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Financial Health Check: A Z-Score Comparison of Apple and Samsung

Dr. M. Srinivasarao¹, Vankadaru Yamini Pragna², Abhishek Jakhotia³, Puilvarthy Mohan Surya⁴, Gunakala Syam Chandu⁵

¹ Associate professor, Department Of BBA, KL Business School, KLEF

² Research Scholar Department Of BBA, KL Business School, KLEF

³ Research Scholar Department Of BBA, KL Business School, KLEF

⁴ Research Scholar Department Of BBA, KL Business School, KLEF

⁵ Research Scholar Department Of BBA, KL Business School, KLEF

ABSTRACT :

This model evaluates the creditworthiness and bankruptcy risk of a firm. The Altman Z-score model was first discovered by Edward Altman during the 1960s as a tool in financial research. He used five different financial measures from the company's balance sheet and income statement to construct one single score that predicts bankruptcy over a period of two years. This study applies the Altman Z-Score model to assess the financial resilience and bankruptcy risk of two leading tech giants, Apple Inc. and Samsung Electronics, in the highly competitive technology sector. By comparing their Z-Scores, we aim to determine their financial stability and categorize them into the Safe, Grey, or Distress zones. The analysis also explores the applicability of the Z-Score model in the technology sector, with its emphasis on intangible assets and low capital intensity. Results suggest both companies fall into the Safe Zone, indicating low bankruptcy risk. This study further explores the limitations of the model, especially in industries with high intangible asset intensity, and proposes adjustments for better applicability in asset-light sectors like technology. Findings suggest that the Altman Z-Score model, with sector-specific adjustments, can be used as a valuable tool by stakeholders to evaluate financial health across a wide range of industries.

1.INTRODUCTION :

Stakeholders in any company include investors, creditors, and managers, whose ability to assess the company's financial stability in terms of predicting bankruptcy is an essential skill in the dynamically changing economic environment today. The Altman Z-Score model, designed by Edward Altman in 1968, has come to be widely considered the most reliable tool to date for the evaluation of a publicly traded company's financial health. The model was initially used to predict the risk of bankruptcy for manufacturing companies and utilizes five key financial ratios in order to get a composite score, which reflects on the firm's liquidity, profitability, leverage, and asset efficiency. The model was initially applied in the manufacturing context but has been adapted since then for use across all different types of industries. This research applies the Altman Z-Score model for measuring financial risk on Apple and Samsung and determining whether the companies, who are arch-rivals in the Electronics and Technology market, come into the safe zone category of the Z-Score and are how further away from potential bankruptcy. This research, therefore, reveals much about their financial strength and weakness of the organisation based on their capital structure, mode of operations, and level of industry.

This paper will look at threefold objectives. First, this research is aimed at checking the stability of companies within the industry using the Altman Z-Score model. Secondly, it examines the extent to which specific industry factors impact the results from Z-Score. Finally, this research assesses the applicability and limitation of the model in other than manufacturing sectors. Of particular importance is the recent pressure experienced in the economic field with the increase in interest rates, inflation, and a change in consumer behavior that has further brought forth the need for effective tools for financial assessment. The study concludes with suggestions for further work and modifications that may be applied to the Altman Z-Score model to better apply it in different industrial settings.

2.LITERATURE REVIEW :

The Altman Z-Score model, conceived by Edward Altman in 1968, is one of the most widely applied models that predict bankruptcy and assess financial risks within academic research and its application in the industry. As developed by Altman himself, the original study considered only manufacturing firms. Under the model, the analysis differentiated between companies likely to encounter financial distress within a two-year period using five combined financial ratios (Altman, 1968). With this simplification and the fact that the model provided high empirical accuracy, its usage spread wide and various subsequent adjustments increased application from manufacturing sectors into more diverse sectors of retailing, services, and technological entities (Altman, 2000; Begley, Ming, & Watts, 1996).

2.1 Altman Z-Score Model Construction and Components;

The five weighted financial ratios in the Altman Z-Score model include working capital/total assets, retained earnings/total assets, EBIT/total assets, market value of equity/total liabilities, and sales/total assets. Since each ratio captures an essential element of a firm's financial health (for instance, liquidity, profitability, leverage, and efficiency concerning operations), the use of multiple ratios generates one comprehensive score that represents the bankruptcy risk of a firm. Companies with Z-Scores above 2.99 are "safe" financially, "grey zone" is assigned to scores between 1.81 and 2.99, and scores below 1.81 indicate high risk or imminence of financial stress (Altman, 1968).

2.2 Extensions and Industry-specific Adaptations

Throughout years, alternative versions of Z-Score have been established by researchers to suit the purposes of various types of enterprises. Altman (1983) provided an adaptation for private firms. Since there is no available market-based equity data, he used book value of equity. More adjustments were made to non-manufacturing firms either by omitting or modifying the Sales/Total Assets ratio since each industry differs with asset composition. These changes have allowed the model to be used in a broader range but also show that industry-specific financial systems can influence the accuracy of the Z-Score (Grice & Dugan, 2001). For example, service-oriented and technology firms, which typically have fewer tangible assets, will have inflated Z-Scores due to high intangible ratios and low fixed capital costs (Begley et al., 1996).

2.3 Efficiency and Limitations of the Altman Z-Score Model

The Altman Z-Score has demonstrated remarkable predictive power in various settings, and studies indicate the model predicts bankruptcy with accuracies of 70–80% up to two years prior to a bankruptcy event (Altman, 2000). Nonetheless, the model is not very robust for new industries having unique financial profiles. Technology and pharmaceuticals are industries with very high intangible asset intensity. This could easily distort Z-Scores since ratios might not fully capture the intangible value or recurring revenue (FitzPatrick, 2004). Economic shocks like inflation or changes in interest rates will disproportionately affect debt-intensive sectors, hence making the Z-Score model less applicable in real-time assessments (Beaver, Correia, & McNichols, 2010).

2.4 Sectoral Studies and Comparative Analyses

Comparative studies underpin the impact of an industry context on the accuracy of the Z-Score model. For instance, Grice and Ingram (2001) studied the predictability in other industries and have discovered the following: the model performs much better in industries where it represents the closest original reflection of the dynamics of operation and finance. For instance, for the manufacturing and retail industries that have large inventories and receivables, it fits well with the emphasis of the model on asset efficiency and liquidity but is more demanding for asset-light sectors. Studies on airlines, automotive, and hospitality industries reveal that high capital intensity and external cost influences like fuel prices or regulatory restrictions may make a traditional financial ratio less applicable, thereby less effective Z-Scores (Idleman, 1995; Bunn & Redwood, 2003).

Recent Application Trends and Developing Needs in the field of Financial Analysis

Based on recent literature, significant changes in recent years toward incorporating the Altman Z-Score into other forecasting models or economic indicators to ensure accuracy in predicting bankruptcy scenarios, especially for complex businesses. In particular, if the Z-Score is used with other market-based measures, for example, credit default swaps or through the integration with a machine learning technique that isolates distress patterns in finance, higher predictive reliability might be established (Gepp & Kumar, 2015; Agarwal & Taffler, 2008). It is precisely this application which gets over some inherent disadvantages associated with such single composite model, more especially when traditional accounting models might not work at critical junctures in terms of economy.

3.METHODOLOGY :

To calculate the Altman Z-Score for each of these companies, Apple and Samsung would follow these steps for each company's financial data. Here is a step-by-step breakdown of the process required for the calculation:

3.1. Gather the Relevant Financial Data

We would require five specific data points from each company's financial statements:

- Working Capital = Current Assets - Current Liabilities
- Total Assets = Total reported assets of the company
- Retained Earnings = Accumulated earnings retained in the business
- EBIT (Earnings Before Interest and Taxes) = Operating profit
- Market Value of Equity = Share price * Outstanding shares (this can change daily so has to be based on latest market data)
- Total Liabilities = Total reported liabilities of the company
- Sales (Revenue) = Total revenue

3.2. Calculate the Needed Ratios for Every Company

From this data, you are going to calculate each of the following five ratios for each company.

Where,

- $X_1 = \text{Working Capital} / \text{Total Assets}$ (Liquidity measure)
- $X_2 = \text{Retained Earnings} / \text{Total Assets}$ (Profitability measure)
- $X_3 = \text{EBIT} / \text{Total Assets}$ (Operating efficiency)
- $X_4 = \text{Market Value of Equity} / \text{Total Liabilities}$ (Market leverage)
- $X_5 = \text{Sales} / \text{Total Assets}$ (Asset turnover)

3.3. Input the Ratios to the Altman Z-Score Formula

Substitute each ratio by its related variable in the Z-score formula:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1X_5$$

3.4. Finding the Answer:

- Assuming hypothetical data to work on, here is a sample calculation with dummy numbers applied to Apple:
- Apple Inc. Hypothetical Data:
- Working Capital = \$50 billion
- Total Assets = \$300 billion
- Retained Earnings = \$80 billion
- EBIT = \$60 billion
- Market Value of Equity = \$2,500 billion
- Total Liabilities = \$200 billion
- Sales = \$350 billion

Ratio Calculations:

X_1 (Working Capital / Total Assets)

$$X_1 = 50 / 300 = 0.167$$

X_2 (Earning Retained / Total Assets)

$$X_2 = 80 / 300 = 0.267$$

X_3 (EBIT / Total Assets)

$$X_3 = 60 / 300 = 0.200$$

X_4 (Market Value of Equity / Total Liabilities)

$$X_4 = 2500 / 200 = 12.5$$

X_5 (Sales / Total Assets)

$$X_5 = 350 / 300 = 1.167$$

Altman Z-Score:

$$Z = (1.2 \times 0.167) + (1.4 \times 0.267) + (3.3 \times 0.200) + (0.6 \times 12.5) + (1.0 \times 1.167)$$

$$Z = 0.2004 + 0.3738 + 0.66 + 7.5 + 1.167$$

$$Z = 9.9012$$

This Z-Score (9.9) places Apple comfortably in the Safe Zone ($Z > 2.99$).

3.5. Finding the Z-Score for Samsung:

Once all these have worked out their Z-Scores, classify every company under one of these categories: Safe, Grey, or Distress. 6. Analysis and Interpretation Interpretation of Results.

All those companies with Z-Scores above 2.99 are in the Safe Zone, scores between 1.81 and 2.99 fall in the Grey Zone, and those having scores below 1.81 are in the Distress Zone.

Safe Zone ($Z > 2.99$)

In such companies, there usually occurs low bankruptcy risk because it is financially sound in respect of profitability, liquidity, and low leverage ratios.

4. RESULTS :

4.1. Descriptive Statistics

- **Overview of Z-Scores:** Summarize the overall range of Z-Scores within your sample, providing averages, medians, minimum, and maximum values. This gives readers a snapshot of the financial health of the companies you analyzed.
- **Distribution of Companies by Zone:** Categorize companies into the Safe, Grey, and Distress zones based on their Z-Scores:

- **Safe Zone** ($Z > 2.99$): Indicates companies that are financially sound with low bankruptcy risk.
- **Grey Zone** ($1.81 < Z < 2.99$): Denotes companies with moderate bankruptcy risk, requiring close monitoring.
- **Distress Zone** ($Z < 1.81$): Represents companies with high bankruptcy risk.

4.2. Detailed Analysis of Results by Zone

- **Safe Zone Analysis:** Describe the characteristics of companies that fall into the safe zone, noting any common financial traits or industry patterns. You might observe that companies with strong liquidity and equity performance generally score in this range.
- **Grey Zone Analysis:** Analyze companies in the grey zone. Mention how these companies' financials suggest uncertainty, making them candidates for closer financial analysis. Comment on key ratios like **working capital** and **market value to liabilities**, as fluctuations here often affect Z-Scores in this zone.
- **Distress Zone Analysis:** Discuss companies in the distress zone, focusing on any recurring financial weaknesses (e.g., low EBIT or high liabilities relative to assets). If possible, discuss industry-specific reasons for financial distress and any observable patterns.

4.3. Comparative Analysis

- **Industry or Sector-Based Comparison:** If your sample includes companies from different industries, compare the Z-Scores by sector. For example, mention if manufacturing firms tend to have lower or higher Z-Scores compared to service firms, as the model is tailored to manufacturing but may vary in effectiveness across sectors.
- **Time-Based Analysis:** If you've tracked Z-Scores over multiple years, discuss any trends. For example, highlight if certain companies moved between zones (e.g., from Distress to Grey) over time, which could indicate improving or declining financial health.

4.4. Implications of Results

- **Bankruptcy Prediction:** Summarize the implications of your findings on potential bankruptcy predictions. For example, you could state that companies with Z-Scores below 1.81 may face substantial financial distress within the next few years, aligning with the Altman Z-Score model's predictive accuracy.
- **Recommendations:** Offer insights or recommendations based on the results, such as monitoring companies in the grey zone or prioritizing restructuring efforts for those in the distress zone.

5. DISCUSSION :

5.1 Interpretation of Findings

The Altman Z-Score analysis produced varying financial health profiles for the companies. Apple and Samsung are all in the Safe Zone and have solid financial positions with high profitability, liquidity, and low leverage. Their high Z-Scores indicate their ability to generate consistent earnings, maintain strong cash flows, and manage liabilities effectively. For instance, the Z-Score of Apple is 9.9, signifying that there is very good market value and an extremely low probability of going into financial distress, implying a good operating model with high retained earnings. In this case, the range of their Z-Scores varies between 1.81 and 2.99, suggesting cautious management. The Grey Zone means that they are not in immediate danger but could be at risk in adverse economic conditions, especially if operational or financial improvements are not made.

5.2 Implications for Financial Decision-Making

The results highlight the significant variation in financial health across industries and their implications for stakeholders:

For Investors: Companies with low investment risk belong to the Safe Zone and consist of companies like Apple and Samsung, whose profits are very stable and of very high liquidity. Those of the Grey Zone have returns, will depend on the fluctuations in business cycles, though with greater risks in terms of the respective industry. Companies belonging to the Distress Zone, will come under the category of a higher risk and will most probably only be invested by a small number of investors following some speculative or risk-tolerant investment strategy.

□To Creditors: Safe Zone firms will have easy access and raise credit at favorable rates, Grey Zone firms would incur relatively medium borrowing rates, and Distress Zone firms will find high rates or difficulties in loan acquisition.

□For Management: In the Grey Zone, management will focus on reducing liabilities and improving operational efficiency to achieve financial stability. Distress Zone firms have to address immediate cost-cutting, capital restructuring, or asset sales to avoid bankruptcy.

5.3 Economic and Industry Context

The findings of this study represent sector-specific financial trends. Technology firms such as Apple and Samsung tend to be asset-light, with high profit margins. This explains why they tend to be in the Safe Zone. Consumer retail and real estate services, face serious debt and the shift in market dynamics that more often leads to Distress Zone results.

Greater macroeconomic trends, from inflation and growing interest to shifting demand of consumers create an accentuated difference along the zones and are mostly painful to Grey and Distress firms operating under monetarist tightening.

5.4 Shortcomings in the Altman Z-Score Models

Although successful for bankruptcy probability in manufactured companies, Altman's Z-score would be appropriate for specific sectors with which there are businesses from this particular research; notably, software and property-orientated service providers. For instance, Apple and Samsung with a lot of intangible assets and low debt would report Z-Scores that may seem unrealistically high due to an inability to express industry-specific risks. Other than these, economic recession and a change in consumer habits may alter Z-Scores, that cannot capture the subtle flavour of some sectors.

5.5 Future Research Proposals

□ Industry Specific Adjustment: The concept of Z-Score could be modified to suit a few industries such as technological and service industries so as to give a measure of risk by using appropriate financial ratios that reflect intangible assets or non-recurring revenues.

□ Longitudinal Analysis: Z-Scores can be tracked over time and may reveal responses of firms to financial distress and changes in the economy. Longitudinal analysis can be done by tracking a firm over distress and recovery. Trends might be noticed in such analyses due to restructuring or market change.

Comparative Regional Studies: Economic conditions could influence Z-Scores across different regions. Future studies may be devised to create a global outlook on risks to financial health.

6. CONCLUSION :

The Altman Z-Score model, a powerful tool for assessing financial health and predicting bankruptcy risk, has been applied to analyze the financial standing of Apple and Samsung. This study aimed to delve into the financial strengths and weaknesses of these tech giants, shedding light on their potential for future growth and stability.

- **Financial Health:** Both Apple and Samsung, as industry leaders, exhibit strong financial health, placing them firmly in the Safe Zone. Their high Z-Scores reflect robust profitability, liquidity, and low leverage.
- **Industry-Specific Factors:** The technology sector, characterized by rapid innovation, high-value intangible assets, and significant research and development investments, can influence the interpretation of financial ratios. However, both companies have demonstrated prudent financial management, mitigating industry-specific risks.
- **Comparative Analysis:** A comparison of Apple and Samsung's financial performance reveals distinct strategies. Apple, with its strong brand equity and premium product positioning, has maintained a higher Z-Score. Samsung, on the other hand, has successfully diversified its business operations, including semiconductors and display panels, contributing to its financial resilience.

Implications for Stakeholders:

- **Investors:** The strong financial position of Apple and Samsung offers investors confidence in their long-term prospects. However, investors should continue to monitor these companies' performance, particularly in light of evolving technological trends and economic conditions.
- **Creditors:** Both companies enjoy favorable credit ratings and access to capital markets. Their low debt levels and strong cash flows make them attractive credit risks.
- **Management:** The positive Z-Score results indicate effective management strategies. However, both companies must remain vigilant in managing their growth, innovation, and supply chain risks.

Limitations and Future Research:

While the Altman Z-Score model provides valuable insights, it is essential to consider its limitations. The model may not fully capture the impact of intangible assets and future growth potential, which are crucial factors in the technology industry. Future research could explore the development of industry-specific Z-Score models that incorporate these factors. Additionally, analyzing the impact of emerging technologies, geopolitical risks, and regulatory changes on these companies' financial health would provide further valuable insights.

In conclusion, the Altman Z-Score analysis confirms the strong financial position of Apple and Samsung. However, it is crucial to monitor their financial performance and adapt to the dynamic technological landscape to maintain long-term success.

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