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Musaed S. AlAli*,

College of Business Studies,
The Public Authority for Applied Education and Training (PAAET), Kuwait
https://orcid.org/0000-0003-0802-5440
ms.alali@paaet.edu.kw
*Corresponding author

Ibraheem T. Alaskar,

College of Business Studies,
The Public Authority for Applied Education and Training (PAAET), Kuwait
https://orcid.org/0000-0002-2769-3471
i.alaskar@paaet.edu.kw

Husain S. Aboualhasan,

College of Business Studies,
The Public Authority for Applied Education and Training (PAAET), Kuwait

Fahed S. Beneid,

College of Business Studies,
The Public Authority for Applied Education and Training (PAAET), Kuwait

EXPLORING THE RELATION BETWEEN IMPLIED CREDIT RATING AND SHARES PRICES: A CASE STUDY ON MOBILE TELECOMMUNICATION COMPANIES IN KUWAIT

Abstract. *This study investigates the relationship between implied credit ratings and share prices in Kuwait's telecommunications sector, focusing on three major companies listed on the Kuwait Stock Exchange (KSE). Despite controversies surrounding credit rating agencies (CRAs) due to issues such as perceived bias and their role in past financial crises, investors continue to depend on CRA assessments. However, some companies hesitate to seek formal ratings due to the associated costs or the risk of exposing financial weaknesses. Using Altman and Hotchkiss's (2010) Z-score model, this research calculates implied credit ratings based on internal financial data from 2016 to 2023 and employs Ordinary Least Squares (OLS) regression to analyse the relationship between these ratings and share price performance. The findings reveal that Zain, with a B+ rating, falls within the grey zone, indicating potential financial challenges, while Ooredoo and STC remain in the safe zone with ratings of AA- and A+, respectively. A statistically significant positive relationship was identified between implied credit ratings and share prices, suggesting that internal credit assessments exert a substantial influence on investor perceptions and market valuation in Kuwait's telecommunications sector. These results underscore the value of implied credit ratings as a practical alternative to formal CRA ratings, particularly in emerging markets with limited access to comprehensive external credit assessments.*

Introduction

Credit ratings are essential components of modern financial markets, serving as vital indicators of a firm's creditworthiness and influencing investor confidence, stock prices, and overall

market stability. By signalling the likelihood of a firm's default or financial distress, credit ratings provide investors with a critical risk assessment tool. Traditional credit rating agencies (CRAs) such as Moody's, Fitch, and S&P assign these ratings based on a range of qualitative and quantitative factors, including financial health, industry position, and economic outlook. However, CRAs have faced scrutiny for potential conflicts of interest and for their perceived role in exacerbating financial crises, leading to concerns about the reliability and transparency of their ratings (White, 2010). As a result, alternative measures, including implied credit ratings derived from internal financial data, have gained traction, offering firms a cost-effective and flexible means of credit evaluation.

One widely recognized model for estimating implied credit ratings is Altman's Z-score, developed in 1968, which uses financial ratios to assess the probability of bankruptcy. This model, initially designed for manufacturing firms, has been adapted over the years to accommodate non-manufacturing and privately held companies, proving its versatility in various economic contexts. Research has consistently shown the Z-score's predictive accuracy in assessing financial distress and its ability to provide early warning signals of potential bankruptcy across multiple industries (Altman & Hotchkiss, 2010). This predictive power has made the Z-score a valuable tool in regions where formal credit ratings may be inaccessible, particularly in emerging markets, where internal metrics are often the primary source of financial data. Studies have demonstrated its successful application in assessing financial health in emerging economies, such as in Romanian, Indonesian, and Kuwaiti banks, underscoring the model's adaptability and relevance (Badea and Matei, 2016; Khaddafi et al., 2017; AlAli et al., 2018).

Despite the established influence of credit ratings on equity markets, the relationship between implied credit ratings, specifically those derived from the Z-score, and stock prices remains underexplored. Given that credit ratings can directly affect a company's perceived risk profile, they also play a significant role in determining its market valuation. In emerging markets, where external credit data may be less reliable or available, examining the relationship between implied credit ratings and stock prices is especially relevant. The telecommunications industry in Kuwait presents an interesting case for this analysis, as it is a capital-intensive sector that relies on substantial financial health to sustain operations and growth. Kuwait's telecommunications companies, listed on the Kuwait Stock Exchange (KSE), operate in a dynamic market with significant investment activity and represent an ideal context for assessing how implied credit ratings influence stock market behaviour.

This paper aims to examine the impact of implied credit ratings on the share prices of major telecommunications companies in Kuwait, utilizing Altman's Z-score model to assess the financial health of these firms over recent years. By analysing the relationship between Z-score-derived credit ratings and stock price movements, this study contributes to the understanding of how internal credit assessments affect market valuation in emerging economies. The findings of this research will provide insights into the utility of implied credit ratings as an alternative to traditional CRAs, particularly in contexts where external credit ratings may be insufficient or inconsistent.

Literature Review

Credit ratings are crucial in financial markets, providing signals of a firm's creditworthiness that influence investor behaviour and impact both stock and bond valuations. Jorion and Zhang (2007) found that changes in credit ratings, whether upgrades or downgrades, lead to notable shifts in stock prices as investors adjust their expectations of a company's financial stability. Despite criticisms of credit rating agencies (CRAs) for potential conflicts of interest, particularly following the 2008 financial crisis, their influence endures due to the essential information they provide for investment decisions (White, 2013). Given the limitations of traditional CRAs, alternative approaches like implied credit ratings have emerged, relying on internal financial metrics rather than external ratings. Among these methods, Altman's Z-score model is widely regarded for its structured assessment of financial stability.

The Z-score model, developed by Altman (1968), applies five financial ratios to estimate bankruptcy probability and classifies firms into safe, grey, or distress zones based on their scores.

Initially tailored for manufacturing companies, the model uses ratios to evaluate liquidity, profitability, and leverage, making it both simple and effective for predicting financial distress. Over time, Altman and Hotchkiss (2010) expanded the model to create the Z′-score and Z″-score, adapting it for non-public and non-manufacturing firms by adjusting variable weightings and removing the sales variable to better suit a wider range of industries. These modifications have reinforced the Z-score's role as a versatile analytical tool for assessing credit risk in diverse sectors.

Studies comparing the Z-score to market-based models have shown that while market data can offer predictive insights, the Z-score remains highly effective in environments where internal financial metrics are the primary data source (Hillegeist et al., 2004). The model's relevance has been further confirmed in private and emerging markets, where low liquidity makes alternative ratings impractical (Agarwal and Taffler, 2008). Applications of the Z-score in various industry contexts, such as the U.S. retail sector, have demonstrated that slight adjustments for sector-specific factors can enhance its predictive power, underscoring its flexibility (Li and Miu, 2010). These findings emphasize the adaptability of the Z-score model, particularly in emerging markets where standardized credit data may be less available.

The model's success extends to international and emerging markets. Badea and Matei (2016) applied the Z-score to Romanian banks and found that many exhibited speculative-grade financial health due to liquidity and profitability concerns. Similarly, Khaddafi et al. (2017) analysed Indonesian banks, revealing that 60% of their sample faced high bankruptcy risk, thus underscoring the Z-score's potential in regions with limited access to formal credit ratings. In the Middle East, a study on Kuwaiti banks identified disparities between CRA ratings and Z-score-derived ratings, suggesting potential inflation in agency ratings; while Kuwaiti banks often received investment-grade ratings, the Z-score model frequently classified them in speculative-grade categories due to its emphasis on internal metrics (Al-Ali et al., 2018).

The Z-score model's predictive accuracy has been well-supported in developed markets as well. Brédart (2014) tested the model with U.S. companies, finding it successful in predicting bankruptcy with an accuracy rate of over 83% up to two years in advance. Research on Serbian companies confirmed the model's ability to assess creditworthiness even for firms undergoing restructuring, with Begović et al. (2014) finding the Z-score effectively identified companies at higher financial risk. Together, these studies affirm the Z-score model's strength as a tool for assessing implied credit ratings, providing foundational credit risk insights valuable to both investors and lenders in various market conditions.

In summary, the extensive research on Altman's Z-score model highlights its adaptability and effectiveness as a tool for assessing credit risk across diverse industries and economic contexts. Studies have demonstrated its predictive power not only in developed economies but also in emerging markets, where access to formal credit ratings is often limited. While traditional CRAs continue to influence investor behaviour, the Z-score model offers a valuable alternative for evaluating financial stability based on internal metrics. Its consistent performance in both corporate and banking sectors underscores its role as a reliable measure for implied credit ratings, providing insights into financial distress that can inform investment and lending decisions. This body of literature underscores the Z-score model's enduring relevance in financial analysis, establishing a foundation for the present study's focus on implied credit ratings and their impact on share prices within Kuwait's telecommunications sector.

Methods

Credit rating is simply an assessment of a borrower's ability to repay their loan in a timely manner and in full. The model for assessing credit rating relies on Altman's Z-score model which evaluates the probability of bankruptcy (Altman and Hotchkiss, 2010). All the coefficients remain unchanged in the original model, with the addition of a constant value of 3.25 to the equation. Concerning the equation (1), it is as shown below:

$$\text{Z-Score} = 3.25 + 6.56\, X_1 + 3.26\, X_2 + 6.72\, X_3 + 1.05\, X_4 \qquad (1)$$

Where the variables are explained in Table 1.

Table 1. Model Variables

Symbol	Variable
X_1	Networking capital / Total assets
X_2	Retained earnings / Total assets
X_3	Earnings before interest and tax (EBIT) / Total assets
X_4	Total book value of equity / Total liabilities

The result from equation 1 is then matched with the corresponding S&P rating based on Altman and Hotchkiss (2010) table as shown in Table 2 to determine the rating for every company.

Table 2. Altman and Hotchkiss (2010) Equivalent Credit Rating for the Z-score

Zone	S&P Rating	Z-Score Range
Safe Zone	AAA	$Z > 8.15$
	AA+	$8.15 > Z > 7.60$
	AA	$7.60 > Z > 7.30$
	AA-	$7.30 > Z > 7.00$
	A+	$7.00 > Z > 6.85$
	A	$6.85 > Z > 6.65$
	A-	$6.65 > Z > 6.40$
	BBB+	$6.40 > Z > 6.25$
	BBB	$6.25 > Z > 5.85$
	BBB-	$5.85 > Z > 5.65$
Grey Zone	BB+	$5.65 > Z > 5.25$
	BB	$5.25 > Z > 4.95$
	BB-	$4.95 > Z > 4.75$
	B+	$4.75 > Z > 4.50$
	B	$4.50 > Z > 4.15$
	B-	$4.15 > Z > 3.75$
Distress Zone	CCC+	$3.75 > Z > 3.20$
	CCC	$3.20 > Z > 2.50$
	CCC-	$2.50 > Z > 1.75$
	D	$Z < 1.75$

In examining the effect of implied credit rating on share prices, equation 2 is set to examine that relation.

$$SP_t = \alpha + \beta Z_t + \varepsilon \tag{2}$$

Where:

SP_t - share price at time t

Z_t - Altman's Z-score at time t

ε - error factor

The model is set to examine the following hypothesis:

H_0: There is no statistically significant relation between share prices and Z-score.

Results

The purpose of this study is to assign implies credit rating for mobile telecommunication companies in Kuwait and examine the effect of the calculated Z-score on their share price. The research is based on the financial reports of the three mobile telecommunication companies that are listed at Kuwait Stock Exchange (KSE) over the period 2016 to 2023. The data used in this research were downloaded from Kuwait Stock Exchange (KSE) website.

The results of applying equation 1 on the financial ratios of the companies under study can be seen in Table 3 where it can be seen that both Ooredoo and STC were in the safe zone with

Z-score of 7.01 and 6.98 respectively which indicates healthy financial position. On the other hand, Zain demonstrated vulnerable financial condition where it was in the distress zone since 2018 to 2022 and barely met the threshold of the grey zone in 2023.

Interpretation of Altman and Hotchkiss (2010) Z-score is presented in Table 3.

Table 3. Interpretation of Companies Z-score

	Zain			Ooredoo			STC		
	Z-Score	**Rating**	**Zone**	**Z-Score**	**Rating**	**Zone**	**Z-Score**	**Rating**	**Zone**
2023	4.51	B+	Grey	7.01	AA-	Safe	6.98	A+	Safe
2022	4.40	B	Distress	6.34	BBB+	Safe	7.27	AA-	Safe
2021	3.70	CCC+	Distress	5.94	BBB	Safe	7.65	AA+	Safe
2020	4.04	B-	Distress	5.51	BB+	Grey	7.42	AA	Safe
2019	4.07	B-	Distress	5.62	BB+	Grey	7.05	AA-	Safe
2018	3.65	CCC+	Distress	5.88	BBB	Safe	8.71	AAA	Safe
2017	5.21	BB	Grey	5.58	BB+	Grey	7.42	AA	Safe
2016	4.99	BB	Grey	5.34	BB+	Grey	5.42	BB+	Grey

By looking at Z-score chart in Figure 1, it can be seen from the linear equation that both Ooredoo and STC showed a positive beta, slope, indicating an improvement in their Z-score over the study period even though STC is showing a decline since 2021. On the other side, Zain was the only company that showed negative beta despite an upward trend since 2021 which should worrying for both investors and Zain top management.
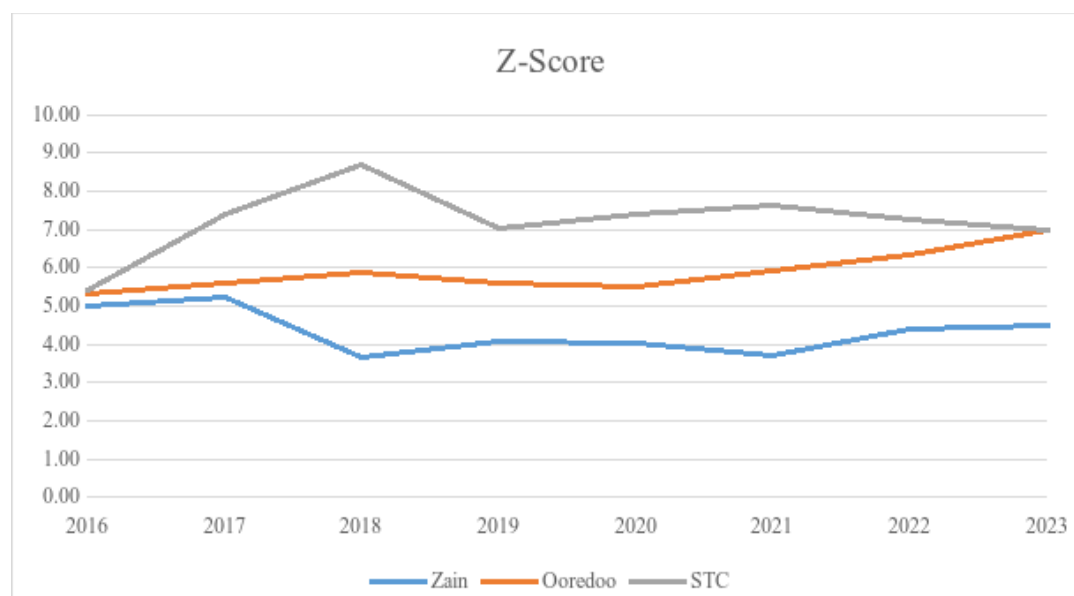

Figure 1. Z-score of Companies

By examining share prices in Figure 2, it can be seen that Ooredoo and STC share prices started increasing at the same period the company Z-score started to increased, indicating a direct relation there. On the other hand, Zain share price started to decrease despite an increase in their Z-score since 2021.

In order to fully understand the effect of Z-score on share prices, OLS regression is performed. By looking at Table 4, it can be seen that the model, despite having Significance F of 0.038 which indicates that the model can be labelled as a "good fit", the model shows a low explanatory power of only 0.144 which means that Z-score can only explain 14.4% of the share price. But since the aim of the study is to examine the relation between share prices and Z-score, the explanatory power of the model is irrelevant.
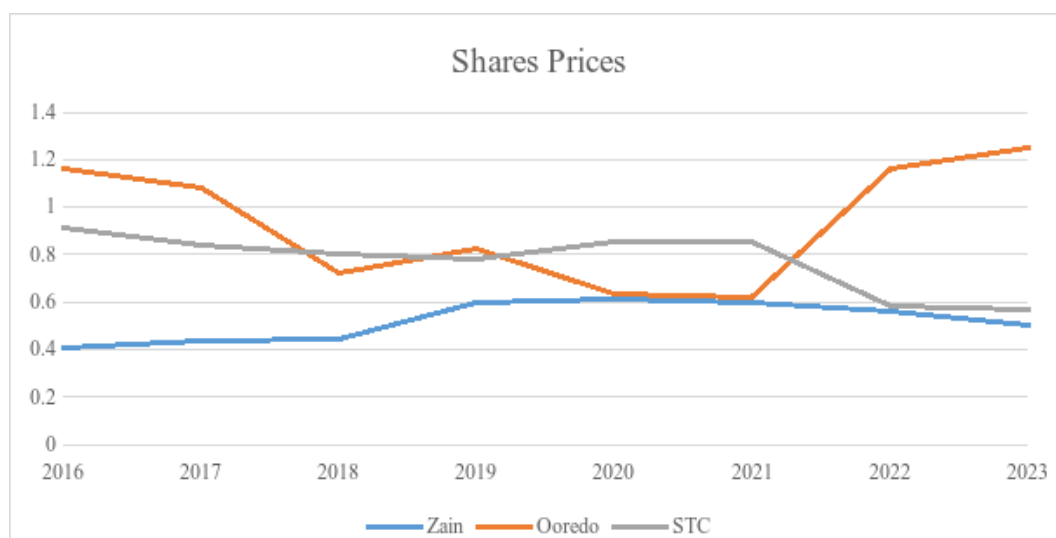
Figure 2. Companies Shares Prices

By looking at the coefficient, it can be seen that there is a direct relation between shares prices and Z-score and that relation is statistically significant at the 95% confidence level since the P-value is 0.038. The results confirms the effect of Altman's Z-score, and thus implies that credit rating, on shares prices of mobile telecommunication companies in Kuwait.

Table 4. OLS Regression Output

Regression Statistics				
R Square	0.182			
Adjusted R Square	0.144			
F	4.880			
Significance F	0.038			
Observations	24			
	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.316	0.198	1.592	0.126
Z-Score	0.073	0.033	2.209	0.038

Conclusion

Investors rely on credit ratings to assess companies' financial strength, even though credit rating agencies (CRAs) have faced criticism and controversy for perceived biases that contributed to financial crises, such as the subprime crisis. Despite these controversies, markets continue to place substantial trust in CRA ratings, which remain influential in shaping market perceptions and stock prices. However, certain companies are hesitant to engage CRAs for credit evaluations due to concerns over the costs involved or the potential exposure of financial vulnerabilities. In light of these concerns, this study aimed to determine implied credit ratings and explore their impact on the stock prices of three major mobile telecommunications firms listed on the Kuwait Stock Exchange (KSE).

Utilizing Altman and Hotchkiss's (2010) Z-score model, this research calculated implied credit ratings for Zain, Ooredoo, and STC using financial data from 2016 to 2023. The results showed that Zain's implied credit rating of B+ placed it within the grey zone, suggesting potential financial challenges if corrective actions are not undertaken. In contrast, Ooredoo and STC achieved ratings of AA- and A+, respectively, indicating a stable financial position within the safe zone. Ordinary Least Squares (OLS) regression analysis confirmed a statistically significant relationship between implied credit ratings and stock prices, indicating that these internal credit assessments directly impact investor perceptions and market valuation within Kuwait's telecommunications sector. These findings highlight the utility of Altman's Z-score model as a

viable alternative to traditional CRAs, particularly for companies in emerging markets where access to formal credit ratings may be limited. For investors, the results suggest that implied credit ratings can serve as a reliable tool for assessing credit risk and market valuation in contexts where traditional ratings are inaccessible or inconsistent. For policymakers, this study underscores the value of promoting accessible, alternative credit assessment models like the Z-score that offer greater transparency for local markets.

In conclusion, while Altman's Z-score model remains a valuable tool for assessing implied credit ratings, its limitations, such as the exclusion of external economic factors, suggest that it should be supplemented with broader economic indicators for a more comprehensive credit risk assessment. Future research could expand on this study by exploring hybrid models that integrate both internal and external metrics, potentially enhancing the accuracy and applicability of credit ratings in diverse economic contexts.

Limitations

While Altman's Z-score model is a widely recognized tool for assessing financial health, it has inherent limitations that may affect its accuracy and applicability, particularly when used to compare firms across different countries or economic contexts. The model relies exclusively on internal financial metrics such as liquidity, profitability, and leverage ratios without accounting for external factors that can significantly impact a company's financial stability. These external factors may include macroeconomic conditions, regulatory environments, industry-specific risks, and geopolitical influences, all of which can play a crucial role in shaping a firm's creditworthiness. The exclusion of these variables in the Z-score calculation often results in discrepancies between the implied credit rating derived from the model and the actual ratings assigned by credit rating agencies, which incorporate both internal and external assessments (AlAli et al., 2018).

This limitation is especially pertinent when the Z-score is applied in diverse geographic regions or global comparisons. For instance, firms operating in volatile or emerging markets may face external risks that are not reflected in their internal financial statements but are critical to their long-term stability and default risk. As a result, while the Z-score can be a useful tool for comparing companies within a single country or sector — where external economic factors may be relatively similar — it is less reliable as a global standard for credit rating comparisons. Moreover, because the Z-score model was initially developed for manufacturing firms in a stable economic context, its application to other sectors, particularly those heavily influenced by external factors like telecommunications, may introduce further inconsistencies in credit assessments.

Furthermore, the model's reliance on historical financial data assumes that past financial health is indicative of future stability, which may not always hold, especially in industries subject to rapid technological or regulatory changes. In such cases, external assessments that integrate forward-looking indicators can provide a more holistic picture of a company's financial outlook than the Z-score model alone. Consequently, while Altman's Z-score remains a valuable tool for quick, internal credit evaluations, particularly in regions or sectors where external credit data is sparse or unreliable, its limitations highlight the importance of complementing the Z-score with broader analyses when making credit determinations in diverse economic settings.

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