidity can indicate idle resources and poor asset utilisation, which may erode profitability and eventually increase distress. For food and beverage companies, whose working capital is dominated by inventories of perishable or price-sensitive inputs, this limitation is particularly relevant.

Firm size: a contextual rather than direct determinant

Firm size was examined in 19 studies and was most often insignificant (eight studies). It reduced distress in two studies (Arya & Suhendah, 2024; Syuhada et al., 2020) and increased it in four (Agatha & Wijaya, 2022; Suhartono et al., 2024; Tania & Wijaya, 2021; Zhao & Choi, 2022). Two studies found that size moderated the effects of leverage, liquidity, and profitability (Ramadani & Ratmono, 2023; Suharti, 2023), whereas a Kenyan study found neither a direct nor a moderating effect (Kibe et al., 2024). In the food and beverage sub-sector, size had no significant effect in the largest sample reviewed (Kusdiana et al., 2024). The evidence suggests that size is better understood as a contextual factor that conditions the effects of other ratios than as an independent warning signal. Large firms may enjoy better access to finance, but they may also carry heavier fixed costs and debt, so the net effect depends on sector and period.

Evidence from the food and beverage sub-sector

The nine food and beverage studies largely mirror the overall pattern but with fewer directional results. Profitability was significant in five of the eight food and beverage studies that examined it, either reducing distress (Qathrunnada et al., 2024) or showing significant effects whose direction was not reported (Efriyenty & Purba, 2022; Juliani & Muslihat, 2021; Muttia & Sutrisno, 2022; Sudaryono et al., 2023). Liquidity was insignificant in three of the five studies that tested it (Azis, 2021; Saraswati & Njotoprajitno, 2022; Sudirman & Mahwiyah, 2023), and leverage produced mixed results, ranging from no effect (Muttia & Sutrisno, 2022; Qathrunnada et al., 2024) to a negative effect (Sudirman & Mahwiyah, 2023). Table 4 summarises these findings. Overall, earnings capacity appears to be the

main safeguard for food and beverage firms, which is consistent with the recent distress cases in which falling sales and rising input costs eroded profits (Elvira, 2023; Ramadhani, 2024).

Table 4. Evidence from Food and Beverage Studies

Study	Liquidity	Leverage	Profitability	Firm size
Efrienty & Purba (2022)	–	–	U	–
Azis (2021)	N	U	N	–
Muttia & Sutrisno (2022)	U	N	U	–
Sudirman & Mahwiyah (2023)	N	D	N	–
Saraswati & Njotoprajitno (2022)	N	U	N	–
Sudaryono et al. (2023)	U	–	U	–
Qathrunnada et al. (2024)	–	N	D	–
Kusdiana et al. (2024)	–	–	–	N
Juliani & Muslihat (2021)	–	–	U	–

Source: Authors' coding. D = reduces distress; N = not significant; U = significant, direction unspecified; – = not examined.

The COVID-19 period as a stress test

Many of the included studies cover the years 2020 to 2022, which makes the COVID-19 pandemic an unplanned stress test of the four determinants. During the pandemic, mobility restrictions and shifts in consumer spending caused abrupt declines in sales in sectors such as transportation, hospitality, and tourism, while government relief measures, loan restructuring, and tax incentives temporarily eased liquidity pressures. Under these conditions, leverage became a particularly important signal: firms with heavier debt burdens were more exposed to falling revenues, as reflected in the positive effect of the debt-to-assets ratio on distress among Indonesian manufacturers during the pandemic (Rarassati & Bustaman, 2021). Hotel and tourism firms showed a marked deterioration in Z-scores in 2020 (Atang et al., 2022), and transport and logistics firms with lower liquidity and profitability were more likely to be classified as distressed in the years before, during, and after the pandemic (Dewi & Rikumahu, 2024). At the same time, the relief measures may have weakened the observed effect of liquidity, because firms were able to defer obligations regardless of their current ratio. The pandemic thus illustrates how the informational value of a financial signal depends on the economic and policy environment in which it is observed.

Explaining the Inconsistencies (RQ3)

The review identifies five interrelated explanations for the contradictory findings. The first is the heterogeneity of distress proxies. Studies that use the Altman Z-score, the Zmijewski score, losses, or interest coverage are, in effect, studying different constructs. Ratios that enter the proxy, such as profitability in the Z-score or leverage in the Zmijewski model, will show stronger associations than ratios that do not. Many abstracts do not even report the proxy, which makes cumulative interpretation difficult. Comparative studies showing that models classify the same firms differently reinforce this point (Ramly & Amilia, 2023).

The second explanation is mechanical overlap between predictors and outcomes, which inflates the apparent importance of profitability and, depending on the model, of leverage and liquidity. The third is small samples and short periods: many studies analyse fewer than 30 firms over three years, so a few observations can change the sign or significance of a coefficient. The fourth is sectoral heterogeneity. Capital structure norms differ greatly between property, transportation, manufacturing, and food and beverage firms, and the same leverage ratio may signal risk in one sector but normal operations in another. The fifth is the influence of the COVID-19 period. Several studies cover 2020–2022, when sales shocks and government relief measures disrupted the usual relationships between ratios and distress. Evidence from Indonesia indicates that distress levels changed significantly during the pandemic in the consumer non-cyclicals sector, which includes food and beverage companies (Umam & Ratmono, 2023), and similar sectoral effects were observed in Malaysia (Hashim et al., 2024). Finally, omitted variables such as operating cash flow, operating capacity, and corporate governance can confound the effects of the four ratios, as shown by studies in which governance indicators improved distress prediction (Chen et al., 2020; Uduwalage, 2021).

Table 5. Research Agenda Derived from the Review

Theme	Evidence gap	Suggested research direction
Distress measurement	Proxies vary and are often unreported	Report the proxy explicitly; test robustness across several proxies (Altman, Zmijewski, losses, interest coverage)
Mechanical overlap	Profitability and leverage partly embedded in proxies	Use proxies that do not contain the predictors, or use forward-looking outcomes such as subsequent default or delisting
Liquidity	Static ratios frequently insignificant	Add operating cash flow, cash conversion cycle, and inventory turnover, especially for food and beverage firms
Firm size	Weak direct effects	Model size as a moderator or control and test non-linear effects
Sample and period	Small samples and short, pandemic-affected windows	Use longer panels, compare pre-, during-, and post-pandemic periods, and pool sectors with sector fixed effects
Food and beverage	Few studies and few directional results	Conduct sector-specific studies of the expanded post-2021 population of listed food and beverage firms, including input-cost and demand shocks

Source: Authors' synthesis of the 57 included studies

Theoretical and Practical Implications

Theoretically, the review refines the application of signalling theory to financial distress. Not all financial signals are equally informative. Leverage and profitability emerge as the most credible signals because they reflect the two forces that ultimately determine solvency: the burden of fixed obligations and the capacity to generate income. Liquidity is a weaker and noisier signal, and firm size acts primarily as a contextual factor that conditions how other signals should be interpreted. Signalling theory therefore needs to be combined with sector and measurement considerations to explain when a ratio conveys risk.

Practically, managers of listed companies should monitor leverage and profitability closely and treat a combination of rising debt and declining returns as an early warning that requires corrective action, such as restructuring debt, cutting costs, or strengthening revenue. Liquidity should be monitored through cash-flow and working-capital indicators rather than the current ratio alone, particularly in the food and beverage sub-sector, where inventories and receivables can mask cash shortages. Investors and creditors can use these insights to prioritise signals when screening firms, and regulators and the stock exchange can encourage disclosures that make distress risk more transparent. For researchers, including the planned study of food and beverage companies listed on the IDX between 2021 and 2023 from which this review originates, the findings suggest reporting the distress proxy explicitly, avoiding overlap between predictors and proxies, adding cash-flow variables, and treating firm size as a moderator.

The findings can also be translated into a simple early-warning approach for listed companies and their stakeholders. A first layer would track leverage and profitability every quarter, flagging firms whose debt ratios rise while returns on assets fall for two consecutive periods. A second layer would replace or complement the current ratio with operating cash flow relative to current liabilities, the cash conversion cycle, and inventory turnover, which capture the liquidity pressures that static ratios miss. A third layer would interpret these signals in light of firm size, sector norms, and macroeconomic conditions, recognising that the same leverage ratio may be normal in property or transportation but risky in food and beverage manufacturing. Such an approach is consistent with the evidence that combined models, which integrate financial ratios with governance or market information, predict distress more accurately than single-ratio models (Chen et al., 2020; Nguyen et al., 2024). For the food and beverage sub-sector, additional indicators such as the share of imported inputs and the sensitivity of margins to raw material prices would further sharpen the warning system.

Limitations

This review has several limitations. First, because of access constraints, the database search relied on Crossref, so studies indexed only in Scopus, Web of Science, or national databases may have been missed. Citation tracking reduced this risk, but some relevant studies may still be absent. Second, screening and coding were based on titles, abstracts, and bibliographic metadata; when abstracts did not report the direction of an effect or the distress proxy, the effect was coded as unspecified, which

limits the precision of the vote counts. Third, vote counting does not take effect sizes or study quality into account, and the predominance of small Indonesian samples limits generalisability. Fourth, the review covers only 2020–2024 and journal articles, excluding earlier foundational work and grey literature.

CONCLUSION

This systematic review synthesised 57 empirical studies published between 2020 and 2024 on liquidity, leverage, profitability, and firm size as determinants of financial distress. The evidence base is dominated by small-sample regression studies of companies listed on the Indonesia Stock Exchange, with nine studies focused on the food and beverage sub-sector. Leverage emerges as the most consistent warning signal of distress, and profitability as the strongest protective factor, although part of the latter reflects its overlap with profit-based distress proxies. Liquidity is frequently insignificant and occasionally reversed, and firm size seldom has a direct effect, functioning instead as a contextual or moderating factor. In the food and beverage sub-sector, profitability is the most frequently significant determinant, while evidence on liquidity and size is weak.

The inconsistent findings in the literature can be traced to heterogeneous distress proxies, mechanical overlap between predictors and outcomes, small samples and short periods, sectoral differences, and the disruptive effects of the COVID-19 pandemic. Future research should report and vary distress proxies, incorporate cash-flow and governance variables, model firm size as a moderator, and use longer, sector-specific panels. For managers and investors, the message is clear: a combination of rising leverage and falling profitability is the most reliable early warning that a firm is moving towards financial distress.

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Abbreviations

ANN (Artificial Neural Network), DAR (Debt to Assets Ratio), DER (Debt to Equity Ratio), DOI (Digital Object Identifier), F&B (Food and Beverage), IDX (Indonesia Stock Exchange), MLR (Multiple Linear Regression), MRA (Moderated Regression Analysis), NPM (Net Profit Margin), PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), ROA (Return on Assets), ROE (Return on Equity), SEM-PLS (Structural Equation Modelling–Partial Least Squares), SVM (Support Vector Machine).

Author Contributions

NN conceptualised the review topic from the original research proposal, conducted the search and screening, extracted the data, and prepared the initial draft. MM supervised the review, refined the theoretical framework and synthesis, verified the coding, critically revised the manuscript, and acts as the corresponding author. Both authors have read and approved the final manuscript.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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Availability of Data and Materials

The list of screened records, the coding sheet, and the search strings are available from the corresponding author upon reasonable request.

REFERENCES

- Achyani, M. N., & Kusumawati, E. (2023). Pengaruh profitability, leverage, liquidity, dan good corporate governance terhadap financial distress [The effect of profitability, leverage, liquidity, and good corporate governance on financial distress]. *Jurnal Maneksi*, 12(4), 899–908. <https://doi.org/10.31959/jm.v12i4.1999>
- Agatha, S. D., & Wijaya, H. (2022). Faktor-faktor yang mempengaruhi financial distress dengan firm size sebagai variabel pemoderasi [Factors affecting financial distress with firm size as a moderating variable]. *Jurnal Paradigma Akuntansi*, 4(1), 218. <https://doi.org/10.24912/jpa.v4i1.17285>
- Arya, A., & Suhendah, R. (2024). Pengaruh profitability, firm size, dan leverage terhadap financial distress [The effect of profitability, firm size, and leverage on financial distress]. *Jurnal Paradigma Akuntansi*, 6(1), 507–516. <https://doi.org/10.24912/jpa.v6i1.29015>
- Aryani, A., & Sihono, A. (2024). Pengaruh liquidity, profitability, leverage terhadap financial distress [The effect of liquidity, profitability, and leverage on financial distress]. *Jaksya: Jurnal Akuntansi Syariah*, 2(1), 45–54. <https://doi.org/10.24952/jaksya.v2i1.11027>
- Atang, G. D., Massie, J., & Wangke, S. (2022). The effect of financial ratios to financial distress using Altman Z score on hotel and tourism companies listed in Indonesian Stock Exchange. *Jurnal EMBA*, 10(1), 1467–1475. <https://doi.org/10.35794/emba.v10i1.39492>
- Azis, Y. M. (2021). Financial ratio analysis in predicting financial distress of food and beverage companies with logistic regression. *Sinergi: Jurnal Ilmiah Ilmu Manajemen*, 11(2), 43–49. <https://doi.org/10.25139/sng.v11i2.4157>
- Badan Pusat Statistik. (2024). *Jumlah penduduk pertengahan tahun (ribu jiwa), 2019–2023* [Mid-year population (thousand people), 2019–2023]. Badan Pusat Statistik. <https://www.bps.go.id>
- Betari, F. H., & Hanif, A. (2023). Profitability moderates institutional ownership's impact on financial distress. *Indonesian Journal of Law and Economics Review*, 18(2). <https://doi.org/10.21070/ijler.v19i0.905>
- Chai, T. M., & Sudirgo, T. (2021). Pengaruh liquidity, leverage dan firm size terhadap financial distress pada perusahaan manufaktur [The effect of liquidity, leverage and firm size on financial distress in manufacturing companies]. *Jurnal Paradigma Akuntansi*, 3(4), 1399. <https://doi.org/10.24912/jpa.v3i4.14953>
- Chen, C.-C., Chen, C.-D., & Lien, D. (2020). Financial distress prediction model: The effects of corporate governance indicators. *Journal of Forecasting*, 39(8), 1238–1252. <https://doi.org/10.1002/for.2684>
- Dahlia, D. (2021). The influence of financial ratios and companies size to predict conditions of financial distress: Researches on companies listed on Indonesian Stock Exchange for the period 2013–2017. *The Accounting Journal of Binaniaga*, 6(1), 27. <https://doi.org/10.33062/ajb.v6i1.419>
- Dewi, S. (2023). Effect of financial performance on financial distress conditions during the Covid-19 pandemic on transportation companies listed on the Indonesia Stock Exchange (IDX). *Indonesian Journal of Management Studies*, 2(2), 31–51. <https://doi.org/10.53769/ijms.v2i2.668>

- Dewi, S., & Rikumahu, B. (2024). Prediction of financial distress in transportation and logistics companies before, during and after the Covid-19 pandemic listed on the Indonesia Stock Exchange. *Global Academy of Business Studies*, 1(2), 115–134. <https://doi.org/10.35912/gabs.v1i2.3576>
- Diyanto, V. (2020). The effect of liquidity, leverage and profitability on financial distress. *Indonesian Journal of Economics, Social, and Humanities*, 2(2), 127–133. <https://doi.org/10.31258/ijesh.2.2.127-133>
- Elfrienty, D., & Purba, N. M. B. (2022). Use of profit and cash flows in predicting financial distress food and beverage companies. *Owner: Riset dan Jurnal Akuntansi*, 6(2), 1239–1248. <https://doi.org/10.33395/owner.v6i2.544>
- Elvira, V. (2023, August). Kinerja semester I/2023 lesu, manajemen Wahana Interfood (COCO) beri penjelasan [Sluggish first-half 2023 performance: Wahana Interfood (COCO) management explains]. *Kontan*. <https://industri.kontan.co.id/news/kinerja-semester-i2023-lesu-manajemen-wahana-interfood-coco-beri-penjelasan>
- Elviyo, E., & Nugroho, V. (2024). Pengaruh leverage, sales growth, firm size, profitabilitas dan likuiditas terhadap financial distress [The effect of leverage, sales growth, firm size, profitability and liquidity on financial distress]. *Jurnal Paradigma Akuntansi*, 6(1), 190–199. <https://doi.org/10.24912/jpa.v6i1.28660>
- Fahmi, M. (2024). *Indonesia's F&B startups are more robust with the resilience of Indonesia's economy*. East Ventures. <https://east.vc/id/berita/insights-id/fnb-startup-indonesia/>
- Fathurachman, F. (2024). Determinants of financial distress in retail trade sub-sector companies in Indonesia. *Governors*, 3(2), 72–80. <https://doi.org/10.47709/governors.v3i2.4315>
- Handayani, F., & Yusran, G. A. (2024). Pengaruh profitabilitas, leverage, likuiditas dan ukuran perusahaan terhadap financial distress pada sub sektor property & real estate [The effect of profitability, leverage, liquidity and company size on financial distress in the property and real estate sub-sector]. *Visioner: Jurnal Manajemen dan Bisnis*, 13(2), 187–196. <https://doi.org/10.52630/jmbv.v13.i02.10>
- Hashim, M., Muhammad, K., Ghani, E. K., & Abd Azis, M. A. (2024). Financial distress analysis of top 100 Malaysian public listed companies during COVID-19 pandemic using Altman Z-score analysis. *International Journal of Economics and Financial Issues*, 14(4), 200–205. <https://doi.org/10.32479/ijefi.16545>
- Hastiarto, O. (2021). The effect of liquidity, leverage, and profitability on financial distress with audit committee as a moderating variable. *International Journal of Current Science Research and Review*, 4(10). <https://doi.org/10.47191/ijcsrr/v4-i10-13>
- Hidayat, T., Yahya, A., Heruwanto, J., & Wibowo, R. (2024). Peran leverage sebagai moderasi pengaruh profitabilitas dan likuiditas terhadap financial distress [The role of leverage as moderator of the effect of profitability and liquidity on financial distress]. *EKOMABIS: Jurnal Ekonomi Manajemen Bisnis*, 5(2), 237–250. <https://doi.org/10.37366/ekomabis.v5i02.1582>
- Hwang, H., & Viriany, V. (2023). Pengaruh leverage, operating capacity, firm size, dan operating cash flow terhadap financial distress [The effect of leverage, operating capacity, firm size, and operating cash flow on financial distress]. *Gema Ekonomi*, 12(8). <https://doi.org/10.36418/gemaekonomi.v12i8.3034>
- Indonesia Stock Exchange. (2024). *IDX statistics 2023*. Indonesia Stock Exchange. <https://www.idx.co.id>

- Juliani, R. H., & Muslihat, A. (2021). Influence of profit and cash flow on financial distress conditions. *Jurnal Ilmu Manajemen Profitability*, 5(2), 327–339. <https://doi.org/10.26618/profitability.v5i2.5905>
- Kamran, M., & Saleem, H. M. N. (2023). Financial indicators and corporate financial distress prediction in context of Pakistan: A systemic review. *Annals of Social Sciences and Perspective*, 4(2), 555–561. <https://doi.org/10.52700/assap.v4i2.344>
- Kibe, P., Wamugo, L., & Atheru, G. (2024). The moderating role of firm size on financial distress in commercial and manufacturing state corporations in Kenya. *International Journal of Finance and Accounting*, 9(4), 50–66. <https://doi.org/10.47604/ijfa.2929>
- Kraus, S., Breier, M., & Dasí-Rodríguez, S. (2020). The art of crafting a systematic literature review in entrepreneurship research. *International Entrepreneurship and Management Journal*, 16(3), 1023–1042. <https://doi.org/10.1007/s11365-020-00635-4>
- Kusdiana, Y., Islami, R., & Suryadi, N. (2024). Innovative approaches to financial distress: The impact of company size and sales growth on food and beverage companies listed on the Indonesia Stock Exchange. *International Journal of Information System and Innovation Management*, 2(2), 66–74. <https://doi.org/10.55583/ijisim.v2i2.1156>
- Lesmana, N., & Damayanti, C. R. (2021). How corporate governance protects Indonesian companies from financial distress. *Jurnal Administrasi Bisnis*, 10(1), 13–22. <https://doi.org/10.14710/jab.v10i1.33523>
- Mahera, A. V., & Hartono, U. (2022). Analisis pengaruh ukuran perusahaan dan kepemilikan institusional terhadap financial distress pada perusahaan manufaktur yang terdaftar di Bursa Efek Indonesia (BEI) [Analysis of the effect of firm size and institutional ownership on financial distress in manufacturing companies listed on the IDX]. *Edukatif: Jurnal Ilmu Pendidikan*, 4(4), 5461–5471. <https://doi.org/10.31004/edukatif.v4i4.3153>
- Mala Sari, E. E., & Isbanah, Y. (2024). Pengaruh likuiditas, sales growth, firm size, arus kas operasi, CEO duality, dan intellectual capital terhadap financial distress [The effect of liquidity, sales growth, firm size, operating cash flow, CEO duality, and intellectual capital on financial distress]. *Jurnal Ilmu Manajemen*, 12(1), 15–31. <https://doi.org/10.26740/jim.v12n1.p15-31>
- Muttia, E. E., & Sutrisno. (2022). Financial performance and prediction of financial distress in food and beverage companies listed on the Indonesia Stock Exchange. *International Journal of Economics, Business and Management Research*, 6(5), 154–167. <https://doi.org/10.51505/ijebmr.2022.6513>
- Muzharoatiningsih, M., & Hartono, U. (2022). Pengaruh rasio keuangan, sales growth, dan ukuran perusahaan terhadap financial distress [The effect of financial ratios, sales growth, and firm size on financial distress]. *Jurnal Ilmu Manajemen*, 10(3), 747–758. <https://doi.org/10.26740/jim.v10n3.p747-758>
- Nandini, I., & Mudjijah, S. (2023). Analisis financial distress dengan metode Altman sebagai prediksi kesehatan keuangan perusahaan [Financial distress analysis using the Altman method as a predictor of corporate financial health]. *Efektor*, 10(2), 180–189. <https://doi.org/10.29407/e.v10i2.19500>
- Nguyen, M., Nguyen, B., & Liêu, M.-L. (2024). Corporate financial distress prediction in a transition economy. *Journal of Forecasting*, 43(8), 3128–3160. <https://doi.org/10.1002/for.3177>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D.

- (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- Pebrianti, G., Suryadi, E., & Safitri, H. (2023). Profitabilitas memoderasi pengaruh likuiditas, leverage dan operating capacity terhadap financial distress [Profitability moderates the effect of liquidity, leverage and operating capacity on financial distress]. *Akuntansi Bisnis & Manajemen*, 30(1). <https://doi.org/10.35606/jabm.v30i1.1181>
- Primawan, A. (2023). Systematic literature review – Determinants of corporate financial distress prediction. *Jurnal Akuntansi*, 13(2), 120–130. <https://doi.org/10.33369/jakuntansi.13.2.120-130>
- Qathrunnada, N., Ahmad, G. N., Yusuf, H. M., & Desmawan, D. (2024). The effect of leverage, total assets turnover, and profitability on financial distress in food and beverage subsector companies on the IDX. *International Journal of Education, Social Studies, and Management*, 4(2), 321–333. <https://doi.org/10.52121/ijessm.v4i2.252>
- Rahmawati, I. A., Indrawati, N. K., & Andarwati, A. (2023). The impact of liquidity and leverage on financial distress: Profitability as an intervening. *Journal of Economics, Finance and Management Studies*, 6(7). <https://doi.org/10.47191/jefms/v6-i7-51>
- Ramadani, A., & Ratmono, D. (2023). Financial distress prediction: The role of financial ratio and firm size. *JRAK: Jurnal Riset Akuntansi dan Komputerisasi Akuntansi*, 15(1), 19–26. <https://doi.org/10.23969/jrak.v15i1.6428>
- Ramadhani, P. I. (2024). Harga bahan baku melonjak, Buyung Poetra Sembada catat rugi Rp 1,47 miliar pada 2023 [Raw material prices soar, Buyung Poetra Sembada books a loss of IDR 1.47 billion in 2023]. *Liputan6*. <https://www.liputan6.com/saham/read/5563034/harga-bahan-baku-melonjak-buyung-poetra-sem-bada-catat-rugi-rp-147-miliar-pada-2023>
- Ramly, R., & Amilia, A. (2023). Perbandingan ketepatan prediksi financial distress antara model Altman Z-score dengan model Zmijewski X-score [Comparison of the predictive accuracy of the Altman Z-score and Zmijewski X-score models]. *Tangible Journal*, 8(1), 55–63. <https://doi.org/10.53654/tangible.v8i1.340>
- Rarassati, J. P., & Bustaman, Y. (2021). Analysis of financial distress determinants and the role of corporate governance for risk mitigation on listed Indonesian manufacturing companies: COVID-19 pandemic. *Business Excellence and Management*, 11(Special Issue 2), 182–195. <https://doi.org/10.24818/beman/2021.s.i.2-14>
- Rizai, S., Ratnawati, T., & Pristiana, U. (2023). The effect of macroeconomics, firm size, assets growth, and liquidity on financial distress and hedging decisions with good corporate governance as moderating variable. *International Journal of Social Science Humanity & Management Research*, 2(12). <https://doi.org/10.58806/ijsshmr.2023.v2i12n11>
- Saputra, A. J., & Salim, S. (2020). Pengaruh profitabilitas, leverage, firm size, dan sales growth terhadap financial distress [The effect of profitability, leverage, firm size, and sales growth on financial distress]. *Jurnal Paradigma Akuntansi*, 2(1), 262. <https://doi.org/10.24912/jpa.v2i1.7154>
- Saraswati, C., & Njotoprajitno, R. S. (2022). Pengaruh rasio keuangan terhadap financial distress perusahaan food & beverage [The effect of financial ratios on financial distress in food and beverage companies]. *Analisis*, 12(2), 164–175. <https://doi.org/10.37478/als.v12i2.1918>
- Saraswati, R. A., Ratnawati, A., & Irawan, T. (2024). Determinants of financial distress in property and real estate companies listed on the Indonesian Stock Exchange. *Jurnal Ekonomi dan Kebijakan Pembangunan*, 13(2), 80–92. <https://doi.org/10.29244/jekp.13.2.2024.80-92>
- Sehgal, S., Mishra, R. K., Deisting, F., & Vashisht, R. (2021). On the determinants and prediction of corporate financial distress in India. *Managerial Finance*, 47(10), 1428–1447. <https://doi.org/10.1108/MF-06-2020-0332>

- Septarini, D. F. (2022). Prediction of financial distress on properties and real estate in Indonesia. *International Journal of Current Science Research and Review*, 5(7). <https://doi.org/10.47191/ijcsrr/v5-i7-62>
- Septiani, T. A., Siswantini, T., & Murtatik, S. (2021). Pengaruh likuiditas, leverage dan profitabilitas terhadap financial distress pada sektor industri barang konsumsi yang terdaftar di BEI [The effect of liquidity, leverage and profitability on financial distress in the consumer goods sector listed on the IDX]. *Jurnal Apresiasi Ekonomi*, 9(1), 100–111.
- Setowening, S., & Djuminah, D. (2023). Determinants of financial distress in the building construction sub-sector companies listed on the Indonesia Stock Exchange. *Journal of Enterprise and Development*, 6(1), 97–108. <https://doi.org/10.20414/jed.v6i1.8695>
- Sudaryono, Nurcahyo, B., & Saputri, I. P. (2023). The effect of operating capacity, liquidity, and profitability on financial distress in food and beverage sub-sector companies listed on the Indonesia Stock Exchange period 2016–2020. *International Journal Management and Economic*, 2(1), 21–33. <https://doi.org/10.56127/ijme.v2i1.483>
- Sudirman, G., & Mahwiyah, M. (2023). Determination of financial distress in food and beverage sector manufacturing companies listed in the Indonesia Stock Exchange. *JACTA: Journal of Accounting and Tax*, 2(1), 1–8. <https://doi.org/10.58738/jacta.v2i1.303>
- Sugiarto, S., & Mahanani, S. (2020). Effect of profitability, leverage, liquidity and activity against financial distress conditions. *EkBis: Jurnal Ekonomi dan Bisnis*, 4(2), 456. <https://doi.org/10.14421/ekbis.2020.4.2.1275>
- Suharti, S. (2023). Pengaruh rasio keuangan terhadap financial distress dengan firm size sebagai variabel moderasi [The effect of financial ratios on financial distress with firm size as a moderating variable]. *Jurnal Ekobistek*, 12(2), 646–651. <https://doi.org/10.35134/ekobistek.v12i2.599>
- Suhartono, S., Handayani, L., & Nurkasim, F. U. A. (2024). Pengaruh likuiditas, leverage, profitabilitas dan ukuran perusahaan terhadap financial distress pada perusahaan sub sektor transportasi [The influence of liquidity, leverage, profitability and company size on financial distress in transportation sub-sector companies]. *Visioner: Jurnal Manajemen dan Bisnis*, 13(1), 95–112. <https://doi.org/10.52630/jmbv.v13.i01.17>
- Suwandi, F., & Tanusdjaja, H. (2021). Pengaruh liquidity, leverage, profitability (LOSS), dan institutional ownership terhadap financial distress [The effect of liquidity, leverage, profitability (loss), and institutional ownership on financial distress]. *Jurnal Paradigma Akuntansi*, 3(4), 1537. <https://doi.org/10.24912/jpa.v3i4.15246>
- Syuhada, P., Muda, I., & Rujiman. (2020). Pengaruh kinerja keuangan dan ukuran perusahaan terhadap financial distress pada perusahaan property dan real estate di Bursa Efek Indonesia [The effect of financial performance and firm size on financial distress in property and real estate companies on the IDX]. *Jurnal Riset Akuntansi dan Keuangan*, 8(2), 319–336. <https://doi.org/10.17509/jrak.v8i2.22684>
- Tania, M., & Wijaya, H. (2021). Faktor-faktor yang mempengaruhi financial distress dengan firm size sebagai variabel moderasi [Factors affecting financial distress with firm size as a moderating variable]. *Jurnal Paradigma Akuntansi*, 3(4), 1517. <https://doi.org/10.24912/jpa.v3i4.15244>
- Triliana, S. P., & Sutrisno, S. (2023). Company performance and financial distress in automotive and component companies listed on the Indonesia Stock Exchange. *International Journal of Multidisciplinary Research and Analysis*, 6(2). <https://doi.org/10.47191/ijmra/v6-i2-28>
- Uduwalage, E. (2021). Does corporate governance enhance financial distress prediction? *South Asian Journal of Business Insights*, 1(1), 78–114. <https://doi.org/10.4038/sajbi.v1i1.41>

- Umam, D. C., & Yusuf, Y. (2024). Determinants of financial distress: Review of the aspects of profitability, liquidity, leverage, and activity. *International Journal Multidisciplinary Science*, 3(1), 36–44. <https://doi.org/10.56127/ijml.v3i1.1218>
- Umam, K., & Ratmono, D. (2023). Prediksi financial distress pada perusahaan listed di Indonesia akibat pandemi Covid-19 [Prediction of financial distress in listed companies in Indonesia due to the Covid-19 pandemic]. *Owner: Riset dan Jurnal Akuntansi*, 7(4), 2836–2843. <https://doi.org/10.33395/owner.v7i4.1582>
- Umamah, R., & Nurasik, N. (2023). Profitability, liquidity, and leverage: Exploring financial distress in the mining sector. *Academia Open*, 8(1). <https://doi.org/10.21070/acopen.8.2023.3677>
- Utami, D. W., Atmaja, H. E., & Hirawati, H. (2021). The role of financial ratios on the financial distress prediction. *Kinerja*, 25(2), 287–307. <https://doi.org/10.24002/kinerja.v25i2.4661>
- Wijaya, F. D., Lasmana, A., & Melani, M. M. (2024). The effect of liquidity, profitability, leverage and activity on financial distress. *Jurnal Ilmiah Manajemen Kesatuan*, 12(4), 1377–1388. <https://doi.org/10.37641/jimkes.v12i4.2550>
- Wijaya, J., & Suhendah, R. (2023). Pengaruh likuiditas, leverage, dan arus kas terhadap financial distress [The effect of liquidity, leverage, and cash flow on financial distress]. *Jurnal Ekonomi*, 28(2), 177–196. <https://doi.org/10.24912/je.v28i2.1468>
- Wisnu, F., & Astuti, D. P. (2023). Financial distress: Profitability ratios and liquidity ratios, with financial statement fraud as moderating. *Economic Education Analysis Journal*, 12(2), 15–26. <https://doi.org/10.15294/eeaj.v12i2.67570>
- Zhao, Y., & Choi, T.-Y. (2022). Effects of external corporate governance mechanism on financial distress risk: Evidence from Chinese listed firms. *Journal of the Korean Data Analysis Society*, 24(6), 2085–2098. <https://doi.org/10.37727/jkdas.2022.24.6.2085>