

EARLY WARNING SYSTEM OF BANKRUPTCY OF INDONESIAN BUSINESS-TO-CONSUMER (B2C) RETAIL Amidst MACROECONOMIC PRESSURE

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ABSTRACT

Corporate bankruptcy is generally preceded by a decline in financial performance that can be detected early through financial ratio analysis. Entering 2026, the business-to-consumer (B2C) retail sector in Indonesia faces new macroeconomic pressures in the form of a weakening rupiah and contracting retail sales, making early detection of bankruptcy risk crucial for investors and fund managers. This study evaluates the financial health of B2C retail companies listed on the Indonesia Stock Exchange using the Altman Z-Score model as an early warning system instrument, based on signaling theory and agency theory. A quantitative descriptive method was used with a sample of 15 pure B2C retail companies (60 annual financial report observations) for the 2021–2024 period, purposively selected from a population of 31 companies based on the completeness of audited reports and the purity of their B2C business models. The results show that the proportion of companies in the Safe Zone increased from 60.0 percent (2021) to 80.0 percent (2022 and 2024), reflecting a sharp post-pandemic recovery. However, two issuers were found to be consistently in the Distress Zone, indicating structural issues that make them vulnerable to further macroeconomic shocks. This study confirms that the Altman Z-Score is effective as an early warning tool to help investors and fund managers mitigate investment risks in the B2C retail sector amid increasing macroeconomic uncertainty.

Keywords: *Altman Z-Score; financial distress; early warning system; macroeconomic crisis; retail sector*

INTRODUCTION

Mid-2026 marked a new phase of pressure on Indonesia's macroeconomic stability. In June 2026, the rupiah exchange rate against the US dollar reached Rp18,107, its deepest point of decline in Indonesia's modern history, prompting public comparisons with the 1997–1998 monetary crisis that led to a change in national leadership (Jurnalpost, 2026). This pressure stemmed from a combination of external factors, including geopolitical escalation in the Middle East, the US Federal Reserve's prolonged high-interest rate policy (higher-for-longer), and the rapid outflow of foreign capital from domestic financial markets. Domestic factors also contributed, including a widening trade deficit due to imports far outpacing export growth and the government's shrinking fiscal space (Bank Indonesia, 2026a).

Although monetary authorities and several economists believe this situation cannot yet be categorized as a full-blown crisis, there is consensus that the national economy is entering a phase of structural vulnerability that, without precise policy mitigation, could escalate into a deeper crisis. These macroeconomic pressures spread rapidly to the real sector, with the retail sector being one of the most directly impacted because its performance is closely correlated with household purchasing power. Bank Indonesia (2026b) noted that the Real Sales Index contracted 3.7 percent annually in April 2026 and continued to contract 3.2 percent in May 2026, reversing the positive growth trend at the beginning of the year. This weakening was heterogeneous across commodity groups: non-essential subsectors such as clothing and information and communication equipment experienced sharp annual contractions of 7.0 percent and 26.4 percent, respectively, while staple goods remained relatively more restrained (Bank Indonesia, 2026b). This pattern is a classic symptom of a shift in consumer behavior toward more selective spending, which empirically typically precedes periods of corporate financial stress in the retail sector. On the cost side, the weakening rupiah also contributed to imported inflation in imported raw materials and merchandise, resulting in retail companies facing margin pressures from two directions simultaneously: reduced demand on the sales side and increased costs of goods sold on the production-distribution side. Within the framework of signaling theory, a company's deteriorating financial condition constitutes negative information that, if not detected early by external parties, will create information asymmetry between management and investors (Spence, 1973; Uddin et al., 2024). Management approaching financial distress tends to have an incentive to delay disclosing adverse information to maintain market confidence, so investors require independent analytical instruments to read signals of the company's financial health earlier and more objectively. This urgency is further reinforced by the perspective of agency theory, which explains that conflicts of interest between management and owners or creditors tend to increase in conditions approaching distress, when management has an incentive to make high-risk decisions to maintain the company's continuity while creditors bear the risk of greater losses (Jensen & Meckling, 1976; Yousaf et al., 2024). This condition becomes even more crucial during periods of macroeconomic stress, when market volatility increases and the margin for error in investment decision-making narrows. Previous studies on predicting financial distress in the Indonesian retail sector generally used data from before or during the Covid-19 pandemic (Fahma & Setyaningsih, 2021; Fachrudin, 2020), thus failing to capture the dynamics of the retail sector's resilience in the face of externally generated macroeconomic shocks, such as those that occurred in 2026.

Pandemics and monetary crises have different transmission mechanisms for financial vulnerability: health crises suppress demand primarily through mobility restrictions, while exchange rate pressures depress cost structures through imports while simultaneously suppressing demand through weakening real purchasing power. At a different level, the phenomenon of financial fragility has long been a concern in the household finance literature; Lusardi, Schneider, and Tufano (2011) found that nearly half of households in the United States were unable to meet an emergency need of US\$2,000 within 30 days, while Koto (2022) documented a

similar pattern in Indonesian households during the Covid-19 pandemic. It should be emphasized that the unit of analysis of both studies is the individual/household, as opposed to the unit of analysis of this study which focuses on corporate financial health; the similarities raised here are analogous at the conceptual level, namely that crisis shocks tend to increase financial vulnerability across economic units, not a claim that the empirical pattern in households applies directly to the corporate level. Based on the above description, this study aims to evaluate the financial health of retail companies listed on the Indonesia Stock Exchange using the Altman Z-Score model as an early warning system instrument, by using the evaluation results for the 2021–2024 period as a baseline for the retail sector's financial resilience ahead of ongoing macroeconomic pressures. Mapping post-pandemic recovery patterns and identifying issuers with persistent structural vulnerabilities is expected to provide an analytical basis for investors, creditors, and investment fund managers in anticipating the continued impact of macroeconomic pressures in 2026 on retail stock-based investment portfolios..

METHOD

This study uses a quantitative descriptive approach with a modified Altman Z-Score analysis technique to evaluate the financial health of B2C retail companies listed on the Indonesia Stock Exchange. The population is the entire object of research, while the sample is a portion of the population (Creswell & Creswell, 2023). The population in this study was 31 retail trade sub-sector companies listed on the Indonesia Stock Exchange for the 2021–2024 period (Indonesia Stock Exchange, 2026). The sampling technique used was non-probability sampling, namely purposive sampling, or a sampling technique with certain criteria (Sugiyono, 2023; Tjahjono et al., 2025). The sample criteria set in this study were: (1) retail trade sub-sector companies listed on the Indonesia Stock Exchange during the 2021–2024 period; (2) publishing complete audited annual financial reports during the 2021–2024 period; (3) presenting financial reports in Rupiah (IDR); and (4) have a pure business-to-consumer (B2C) business model, namely companies whose majority of revenue comes from direct sales to end consumers through retail outlets, not from wholesale distribution activities, manufacturing, or business-to-business (B2B) trading to retailers or other institutions. The fourth criterion was established because the primary argument of this study centers on the transmission of household purchasing power to the financial health of issuers. Issuers with distribution or B2B business models, although formally classified as 'retail trade', have their performance more influenced by institutional demand and upstream industry cycles than by direct household purchasing power, so their inclusion could obscure the transmission channels that are the focus of this study's analysis. Business model verification was conducted by examining the business profile, revenue segment composition, and core business activities of each issuer from their prospectuses, annual reports, and official information disclosures. Applying these four criteria to a population of 31 companies resulted in the exclusion of 16 companies: four companies did not meet the second criterion because they did not publish complete audited annual financial statements, while twelve companies did not meet the fourth criterion because their business models were predominantly

distribution, manufacturing, or B2B. Based on the application of these four criteria, a research sample of 15 pure B2C retail companies was obtained, with a total of 60 annual financial report observations (firm-year observations) for the period 2021–2024. The pure B2C business model criteria are intended to produce a sample that is more precise in representing the transmission channel of household purchasing power to corporate financial health, while reducing interpretation bias that can arise if issuers with institutional demand characteristics are included in a sector analysis that conceptually focuses on end consumers.

RESULTS AND DISCUSSION

Financial Health Zone Distribution

The results of the Altman Z-Score calculation for 15 pure B2C retail companies during the 2021–2024 period show the following zone distribution:

Year	Distress Zone	Grey Zone	Safe Zone
2021	5 (33.3%)	1 (6.7%)	9 (60.0%)
2022	2 (13.3%)	1 (6.7%)	12 (80.0%)
2023	2 (13.3%)	2 (13.3%)	11 (73.3%)
2024	2 (13.3%)	1 (6.7%)	12 (80.0%)

Table 1. Distribution of Financial Health Zones per Year (processed from research data)

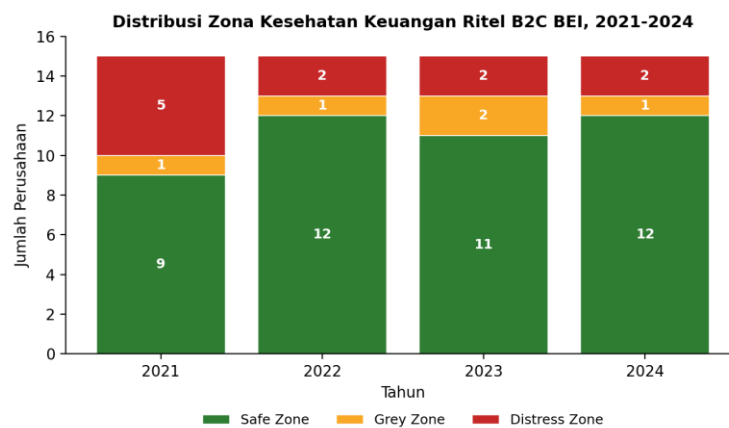


Figure 1. Distribution of BEI B2C Retail Financial Health Zones, 2021–2024 (processed from research data)

Table 1 and Figure 1 show a fairly sharp recovery trend in the pure B2C retail segment post-pandemic. The proportion of companies in the Safe Zone jumped from 60.0 percent in 2021 to 80.0 percent in 2022, slightly corrected to 73.3 percent in 2023, and then returned to 80.0 percent in 2024. This proportion is consistently higher than the broader retail population, which includes both distribution and B2B issuers, confirming that B2C business model screening successfully isolated segments with systematically better financial resilience, consistent with the argument that pure B2C issuers have a more concentrated demand exposure to the

post-pandemic recovery in household consumption compared to issuers with distribution or B2B business models that are more influenced by the institutional demand cycle. The proportion of Distress Zones declined sharply from 33.3 percent in 2021 to just 13.3 percent in 2022 and remained at that level until 2024, indicating that structural issues are now concentrated in a small number of issuers, which will be discussed further in the following subsection.

Trend of Z-Score Values and the Ratio Components that Form Them

Given that the Z-Score distribution in the data contains extreme outliers due to negative equity conditions in certain issuers, a more representative statistic to illustrate the central tendency is the median, not the mean. Table 2 and Figure 2 present the median and quartile distribution of Z-Score values per year.

Year	Distress Zone	Grey Zone	Safe Zone
2021	5 (33.3%)	1 (6.7%)	9 (60.0%)
2022	2 (13.3%)	1 (6.7%)	12 (80.0%)
2023	2 (13.3%)	2 (13.3%)	11 (73.3%)
2024	2 (13.3%)	1 (6.7%)	12 (80.0%)

Table 2. Median and Quartile Distribution of Z-Score per Year (processed from research data)

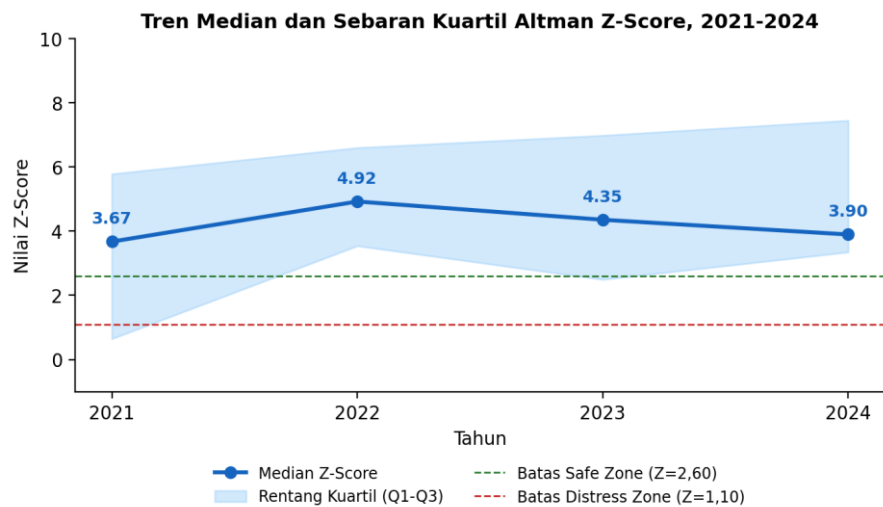


Figure 2. Median Trend and Quartile Distribution of Altman Z-Score, 2021–2024 (processed from research data)

The median Z-Score shows a non-linear pattern: it increased sharply from 3.67 in 2021 to 4.92 in 2022, then corrected to 4.35 in 2023 and 3.90 in 2024. This pattern differs from the zone distribution trend in Table 1, which shows a relatively stable improvement in the proportion of Safe Zones; this difference implies that the improvement is in the form of a widening of the Safe Zone population (more issuers exceeding the 2.60 threshold), while intensively the magnitude of the improvement in issuers already in the Safe Zone actually levels off after 2022. Further analysis

of the components that make up the Z-Score in Table 3 reveals more detailed dynamics behind this pattern.

Table 3. Median Ratio X1–X4 per Year (processed from research data)

Year	Median Z-Score	Quartile 1 (Q1)	Quartile 3 (Q3)
2021	3.67	0.64	5.78
2022	4.92	3.54	6.60
2023	4.35	2.49	6.98
2024	3.90	3.35	7.45

Table 3 shows that the median X3 ratio, EBIT to total assets, which represents pure operational profitability, peaked in 2022 (0.072), then dropped sharply to 0.041 in 2023, before partially recovering to 0.050 in 2024 — still below the 2022 level. This non-linear pattern differs from the X4 ratio (equity to total liabilities), which also peaked in 2022 (1.521) but has since gradually declined to 1.441 in 2023 and 1.314 in 2024. In other words, the dual drivers that sharply lifted the Z-Score in 2022 — both improved operational profitability and strengthened capital structure — began to weaken in 2023–2024, with the weakening being sharper in profitability (X3) than in capital (X4). The X2 ratio (retained earnings to total assets) was the only component to show a consistent upward trend throughout the observation period, from 0.199 in 2021 to 0.281 in 2024, reflecting the continued accumulation of retained earnings despite a slowdown in the current year's profitability (X3). This finding is important because the X3 ratio is the component most directly exposed to margin pressures due to weakening purchasing power and imported inflation that are ongoing in 2026. The decline in X3 since 2023—preceding the latest macroeconomic pressures—indicates that the operational profitability cushion in the B2C segment has not yet fully recovered to its peak level, thus reducing the buffer against further shocks relatively compared to the position in 2022.

Companies in Persistent Distress

Analysis of status movements per company shows that two issuers, namely CARS and GLOB, remained in the Distress Zone throughout the 2021–2024 period, as visualized in Figure 3.

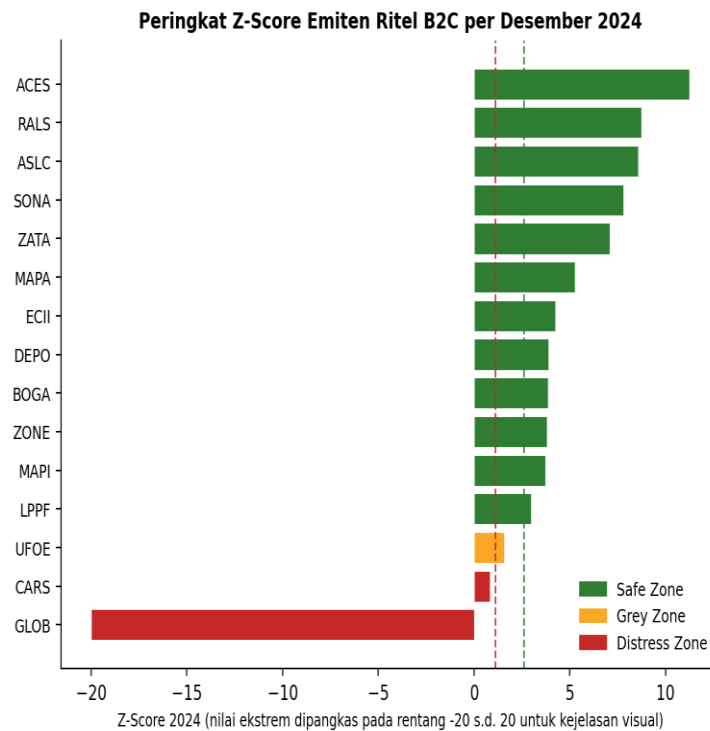


Figure 3. Z-Score Ranking of B2C Retail Issuers as of December 2024 (extreme values are truncated in the range of -20 to 20 for visual clarity; processed from research data)

The severity of distress for the two issuers differs markedly. GLOB exhibits a pattern of extreme and worsening deterioration throughout the observation period, with its Z-Score plummeting from -523.25 in 2021 to -1,266.52 in 2024, reflecting a widening negative equity due to the accumulation of structural losses. In contrast, CARS exhibits a much more moderate and relatively stable Z-Score, ranging from 0.38 to 0.96 throughout the observation period—consistently below the Distress Zone threshold (1.10) but not exhibiting the same progressive deterioration trend as GLOB. This contrasting pattern highlights that the single label 'Distress Zone' can obscure vast differences in risk levels between issuers: GLOB represents profound structural risks that may require capital restructuring, while CARS reflects more marginal distress that could potentially be corrected through gradual operational improvements.

Another interesting finding is the UFOE pattern, which moved from the Distress Zone in 2021 ($Z = 0.81$) to the Grey Zone in 2022 ($Z = 1.55$) and remained there until 2024 ($Z = 1.58$), without ever reaching the Safe Zone. This 'stuck in the Grey Zone' pattern differs from the full recovery pattern shown by three other issuers—ASLC, MAPI, and ZATA—which all successfully transitioned from the non-Safe Zone category in 2021 to the full Safe Zone in 2024. Within the framework of signaling theory (Spence, 1973), UFOE's stagnant status in the Grey Zone for three consecutive years is an ambiguous signal that requires extra caution from investors, as it does not show a convincing enough improvement trend to be categorized as a recovery, but also does not deteriorate to the Distress Zone. This combination of findings confirms that the post-pandemic B2C retail recovery is

neither linear nor uniform across issuers, but rather hides at least three distinct trajectories: full recovery (ASLC, MAPI, ZATA), stagnation in the intermediate zone (UFOE), and persistent distress of varying intensity (CARS, GLOB).

Implications as an Early Warning System

The findings of this study strengthen the argument that the Altman Z-Score can function effectively as an early warning system for investors, creditors, and investment fund managers such as pension funds in mitigating risks in B2C retail stock-based investment portfolios. Referring to signaling theory (Spence, 1973; Ross, 1977), the Z-Score zone classification provides a more objective signal and is independent of voluntary management disclosure, thereby reducing information asymmetry between issuers and investors, especially during periods of high market volatility. Also in line with agency theory (Jensen & Meckling, 1976; Myers, 1977; Yousaf et al., 2024), the existence of such external indicators plays a role in reducing agency costs by providing an objective basis for creditors to evaluate risks before disbursing or extending financing facilities. As a cross-level analogy, although the units of analysis differ, namely households in the studies of Lusardi, Schneider, and Tufano (2011) and Koto (2022), compared to corporations in this study, the pattern of increased financial vulnerability during the crisis found in both studies reinforces the hypothesis that the impact of the crisis on financial health tends to be heterogeneous across economic units, including the companies in this study. Therefore, Z-Score-based evaluation at the individual issuer level and monitoring the trend of ratio components over time, rather than simply zone classification at a single point in time, are crucial in the investment selection process.

Relevance of Findings to Macroeconomic Pressures 2026

The financial resilience baseline mapped in this study has sharper relevance when placed in the context of ongoing macroeconomic pressures in 2026. The weakening of the rupiah to Rp18,107 per US dollar (Jurnalpost, 2026) and the contraction of the Real Sales Index by 3.2–3.7 percent annually in April–May 2026 (Bank Indonesia, 2026b) indicate that the B2C retail sector is entering a new stress test phase, with a different transmission mechanism than the pandemic pressures underlying the 2021–2024 data. The findings of Sousa, Braga, and Cunha (2022) that macroeconomic indicators have a significant influence on the validity of bankruptcy prediction models also emphasize the relevance of updating the Z-Score baseline as macroeconomic conditions change. As found in the previous subsection, the median X3 ratio has been declining since its peak in 2022 and has not fully recovered until 2024, while the X4 ratio has also been gradually declining since 2022; This situation suggests that the dual cushion supporting post-pandemic Z-Score improvement—both in terms of profitability and capitalization—both showed signs of weakening momentum even before the pressure of the weakening rupiah and the contraction in retail sales in 2026 took hold.

Analytically, two transmission channels operate simultaneously in the B2C retail sector. First, the demand channel, where weakening real purchasing power suppresses sales volume, particularly in non-essential goods categories that are most elastic to income changes. Second, the cost channel, where rupiah depreciation

increases the cost of goods sold for retail companies with a high import component through imported inflation. This combined pressure on both sides of the income statement could further depress the X3 ratio, given that it has not yet fully recovered from the 2023 correction.

The implication is that issuers identified as persistently in the Distress Zone in this study, particularly GLOBs with exponentially worsening deterioration, deserve the greatest attention, as the fragility of their capital structures predating the 2026 macroeconomic pressures could increase their exposure to further shocks. UFOEs that have stagnated in the Grey Zone for three consecutive years also deserve close attention, given their ambiguous status risks shifting toward the Distress Zone if margin pressures resulting from the 2026 retail sales contraction materialize. Conversely, issuers with capital structures that have recovered to the Safe Zone post-pandemic are not necessarily immune to these new pressures, given the downward momentum in X3 and X4 since 2022. Therefore, the Z-Score evaluation in this study should be understood as a baseline that needs to be updated periodically with particular attention to the trend of the X3 component, rather than as a final conclusion regarding the resilience of the Indonesian B2C retail sector in the face of ongoing macroeconomic pressures.

CONCLUSION

This study concludes that the financial health of the pure B2C retail segment listed on the Indonesia Stock Exchange shows a fairly sharp post-Covid-19 pandemic recovery trend, as reflected in the increasing proportion of companies in the Safe Zone from 60.0 percent in 2021 to 80.0 percent in 2022 and 2024. However, analysis of the ratio components that make up the Z-Score reveals that the improvement peaked in 2022 and has since slowed down, particularly in the operational profitability ratio (X3), which has not fully recovered to its peak level until 2024. Two issuers (CARS and GLOB) have consistently been in the Distress Zone throughout the observation period with very different levels of severity, while one issuer (UFOE) has shown a pattern of stagnation in the Grey Zone for three consecutive years. These findings require special attention from investors and creditors, especially as the resilience baseline is now facing new macroeconomic pressures in the form of a weakening rupiah and a contraction in retail sales in 2026. Based on signaling theory and agency theory, the Altman Z-Score model has been proven capable of providing objective signals regarding the financial health of individual companies and aggregate sectoral trends, making it suitable for use as an early warning system instrument in the investment decision-making process in situations of increasing economic uncertainty. Methodologically, this study also shows that sample screening based on B2C business models produces a sectoral resilience picture that is materially different from the broader retail population, underscoring the importance of precise population definition in sector-based financial distress research. For investors and investment fund managers, it is recommended not only to rely on the aggregate sector recovery trend, but also to evaluate the Z-Score at the individual issuer level and pay close attention to the trend of the X3 ratio component in particular, considering that this ratio is the main transmission channel for macroeconomic pressures in 2026 and has not fully

recovered from the 2023 correction. For future researchers, it is recommended to expand the observation period to include 2025–2026 data to capture the direct impact of exchange rate pressures on the financial health of B2C retail, add an influence analysis (regression) between the X1–X4 ratio components with macroeconomic variables such as exchange rates and inflation, and consider replicating the B2C business model screening criteria in other sectors to test the generalizability of the findings regarding the importance of precise population definitions in financial distress research.

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