

The Potential for the Application of the emerging market Z-score model in the case of listed Banks in Ghana

Dramani Angsoyiri and Anthoinette Ativor

MBA Students, Department of Accounting and Finance

Kwame Nkrumah University of Science and Technology, Kumasi

angsoyiridramani@yahoo.com

anthionette@gmail.com

Abstract— the purpose-The primary goal of the research is how to put into operation the emerging market (EM) Z-score model in predicting corporate failure and to evaluate financial performance through the analysis of the annual audited report of four quoted banks in Ghana. More so this research introduces the Z-score model in this sector as a tool for possible diagnostic behind financial performance and deterioration.

Keywords— Quoted banks, risk, bankruptcy, finance, corporate failure

Methodology/ design /approach- The method used in this research is primarily based on the EM Z-score model developed by Altman. The approach used in this research is in line with previous research that upholds the Z-score model with 80 percent prediction accuracy. These previous researchers confirm that it is a robust instrument that helps in predicting and assessing the overall performance of companies financially and possible distress of corporate organizations given that it consists of numerous ratios financially which can be utilized to predict business liquidation, financial distress, and corporate failure. The method set up in this research is to study the annual report

of banks quoted on the Ghana Stock Market by computing their Altman emerging market Z-score ratio for three years that is from 2016 to 2019 and comparing it with 2019 which is the current year emerging market Z-score ratio to evaluate the whole performance of the banks financially as well as the possibility of liquidation of banks quoted on the Ghana Stock Market.

Findings- The research establishes that banks in Ghana should work hard on enhancing the Z-score ratios which are dragging the emerging market Z-score down to better comprehend the earlier period performance and to realize their current situation in the sector; the Z-score can be adopted by banks in Ghana as an effective and efficient assessment approach towards the financing the possible long joint venture projects encompassing Small and Medium businesses enterprises. This model was adopted by banks in Ghana as an autonomous credit hazard examination approach to appraising the financial strength and competencies of potential projects.

Research/implications/Limitation - It was ascertained from this research that the Altman emerging market Z-score ratio model is an applicable model for measuring the performance of quoted banks in Ghana. Limitation

including the Ghanaian banking sector is still considered to be a small size that may have negative consequences on the maximum result of the research. Future research should be conducted towards updating coefficient value associated with every ratio in the Altman emerging market Z-score ratio model as per the inputs from the banks in Ghana.

Practical implication- EM Z-score is an applicable model to appraise the performance of quoted banks in Ghana and the accounting ratios utilized in computing the emerging market Z-score is well thought-out to provide precious influential indicators.

Social implication- EM Z-score ratio widens the sector exposure that will enable it to finance more projects and business and will reflect positively on the welfare of the society. By adopting the Z-score model small and medium enterprises will get the needed financing.

Originality-Introducing EM Z-score to quoted banks in Ghana as a critical credit risk appraising technique.

Keywords: Quoted banks, risk, bankruptcy, liquidation, finance, corporate failure

Paper type Research paper

INTRODUCTION

The banking industry in Ghana consists of the Bank of Ghana as the body in charge of regulating banks in Ghana, 23 universal banks, and 140 rural and community banks (2019 banking survey), with 14 of the universal banks foreign-owned and 9 local owned. The current universal banking system was introduced in the year 2003. This study is important in this sense that it attempts to appraise <https://doi-ds.org/doi/10.2021-43827315/IJMRE>

the distance to corporate failure by utilizing weighted average EM Z-score for quoted banks in Ghana. This research is the first to apply this method in an emerging financial market such as Ghana that is characterized by high profile financial risk in comparison with conventional banks. The primary goal of this research is to implement the Z-score ratio technique in predicting corporate failure and also to appraise the financial performance of quoted banks in Ghana. The result of this research is to be considered as a warning signal of future corporate failure of quoted banks in Ghana might encounter.

More so this research goal is to introduce the emerging Z-score ratio model to this sector as a diagnostic beneficial technique for a probable cause behind the deterioration of financial performance. A thorough comprehension of the association between the numerator and the denominator of all the EMZ-score ratio model to enable the researcher to assess the cause for the level of performance will provide insight for quoted banks in Ghana in their bid to manage their position in the sector and also to enable them to draft their strength, weakness and opportunity and threats (SWOT) analysis and budget. This research is meant to establish the trend of financial performance rather than to do an in-depth discussion of the extent of the prediction reliability of the EM Z-score provided in the life span of the business. The literature review of this research will introduce concepts of quoted banks numerous Z-score previous study outcomes, followed by the description of the methodology and analysis of the data and ends with conclusion and recommendation.

Literature Review

Kingsley Opoku Appiah (2011), investigated the predictability and the application of the Altman Z-score ratios model in predicting business failure in Ghana. The study sampled 15 failed and non-failed corporate

organizations from the Ghana stock market, from 2004 to 2005. It was established that business failure cannot be predicted accurately in Ghana utilizing the Altman Z-score ratio model because of type ii error. It was however determine that failed companies can be distinguished from non-failed companies depending on the nature of the business and company's sizes.

Opoku Appiah Amon Chizema and Joseph Arthur (2015), Their study evaluate present literature to make contributions meaningfully to a better appreciation of methodology problems of statistical technique, synthetic talent expert device, and the theoretical method to fixing company failure prediction model. Their result suggests the necessary literature on the prior body on corporate failure prediction exists, it was, however, established that a theoretical sound, accurate, and popularly familiar failure prediction model for the corporate establishment for stakeholders has not yet be established. Data from 11 nations with 15%, 53%, and 11% statistics coming from Korea USA, and the UK in that order while, Belgium, France, and Australia accounted for only 4% and the rest of the World contributing 9%

A study carried out by Pam (2013) in the banking sector of Nigeria focusing on two failed banks and two non-failed banks revealed that liquidity, profitability, running efficiency, and complete assets turnover had been key ratios of the Altman's Z Score model are necessary tools in organizing the strength of a financial organization.

Mohammed & Soon (2012) applied the Altman's Z score ratios model in predicting company failure and modern ratio to examine the economic circumstance of 44 companies that were listed in the Malaysian Stock Exchange from 2008 to 2010 and the study results concluded that the Altman's Z rating model and the

present-day ratio are exact predictors of corporate failure of firms.

Johnson and Kumbro (2011) conducted their research using multiple discriminating analyses. They sampled 45 companies in the United States of America that filed for liquidation from 2007 to 2010. The research utilized the Z-score ratio model by Altman. It was established that the Altman Z-score model was a reliable tool for predicting business failure.

Research methodology

This phase of the research offers a brief explanation of steps taken to arrive at the Altman emerging market Z-score ratio model. The approach used in this research is in line with previous research, mostly Parshar (2000) and Altman (2002) that uphold the Z-score model with 80 percent prediction accuracy. These previous researchers confirm that it is a robust instrument that helps in predicting and assessing the overall performance of companies financially and possible distress of corporate organizations given that it consists of numerous ratios financially which can be utilized to predict business liquidation, financial distress, and corporate failure. The method set up in this research is to study the annual report of banks quoted on the Ghana Stock Market by computing their Altman emerging market Z-score ratio for three years that is from 2016 to 2019 and comparing it with 2019 which is the current year emerging market Z-score ratio to evaluate the on the whole performance of the banks financially as well as the possibility of liquidation of banks quoted on the Ghana Stock Market.

$$\text{Emerging Market Z-score} = 3.25 + 6.56(X1) + 3.26(X2) + 6.75(X3) + 1.05(X4)$$

Definitions of variables

X1= the ratio of working capital to total assets: Determine the net liquid assets of the enterprise about total assets and establish the commercial enterprise capability to manage the liquidity of the business. The liquid asset of the business or working capital is measured by means of deducting total liabilities from the total asset current asset as a canon a distressed commercial enterprise will experience a decrease in working capital.

X2= the ratio of retained earnings to total assets: Determine the retained profits in relation to total assets and establishes the collective profitability.

X3= the ratio of earnings before taxation and interest: is determined by dividing profit before interest and taxation (PBIT) by total asset. It establishes the business potential to produce earnings from the whole of its total assets. This ratio is extraordinarily essential when determining company survival and establishing the effectiveness of the business in general and stress the level of productiveness resulting from money borrowed in particular.

X4= the ratio of equity to total liabilities; this ratio determines the market value of equity to total liabilities, the high the score, the less probable for liquidation or insolvency.

Where cut off rankings reflect

Safe if higher than 2.60

Bankrupt if much less than 1.10

Grey region = 1.10-2.60

Sample

The sampling technique used in this research is purposive sampling which refers to choosing a unit among a population of items which is based on a certain specific principle either than at random. Tashakkori and Teddlie <https://doi-ds.org/doi/10.2021-43827315/IJMRE>

(2003). Babbie (2008), suggests that the population is referred to as a collection of elements or cases be it individuals, objects, or procedures which match specific criteria and about whom conclusions are drawn. From a population of 23 banks, the researcher utilized a non-probability sampling method in selecting banks for this study. The researcher analyzes a sample of 5 quoted Banks on the Ghana Stock Market from 2016 to 2019.

Discussion of Results

The goal of this research is to appraise the distance to distress by utilizing the modified Altman Z-score ratio model known as EM Z-score. This research can be considered as a non-traditional manner to ascertain the financial performance of quoted banks in Ghana. As indicated above, the Altman EM Z-score can be reconstructed on the foundation of the entire score attained by a corporation, in which a score less than 1.1 indicates the company is unhealthy and therefore its financial position is endangered and close to liquidation. Those businesses whose score is more than 1.6 are in the healthy zone and therefore strong financial position. The zone above 1.1 and less than 1.6 are in the grey area and business organizations found in this zone are said to be facing serious financial troubles. The financial statement of the financial year of quoted; banks in Ghana from 2016 to 2019 were reconstructed as set out in table one to five in order to compute the EM Z-score model. As indicated above, quoted banks in Ghana might be characterized as being financially healthy and sound for the reason being that their EM Z-score is in the healthy zone and significantly more than the cut-off point of 2.60. However, figure 3 gives an insight into the performance of quoted banks on the Ghana stock market. In spite of, the higher EM Z-scores attained by GCB and EGH in 2016, their emerging market Z-score decline in the successive years. This condition demands urgent attention by management so

that the factors causing the decline in the emerging market ratios could be discovered, these factors if left might cause bankruptcy and failure. The emerging-market Z-score of CAL rises sharply in the year 2016 which indicates an improvement and falls in the subsequent years and begun to rise from 2018 to 2019. However, the emerging market Z-score of ADB and RBGL begin getting higher from 2016, signifying an enhancement in their financial performance and financial position

Table 1 EM Z-Score of CAL

| Financial year | 2016 | 2017 | 2018 | 2019 |
|---------------------|-----------|-----------|-----------|-----------|
| Receivable | 1,966,394 | 1,853,674 | 2,422,952 | 2,920,026 |
| Investment | 1,486,97 | 818,032 | 2,710,691 | 1,815,912 |
| Cash | 428,756 | 512,376 | 637,570 | 597,784 |
| Fixed assets | 278,810 | 252,332 | 504,242 | 435,583 |
| Total assets | 3,618,858 | 4,223,138 | 5,419,299 | 7,048,498 |
| Current assets | 3,366,526 | 3,944,328 | 4,204,271 | 6,544,332 |
| Current liabilities | 3,099,355 | 3,551,068 | 4,639,854 | 6,073,711 |
| Retained earnings | 0 | 0 | 73,666 | 189,473 |
| Shareholders fund | 519,503 | 672,070 | 779,445 | 974,787 |
| Total income | 10,208 | 152,989 | 153,216 | 173,413 |
| Total expenses | 243,369 | 350,126 | 296,351 | 353,452 |
| Total liabilities | 3,099,355 | 3,551,068 | 6,073,711 | 4,639,854 |
| Profit before tax | 17,051 | 218,863 | 222,906 | 242,940 |
| Income tax | 6,843 | 65,965 | 69,690 | 69,527 |
| Profit for the year | 10,208 | 152,898 | 153,216 | 173,413 |
| Earnings/share | 1.87 | 24.49 | 24.49 | 27.73 |
| X1 | 0.073827 | 0.09312 | 0.0803763 | 0.066769 |
| X2 | 0 | 0 | 0.0135933 | 0.0268813 |
| X3 | 0.004712 | 0.051825 | 0.0411319 | 0.0344669 |
| X4 | 0.167616 | 0.189259 | 0.1283309 | 0.21009 |
| EM Z | 3.941968 | 4.407853 | 3.1781995 | 4.2278498 |
| Original Z | 0.204711 | 0.396321 | 0.1353129 | 0.3575515 |

All the same, this analysis provides insight into the banks' performance quoted on the securities market, in this

although the higher scores achieved by Cal Bank in 2016 and, the emerging market Z-score tended to decline sharply within the following years, this case demands urgent attention by top management so as to indicate the factors causing this so as to stop failure and bankruptcy.

Table 3 EM Z-Score of ADB

| Financial year | 2016 | 2017 | 2018 | 2019 |
|---------------------|-----------|-----------|-----------|-----------|
| Receivable | 1,005,302 | 1,139,356 | 1,068,814 | 1,216,631 |
| Investment | 1,085,752 | 1,099,177 | 1,189,749 | 1,203,468 |
| Cash | 610,563 | 951,675 | 652,828 | 728,384 |
| Fixed assets | 105,015 | 105,117 | 98,846 | 96,382 |
| Total assets | 3,035,493 | 3,545,143 | 3,597,395 | 3,853,023 |
| Current assets | 2,930,478 | 3,440,026 | 3,498,549 | 3,756,641 |
| Current liabilities | 2,580,715 | 3,066,130 | 2,957,684 | 3,193,486 |
| Retained earnings | 0 | 0 | 0 | 0 |
| Shareholders fund | 454,778 | 479,013 | 639,711 | 659,538 |
| Total income | 278,457 | 26,510 | 5,908 | 112,572 |
| Total expenses | 383,961 | 359,565 | 353,420 | 88,920 |
| Total liabilities | 2,580,715 | 3,066,130 | 2,957,684 | 3,193,486 |
| Profit before tax | -105,714 | 47,339 | 34,057 | 23,652 |
| Income tax | 35,688 | -20,829 | -28,149 | 2,826 |
| Profit for the year | -70,026 | 25,510 | 5,908 | 20,826 |
| Earnings/share | -1.66 | 11 | 2.56 | 9 |
| X1 | 0.115224 | 0.105467 | 0.1503491 | 0.1461593 |
| X2 | 0 | 0 | 0 | 0 |
| X3 | -0.03483 | 0.013353 | 0.0094671 | 0.0061386 |
| X4 | 0.176222 | 0.156227 | 0.2162878 | 0.206526 |
| EM Z | 3.956875 | 4.195636 | 4.5270112 | 4.4669082 |
| Original Z | 0.129077 | 0.264362 | 0.3414331 | 0.319564 |

Table 4 EM Z-Score of EGH

| Financial year | 2016 | 2017 | 2018 | 2019 |
|----------------|-----------|-----------|------------|------------|
| Receivable | 3,480,544 | 2,685,468 | 4,149,511 | 4,624,270 |
| Investment | 0 | 0 | 0 | 0 |
| Cash | 3,193,202 | 2,952,753 | 2,443,686 | 2,711,120 |
| Fixed assets | 316,661 | 456,006 | 443,016 | 454,622 |
| Total assets | 8,056,870 | 9,098,038 | 10,454,765 | 10,937,674 |
| Current assets | 7,740,209 | 8,642,032 | 10,011,749 | 10,483,052 |

| | | | | |
|---------------------|-----------------|-----------------|------------------|------------------|
| Current liabilities | 7,092,794 | 8,061,213 | 9,128,546 | 9,382,110 |
| Retained earnings | 0 | 0 | 0 | 0 |
| Shareholders fund | 964,076 | 1,036,825 | 1,326,219 | 1,555,564 |
| Total income | 1,206,657 | 1,116,846 | 1,307,498 | 729,919 |
| Total expenses | 744,958 | 759,207 | 803,003 | 423,207 |
| Total liabilities | 7,092,794 | 8,061,213 | 9,128,546 | 9,382,110 |
| Profit before tax | 462,676 | 358,383 | 506,251 | 306,784 |
| Income tax | 134,780 | 104,738 | 166,283 | 91,079 |
| Profit for the year | 327,896 | 253,645 | 339,968 | 215,705 |
| Earnings/share | 112 | 87 | 110 | 134 |
| X1 | 0.080356 | 0.06384 | 0.0844785 | 0.100656 |
| X2 | 0 | 0 | 0 | 0 |
| X3 | 0.057426 | 0.039391 | 0.048423 | 0.0280484 |
| X4 | 0.135923 | 0.128619 | 0.1452826 | 0.1658011 |
| EM Z | 4.305757 | 4.06855 | 4.2821283 | 4.2728793 |
| Original Z | 0.367487 | 0.283771 | 0.3483397 | 0.3128274 |

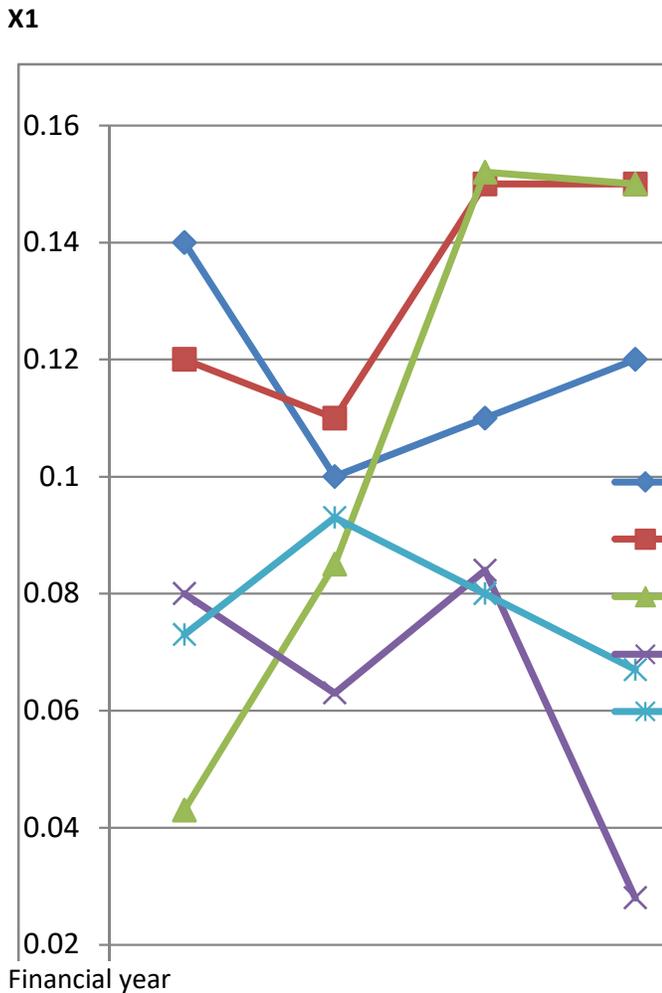
| | | | | |
|-------------------|----------|----------|-----------|-----------|
| Original Z | 0.540968 | 0.811982 | 0.8275153 | 0.8859766 |
|-------------------|----------|----------|-----------|-----------|

In order to establish the direction of the relationship that exists between working capital to total assets ratio and corporate failure, the research deems it essential to draw a line of best fit that is the key determinant of the predictive accuracy of the Z- score model by Altman (Anderson et al., 2002), the result is shown in figure 2 above. Ratio X1, which concerns working capital, which determines the correlation that exists between current liabilities and current assets, where current assets are expected to exceed current liabilities more than twice in this sector. As shown in figure 2 EGH and CAL should enhance its short term stability situation as it is less than the sector average, whereas GCB, ADB, and RBGL appear above the sector average, its stakeholders have got to closely monitor the decrease in ratio X1, as it acts as a warning sign and takes the necessary actions to prevent further deterioration. In conclusion, those banks are therefore advised to improve their investments in working capital. Also X2 and X3 ratio determines operating efficiency, which means the ability of quoted banks in Ghana in the generation of profit from sales of their business product and also their ability in using assets to generate sales, hence enhancing these ratios will increase or improve the entire EM Z-score ratio. The exception being RBGL, CAL, and GCB whose X2 is zero. Figure 5 establishes that all quoted banks in Ghana have enhanced their position since 2016.

Table 2 EM Z-score of RBGL

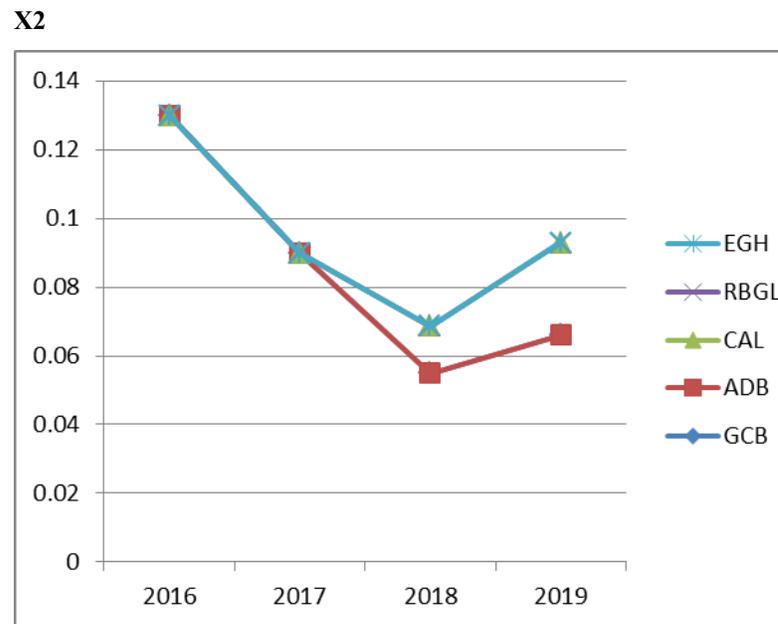
| Financial year | 2016 | 2017 | 2018 | 2019 |
|---------------------|-----------------|-----------------|-----------------|------------------|
| Receivable | 919,436 | 809,736 | 1,175,066 | 1,401,224 |
| Investment | 28,376 | 54,549 | 50,428 | 568,866 |
| Cash | 642,944 | 846,357 | 905,652 | 1,136,757 |
| Fixed assets | 65,545 | 67,250 | 64,908 | 93,046 |
| Total assets | 1,897,556 | 2,100,178 | 2,879,034 | 3,326,242 |
| Current assets | 1,832,011 | 2,032,928 | 2,814,126 | 3,251,499 |
| Current liabilities | 1,749,958 | 1,852,901 | 2,374,560 | 2,764,868 |
| Retained earnings | 0 | 0 | 0 | 0 |
| Shareholders fund | 145,097 | 238,635 | 500,170 | 574,793 |
| Total income | -47,729 | 272,753 | 297,668 | 342,962 |
| Total expenses | 265,382 | 203,329 | 259,018 | 231,658 |
| Total liabilities | 1,749,958 | 1,852,901 | 2,374,560 | 2,764,868 |
| Profit before tax | -63,782 | 69,445 | 38,650 | 111,294 |
| Income tax | 16,446 | 19,690 | 8,011 | 26,589 |
| Profit for the year | -47,729 | 46,494 | 28,201 | 79,123 |
| Earnings/share | -16.13 | 5.04 | 15.49 | 9.19 |
| X1 | 0.043241 | 0.08572 | 0.1526783 | 0.1463005 |
| X2 | 0 | 0 | 0 | 0 |
| X3 | -0.03361 | 0.033066 | 0.0134246 | 0.0334594 |
| X4 | 0.082915 | 0.12879 | 0.2106369 | 0.2078917 |
| EM Z | 3.394847 | 4.169757 | 4.562952 | 4.6528648 |

Figure 1 Listed Banks X1 Ratio Score



Finally the ratio X4, which measure the long term stability of business financially, it establish the association between net worth and total liability, when there is excessive gearing it results from equity of trade can lead to liquidation as capital cushion is not adequate to cater for

Figure 2 Listed Banks X2 Ratio Score



Financial Year

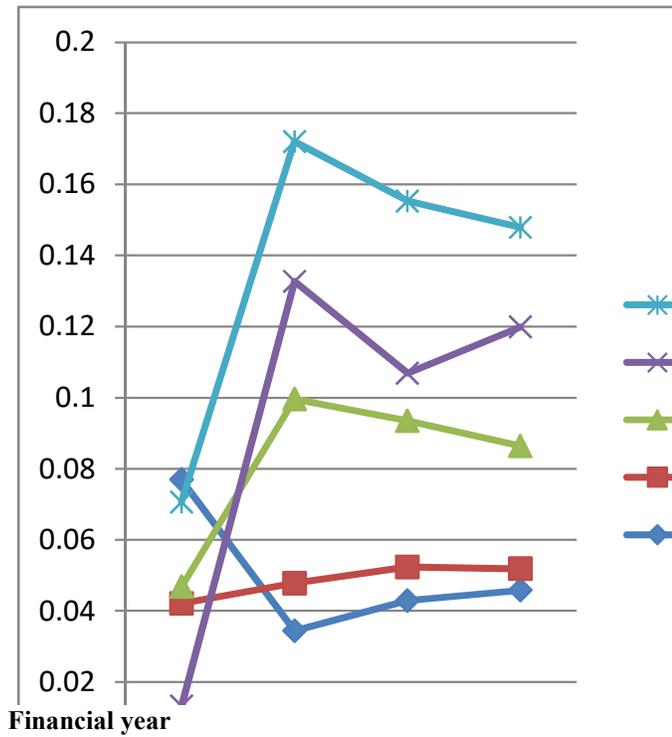
Conclusion and recommendations

The primary objective of the study was to introduce the Z-score model to this sector as a beneficial diagnostic technique for probable cause standing behind the decay of financial performance and also to give an insight on the performance of quoted banks in Ghana. The research significantly shows that quoted banks in Ghana are financially healthy and sound, although all the banks' EM Z-score falls within the healthy zone by importantly exceeding the cut-off point of 2.60. The research shows that the Z-score is an important analytical technique that can be adapted by quoted banks in Ghana to supplement other analytical techniques to determine quoted banks averages. The research also, shows that ratios utilize in the computation of Z-score are considered to give a valuable influential hint. In conclusion, to comprehend the past performance and realize their current state in the sector,

quoted banks in Ghana should work on enhancing the ratios which are dragging the EM-Z score down.

Figure 3 Listed Banks X3 Ratio Score

X3



the business contingent obligation. Figure 4 shows the performance of quoted banks in Ghana, which indicates that their net worth is increasing or there is a decrease in liability. Deterioration may lead to serious problems.

Figure 4: Listed Banks X4 Ratio Score

X4

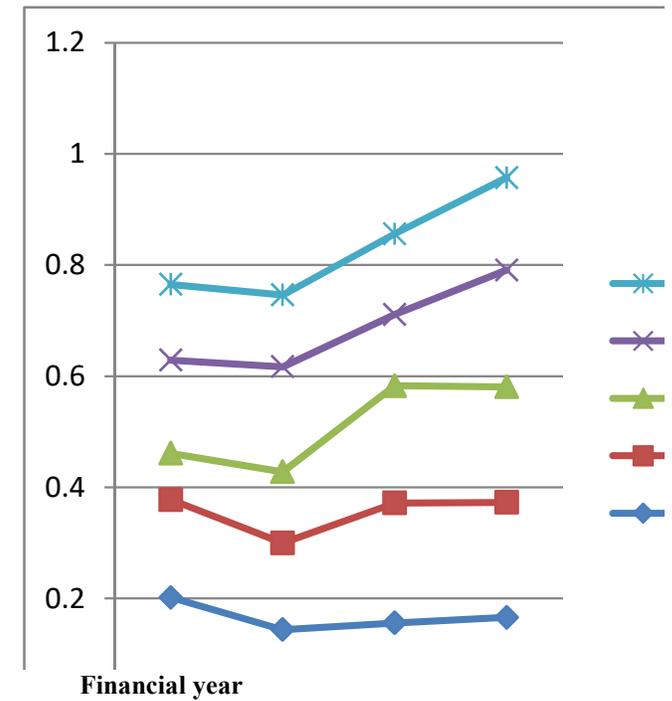
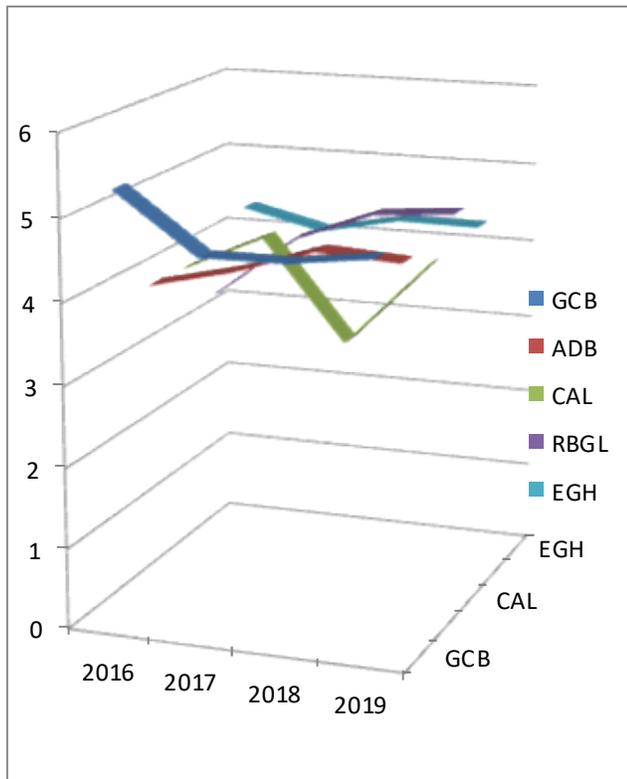


Figure 5 Emerging Market Z-score for Banks quoted on the Ghana Stock Exchange

EM-Score



Financial year

REFERENCES

- [1] Appiah, K. O. (2011), corporate failure prediction: some evidence from listed firms in Ghana. *International Journal of Law and Management* Vol. 10, No.132-41 32
- [2] Appiah, K.O., Chizema, A., & Arthur, J. (2015) Predicting corporate failure: a systematic literature review of methodology issues *International Journal of Law and Management*, 57(5), 461-485
- [3] Altman, E., (1968), Financial Ratios Discriminant Analysis and the Prediction of Corporate Bankruptcy *the Journal of Finance*, 23(4), 589-609
- [4] Altman, E., I. (2000), Predicting financial distress of companies: revisiting the Z-score and Zeta model, available at:

www.pages.stern.nyu.edu/ealtman/Zscores.pdf (accessed 1 may 2007)

[5] Altman, E., I. (2002), corporate distress prediction model in turbulent economic and Basel II environment, available at: www.pages.stern.nyu.edu/ealtman/(accessed 24 may 2008).

[6] Alareen, B., & Branson, J. (2013) Predicting Listed companies' failure in Jordan using Altman's model: a case study. *International Journal of Business and Management*, 8(1), 113

[7] Argenti, J (1984). Predicting corporate failure, Institute of Chartered Accountant in England and Wales

[8] Mohammed, A., & Kim-soon, N. (2012) Using Altman's model and current ratio to assess the financial status of companies quoted in the Malaysian Stock Exchange, *IJSRP*, 5(2), 7-14.

[9] Ntoiti, J. (2013). Determinants of financial Distress in local Authorities in Kenya *Journal of Business Management*, 5(3), 43

[10] Parasher, S.P. (2000) Z-score of UAE companies Emirates Institute for Banking and Financial Studies, Research Paper, November

[11] Pam, W.B. (2013). Discriminant Analysis & Prediction of Corporate Bankruptcy in the Banking Sector of Nigeria, *International Journal of finance & Accounting*, 319325

[12] Saif H. Al Zaabi, O., (2011), Potential for the application of emerging market Z-score in UAE Islamic banks *International Journal Islamic and middle Eastern Finance and Management* vol.4 No. 2, pp.158-173

[13] Tashakori, D. & Teddlie, B. (2003). Transcending the qualitative-quantitative debate: The analytic and systemic approaches to educational research. *Educational Researcher*, 20(6), 10- 18

[14] Johnson, T. & Kumbaro, J. (2011), Predicting Corporate default: an assessment of the Z-score model on U.S. Market 2007-2010, Lund University

