

Exploring the Financial Performance of the Listed Companies in Kuwait Stock Exchange Using Altman's Z-Score Model

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Abstract

A quantitative method was used to explore the financial performance of the listed firms on the Kuwait Stock Exchange. The number of firms explored was 196 out of a possible 206 (two firms are subsidiaries of one of the firm, and others are insurance firms excluded). The listed firms were observed from 2009-2014 to understand their status in the market, and the direction they are headed towards. The financial data were gathered from the published annual reports of the respective firms and the financial statements from the Kuwait Stock Exchange website. The results, using the Altman Z-score model for the period 2009-2014, show that approximately 39.46% of the firms on average were safe; approximately 25.94% of the firms on average were distressed; approximately 15.90% of the firms on average were in a grey area; and approximately 18.71% firms on average had no available data. The bankruptcy rate could not be justified using the Zmijewski score model due to the inconclusive results and the absence of bankruptcy laws in the State of Kuwait. This paper provides insight into the financial distress level in Kuwait. The level of distress shows that major changes are necessary within firms and operations are not running smooth. Bankruptcy laws are required for firms operating in distress. This exploration is a stepping-stone for potential investors by showing the most profitable sectors for investment and for future researchers to predict accurate bankruptcy rates in the State of Kuwait.

Keywords: Bankruptcy; Distress; Firms; Altman Z-score; Zmijewski score; Models; Stock markets; Kuwait

Overview

This paper studies the financial performance of the listed companies on the Kuwait Stock Exchange. It explores whether the Kuwait market is good for investment by foreign investors to trade in stocks. Because such a paper has not been written before about the Kuwait stock market, this paper presents limitations, such as lack of and unavailable data. It also presents opportunities of investment available in various sectors for potential foreign investors and further develops an understanding of the future of the Kuwait Stock Market. This paper uses quantitative research methodology to investigate the financial performance of the Kuwait market via Altman's Z-score model and Zmijewski's bankruptcy model. Annual reports of the listed companies and financial statements from the Kuwait Stock Exchange website were used for examination.

Problem statement

The main problem is that financial markets have been recurrently crashing e.g., stock market collapse in China. Such phenomenon affects the markets worldwide. For investors, it is difficult to predict such phenomena. However, they can invest sensibly by using the bankruptcy prediction models for judging the firm's financial condition. The Kuwait financial market was limited due to its lack of maturity and depth, lack of imposed restrictions, and overseas investment in the stock market portfolios did not have the sufficient attention until the early nineties. These foreign investments are viewed as "hot money", and the government preferred direct investments. Kuwait has opened its market for attracting foreign assets with the associated repayment to the economy of Kuwait by contributing to the national projects and transferring the latest technological developments. The core intention of the foreign investors is to maximize proceeds while guaranteeing their rights in the legislative framework. Thus, the restrictions were eradicated on work permits and ownerships, and the clashes in the related laws and regulations. In 1999, the Amiree Decree Law No. 10 was issued regarding the directive of the direct investment of foreign assets in Kuwait. This investment committee studies the investment needs, sponsors the vacant venture occasions in the country, presents

incentives to persuade overseas investors, smoothens the progress of licensing events, and gets rid of the obstacles which the foreign investors might face. In 2000, the Amiree decree No. 20 was issued for the approval of foreign investors to possess shares in the shareholding companies of Kuwait that exist or may be established [1]. According to the ministerial decree No. 205, the inner bylaws of the non-direct speculation in securities law was issued, which regulates foreign investor's investment in stocks.

In 2008, income tax on the earnings of foreign companies was reduced from 55% to 15%, as per law No. 2 and the freedom from taxes on profits from trading on the Kuwait stock market, made straight or through portfolios or investment funds, attracted foreign investment significantly increasing the trading volume in the market. However, more awareness is needed to attract investors from around the world. This study will help investors analyze the sectors that are performing well, and help the listed firms know of their company status, and take necessary actions to improve their financial image in the eyes of investors.

Purpose

This quantitative paper focuses on the financial performance of the companies listed on the Stock Exchange of Kuwait. The purpose is to find out how likely are Kuwait firms to file for bankruptcy and to provide additional and better understanding of Kuwait corporate performance since financial ratios alone is not enough to analyze whether the firms in Kuwait stock market are profitable for foreign investment. The analysis, using the Altman Z-score model and Zmijewski model, helps

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in predicting which will be the profitable firms and the endangered firms, which is a useful indicator for successful firm acquisition by possibly profitable firms interested in expanding their business. Both tools predict the performance level and bankruptcy level. The intent was to assess the sectors in Kuwait that are suitable for investment with least involved risk. The results will assist future investors in making profitable investment decisions and generating fruitful gains.

Significance

The significance is to expand the existing research that has been conducted on various financial markets. This exploration creates the initial knowledge and understanding of the future of the Kuwait stock market. Ijaz, Hunjra, Hameed, Maqbool, and Azam [2] stated that the failure of business causes large financial and non-financial losses. Therefore, an appropriate forecast of the financial health of a business is essential for stakeholders of the business, including clientele. This paper analyzed the performance of the companies listed on Kuwait Stock Exchange using the Altman's Z-score model and Zmijewski score model for any bankruptcy prevalent in the upcoming future. This analysis helps CEOs understand whether investing in Kuwait Stocks is profitable as Kuwaiti Dinar (KWD) is relatively strong when compared to the currencies of other Gulf countries. This is a good sign for generating higher profits in the stock market. So far, no such study has been conducted on the Kuwait stock market. This paper will help foreign investors in understanding this market for making future investments. Over the years, the initial models of Altman and Zmijewski have been altered based on the firm i.e., manufacturing or non-manufacturing. This is a stepping-stone for further analysis by future researchers to enhance the Altman Z-score and Zmijewski score models that are best suited to the Middle East countries and other types of firms. Thus, this paper sheds further light on the usage of models like Altman and Zmijewski score among future investors and companies, in testing their financial condition of companies and their investment for mergers and acquisitions, and in further developing the bankruptcy laws in the country of Kuwait so firms can function better.

Design

The quantitative research methodology uses numerical data from the financial statements. To ensure the accuracy of the secondary data collected published company annual reports on their individual websites and financial statements from Kuwait Stock Exchange are used. Hence, no primary data was required as the financials used for analysis are published and available for easy access. Muthukumar and Sekar [3] stated that the Altman Z-score is a quantitative method based on the balance sheet and income statement data for determining a company's financial health. The Zmijewski score model uses probability versus traditional analysis to determine whether the listed companies will go bankrupt in the coming two years. The research design was causal to determine how far the company's performance was affected post-financial crisis. There are 206 companies listed on the Kuwait stock market out of which 196 were explored. The insurance companies were excluded, and two companies are subsidiaries for one of the petroleum firms.

Questions (Hypotheses)

The objectives of this paper are to:

1. Examine the financial soundness of listed companies using the Z-score model in Kuwait from 2009-2014;

Predict the bankruptcy rate of the listed firms within two years

using Zmijewski score. Keeping the above objectives in mind, the intent was to answer the following questions:

R1. Are the firms listed in Kuwait stock market efficient for foreign investment?

If the firm is operating as per the criterion of Altman Z-score and Zmijewski score models, both models go in hand with each other. However, if the firms are operating well under Altman Z-score model criteria and not under Zmijewski score model or vice versa, then they oppose each other's theory aiming towards distress/bankruptcy.

H₀₁: The models Altman's Z-score and Zmijewski's Score do not contradict each other

H₁₁: The models Altman's Z-score and Zmijewski's Score contradict each other.

R2. Is bankruptcy likely to occur in the future in the listed firms of Kuwait stock market?

The Zmijewski score model criterion states that a positive score shows no bankruptcy while a negative score shows bankruptcy in the coming two years.

H₀₂: Bankruptcy does not occur in two years if Zmijewski's Score is positive.

H₁₂: Bankruptcy can occur in two years if Zmijewski's Score is negative.

Assumptions and limitations

All data gathered in this paper was from the yearly reports of the respective company sites and Kuwait Stock Exchange website. This paper applied the assumption that the companies are well established and performing well with positive profits as they are listed in the stock exchange. Data from 2009 onwards has been used. The aim was to explore the Kuwait stock market post-financial crisis of 2008. The five-year period 2009-2014 would provide a better scenario of the financial market when compared to one or two years. The limitations that exist in this research are: Many firms have no data available for the years 2009 and 2010. The primary reason being they were not established yet. However, this does not affect the Altman results for the individual firms. Many firms do not have annual reports published. These firms have used financial statements available from the Kuwait Stock Exchange website. Data reports firms for certain years were available in the language of Arabic and have not been used. This was compensated by the financials available on the Kuwait Stock Exchange website. For calculation, Net profit of a firm has been used instead of EBIT since data was not available in the statements. Some firms did not have data for retained earnings and hence, the calculation scores were incomplete and could be inconclusive. Hence, there could be a discrepancy in categorizing the firms from distressed to grey zone to secure.

Operational definitions

Altman's Z-score model is a financial model that uses five ratios from the financial statements for determining the likelihood of a company's bankruptcy in the coming two years [4].

Asset is defined as a valuable item [5].

Bankruptcy is defined as the inability of the firm to pay its debts. This results in reorganization and continued operation of the firm or liquidation and distribution of the proceeds to clear the outstanding amount (Scott, 2003).

Distress is defined as a condition of strain [6].

Hot Money is defined as the currency that is moved from one form of investment to another, to take advantage of changing international exchange rates or gain [6].

Speculation is defined as trading a financial mechanism involving high risk, in expectation of substantial returns. The motive is to maximize gains from fluctuations in the market. Speculators are widespread in the markets where price movements of securities are recurrent and unpredictable. They play very important roles in the markets by absorbing excess risk and providing much-needed liquidity in the market by buying and selling when other investors don't take part.

Zmijewski model is similar to Altman's Z-score model, i.e. it uses ratios from the financial statements, as the probability unit to predict whether a firm will go bankrupt in two years [7].

Literature Review

Before proceeding further into the theoretical set up, it is necessary to position the history of the Kuwait Stock Market. This paper forecasts the bankruptcy probability of companies listed on the stock exchange by using financial ratios and probability units. The financial ratios are calculated by using balance sheet data and income statement for each company while the probability units will further be conducted using Microsoft Excel software. This area will then illustrate the conclusions of several papers on the Altman Z-score model and Zmijewski score model by using the financial ratios.

Theoretical orientation

The Gulf Cooperation Council (GCC) is comprised of six Gulf States, namely Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates, a political and economic pact, pledged to achieve endlessly closer unification. The stock markets in the GCC are comparatively small, and the majority of stocks are infrequently traded since the trading volume is low [8]. The banking sector accounts for 49%, followed by telecoms with 11% of the total Kuwait Stock Exchange value [9]. Kuwait's sovereign net foreign assets were valued at 269% of GDP at the end of the 2014 – the highest of any rated sovereign, according to Fitch – and government debt was at just 5.3% of GDP, showing Kuwait's strong fiscal position [10]. Commercial banks control the financial markets in this constituency. In 1952, the investors of Kuwait were introduced to stock trades and National Bank of Kuwait was the primary Kuwaiti shareholding company. In 1978, the Kuwait stock market stabilized and led to the creation of Souk Al-Manakh (a parallel stock exchange) in 1979 as an unregulated market in Kuwait, where Gulf-based companies did not meet the exchange listing requirements. Towards the end of 2001, the top ten listed firms in Kuwait in terms of market capitalization was about 55.5% of the market capitalization of every listed firm. The Arab stock markets have witnessed a latest trading environment, because of globalization, liberalization, and the mixing of the world economy, leading to new practices in the majority of stock exchanges. In Late 2009, a partnership contract was signed between NASDAQ OMX and Kuwait Stock Exchange, implementing the "X-stream" trading system Phase 1 in 2012. On 28th February 2010, the trading activities and regulations were reassigned to the Capital Markets Authority by the latest law. In May 2010, the "SMARTS" supervision system was put into operation. Phase 2 of the trading system is under process to introduce new items and services, counting ETFs, Futures and Options in the global form,

Market makers for suitable products, fixed income instruments, Sukuks, and New indices. Kuwait has a longstanding reputation as a center for Islamic financial services, leading to the rapid expansion of sharia-compliant banks and investment companies in recent times. Islamic banking assets grew to around 45% by the end of 2013, and an IMF report released in December 2014 showed Kuwait's sharia-compliant banking sector is the fifth largest in the world, with more than \$68.9bn in assets. As per the Kuwait Stock Exchange website, the market capitalization of Kuwait Stock Exchange has consistently been one of the biggest of Arab markets, in the company of more than 200 companies working out over KD 28 billion (US\$100 billion) market value. The sectors that exist in the Kuwait stock market for primary/secondary trading are banking, investment, insurance, real estate, industrial services, food, and non-Kuwaiti. The firms in Kuwait with growth opportunities have higher debt ratios because they can get the debt finance whenever needed. The primary market involves the IPOs which can be bought by Kuwaitis only, when the company goes public. The secondary market involves the purchase of shares from existing investors [11]. According to a report titled, "Dealing with Bankruptcy in the GCC", issued by Kuwait Financial Centre, bankruptcy laws in Kuwait are still pending. This report stated that as of March 2009, after the financial crisis, the Financial Stability Law (FSL) was introduced. However, issues regarding bankruptcy and insolvency are still not discussed. The period it takes to resolve the insolvency in Kuwait is around four years or more. As of May 2015, the bankruptcy regime in Kuwait is governed by Articles 555 to 800 of the Kuwait Law of Commerce No. 68 of 1980 the Current Law [12]. As of May 2015, a "Draft Law" is under process by the Department of Legal Opinions & Legislation of Kuwait to bring its bankruptcy and insolvency legal regime closer to Chapter 11 of the United States Bankruptcy Code. If this law is declared, Kuwait may become the first GCC country to have a bankruptcy and insolvency regime that facilitates the rehabilitation of debt-stricken businesses versus forced liquidation. This will enable entrepreneurs and local executives to grow businesses.

Given is a discussion on the status of various sectors in Kuwait. According to the Oxford Business Group report Kuwait has oil reserves the sixth largest in the world. The revenues from hydrocarbons comprise about 60% of GDP and 95% of exports. Kuwait faces a long-term challenge in the recent fall in oil prices, which have added to its drive for economic diversification. The Kuwaiti construction market saw a marked rebound in 2014, with the government moving forward with key developments in several sectors. The country's oil and gas sector was a major contributor to the country's resurgence in construction projects, with oil and gas projects representing more than 60% of the \$25.1bn awarded in 2014. Rising investment in real estate, meanwhile, is bolstering that sector, with the total value of transactions in 2014 increasing by almost 40% in 2013 to reach \$7.27b. Kuwait's insurance sector had solid expansion in recent times in key areas, including Takaful (Islamic insurance) and other non-life segments, with the industry bringing in \$1.04bn in gross written premiums in 2014. The industry in Kuwait is crowded, with the top five insurers controlling around 60% of revenues at the end of 2013. The Takaful segment has been active in the country since the early 1990s. Access to the internet, via mobile devices, has sped up quickly in Kuwait since the government liberalized the telecoms and IT sector in the early 2000s. The nation has one of the highest smartphone penetration rates in the region, at 69% of the population in 2014, after seeing 40% growth on the previous year. Kuwait's retail market continues to perform strongly, underpinned by a strong appetite for luxury products and the strong purchasing power of a young and diverse population. In the

2013-14 academic years, the government operated 803 public schools, with a total enrollment of 360,845 pupils and a teaching staff of 60,902. Reforms are designed as the demand grows to underpin the sector's role in the government's economic diversification plan are being implemented in line with Kuwait Vision 2035, the long-term strategy, to push towards a knowledge-based economy.

Review of literature

Financial collapse arises when debt to creditors are not working or honored with trouble by deteriorating interest or principal payments on the debt. This collapse leads to bankruptcy is expensive, or the firm is in an inauspicious and unsafe situation due to bad decisions [13]. As a result, investors agonize about the costs of financial collapse reflected in the present market value of the firm. Investors consider the potential for future distress into their evaluation of the market value [14]. Therefore, if a possibility of bankruptcy exists, the company's present market value is bargained by the present value of potential financial collapse expenses. Three important factors decide the current value of financial distress expenses: It depends on the fact that a firm cannot fulfill its debt obligations which increase with the increase in firm's liabilities in relation to its assets, besides the unpredictability of a firm's cash flow and asset values. Firms with high business risk issue less debt are more likely to be financially distressed. The size of the financial distress expenses depends on the existence of direct and indirect bankruptcy costs. More debt means a higher chance of default, thus increasing the expected value of the linked costs. The suitable discount rate for the distress expenses depends on the firm's market risk [15]. Kumar and Kumar [16] stated that financial ratio analysis is used by firms to make vital decisions. Meeampol, et al. [17] stated that bankruptcy could be an alternative when a business is failing, but should be the last option in case everything fails. Calandro [18] stated that the fraud metric, Altman's Z-score could be a good source for analyzing the financial performance of an organization. The Z-score financial distress model has been accepted broadly for almost four decades and influential in areas such as credit risk analysis, merger and acquisition target analysis, and turnaround management. The Zmijewski score model compares the relative information content of these to a market-based measure of the probability of bankruptcy with traditional financial analysis.

Synthesis of research

The work of Fitzpatrick [19] showed significant curiosity on the corporate malfunction forecast. This work used financial ratios to put side-by-side efficient firms with non-efficient firms. Altman [20] used Beaver's work [21] to build up a function consist of five ratios. Since then, a range of failure prediction models has been proposed using different methods. However, the Altman Z-score model is the most commonly recognized and used model for predicting the likelihood of a financial crash by researchers, auditors, financial analysts, corporate managements etc. [22]. An abundant number of studies have been documented evidence on the performance of Altman's model. Given is an assessment of some of the studies used to evaluate stock exchange performances: Pongsat, Ramage, and Lawrence [23] compared the Ohlson's Logit model and Altman's model for predicting bankruptcy of large and small firms in Thailand and concluded that both models were similar in predicting the bankruptcy pattern. Chung, Tan, and Holdsworth [24] established that the Altman model outperformed other models in predicting corporate collapse one year prior to failure for 10-unsuccessful finance companies in New Zealand during 2006-2007. Odipo and Sitati [25] tested whether Altman's financial misery

forecast model is useful in predicting a collapse in Kenya using ten listed firms and ten delisted firms in the Nairobi Stock Exchange from 1989 to 2008, which resulted in a precise financial crash in Kenya. Charles and Goodluck [26] used a multivariate system using Altman's Z model to distinguish between unhealthy and healthy firms in the financial sector of Nigeria in the year 2009, and the outcome shows that Altman's model could predict financial failure of banks in Nigeria. Onyeiwu [27] used the Altman's Z-score model to examine between healthy and unhealthy organizations in the manufacturing industry of Nigeria between 2005 and 2009 and concluded that Altman's model can group the crashed and non-distressed firms. Moghadam, Zadeh, and Fard [28] used the original Altman and Ohlson models on Iranian listed companies from 1998 to 2005 and concluded that both models could forecast bankruptcy issue of listed companies in Iran. Wang and Campbell, [29] used figures from Chinese listed companies for the period 2000–2008. Altman's original model, a variation of the original model for which the coefficients were recalculated, and a revised model, which used different variables were used to demonstrate that at the aggregate level, the revised Z-score model has a higher prediction precision compared with both Altman's initial model and the re-estimated model. Pitrova, [30] applied the Altman's model to Czech firms four years prior to failure and resulted with 84% accuracy when predicting non-failed firms. Conversely, financial difficulties only one year prior to failure can be predicted with the highest accuracy. Ray examined the Indian fertilizer firms using data from 2000-2007 for bankruptcy using the Altman's model. This study could identify financially troubled companies depicting inefficiencies inside the firms that could threaten their financial health. Li [31] tested the predictive accuracy of Altman's initial model and two re-estimated adaptations of the initial model on a sample of 70 manufacturing and non-manufacturing US firms from 2005-2012, resulting precision rate range between 75% and 100% with an average of 91.7%. Mohammed and Kim-Soon [32] compared the Altman's model and current ratio in assessing the financial status of firms listed on the Malaysian Stock Exchange. The conclusion of this study discovered that both approaches are successful in differentiating financial collapse and safe firms. Conversely, significant differences are found between the approaches one year proceeding to break down. Onofrei and Lupu [33] tested the Altman model in the Romanian market during 2006-2010. It was astonishing to see that this model failed on the Romanian economy as the Altman's Z-score model was developed to test stable economies only showing economic instability. Alareeni and Branson [34] performed a study on 71 failed and 71 safe companies in Jordan to test the precise power of Altman's model between 1989 and 2008. The outcome predicted that the Altman Z-score model is efficient for the industrial firms, but could not distinguish between service firms.

Methodology

The methodology used in this paper was quantitative in nature using causal research design to determine the company's performance listed on the Kuwait Stock Exchange post-financial crisis of 2008. The aim of this paper is to build a framework to further investigate the current performance level of the listed firms by potential investors. The analysis was derived from an extensive literature review covering the history of Kuwait Stock Exchange, the theory of both Altman Z-score model and Zmijewski score model, their applications worldwide on different stock exchanges, and the conclusions in the worldwide market so far.

Design

The quantitative research methodology was used on the numerical

data collected from the financial statements published in company annual reports and Kuwait Stock Exchange website. As stated by Muthukumar and Sekar, the Altman Z-score model is based on the balance sheet and income statement data for determining a company's financial health. The Zmijewski score uses the probability versus traditional analysis to determine the bankruptcy occurrence within two years' time. Since the listed companies of Kuwait Stock Exchange are being evaluated; the formula used is:

$Z = 6.56 X_1 + 3.26 X_2 + 6.72 X_3 + 1.05 X_4$ (for the non-manufacturing and emerging companies).

Where

$X_1 = \text{working capital (current assets (CA) - current liabilities (CL)) / total assets (TA)}$;

$X_2 = \text{retained earnings (RE) / TA}$;

$X_3 = \text{earnings before interest and taxes (EBIT) / TA}$; and

$X_4 = \text{Total book equity (TE) / Total liabilities (TL)}$

Altman (2002) advocated that banks and insurance companies should be excluded from the testing of Z-score model (p.5, Miller, 2009). However, for the purpose of this paper, only insurance companies have been excluded.

$Z = 1.2 X_1 + 1.4 X_2 + 3.3 X_3 + 0.6 X_4 + 1.0 X_5$ (for the manufacturing companies),

Where

$X_1 = \text{working capital (current assets (CA) - current liabilities (CL)) / total assets (TA)}$;

$X_2 = \text{retained earnings (RE) / TA}$;

$X_3 = \text{earnings before interest and taxes (EBIT) / TA}$;

$X_4 = \text{market value of equity / book value of total liabilities (TL)}$; and

$X_5 = \text{sales / TA}$

$X_1 = \text{Working Capital / TA}$:

The formula Working capital/TA quantifies the net liquid assets of the firm compared to the total capitalization [35]. Working capital is the difference between current assets and current liabilities. In general, a firm experiencing regular operating losses has shrunk current assets when compared to TA.

$X_2 = \text{Retained Earnings / TA}$:

The formula Retained Earnings/TA evaluation of cumulative profitability was cited earlier as one of the "new" ratios. The age of a firm is absolutely considered in this ratio. For example, a young firm will show a low RE/TA ratio because it has not had time to build up its collective profits. The incidence of failure is much higher in a younger firm. $X_3 = \text{EBIT / TA}$: The formula Earnings before Interest and Taxes/TA is calculated by dividing the TA of a firm into its EBIT. This measures the productivity of the firm's assets, before tax or leverage. When the TL exceeds a fair valuation of the firm's assets, then bankruptcy occurs. $X_4 = \text{Market Value of Equity / Book Value of Total Debt}$: Equity is the collective market value of all shares of stock, preferred and common while debt includes TL. This shows how much of the firm's assets decline in value before the TL the assets exceed and the firm becomes bankrupt. It is an efficient forecaster of bankruptcy than a used ratio: Net worth/Total debt (book values). $X_5 = \text{Sales / TA}$: This is a regular

financial ratio demonstrating the sales (revenue) producing ability of the company's assets. The management uses this formula to deal with its current competitor scenario. Conversely, because of its exceptional relationship to other variables in the Altman model, the Sales/TA ratio ranks second in its involvement to the overall discriminating ability of the model.

The criteria used to interpret the Z-score model is:

- Safe Zone= $Z > 2.99$ (risk free);
- Distress Zone= $Z < 1.81$ (bankruptcy); and
- Grey Zone= $1.81 \leq Z \leq 2.99$ (at risk).

For banking institutions, the Z score model formula varies from the above. Here,

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

Where X_1 , X_2 , and X_3 remain same as above, and $X_4 = \text{Total Book Equity (TE) / TL}$. The criterion used to interpret is:

- $Z > 5.85$ Safe Zone.
- $4.35 < Z < 5.85$ Grey Zone.
- $Z < 4.35$ Distress Zone.

Therefore, higher the score means more financially sound the company [36]. The Zmijewski score model predicts a firm's bankruptcy in two years. This model uses three explanatory variables while an Altman Z-score uses five variables [37]. Here, the scores greater than X represent a higher probability of default. Accounting researchers like Grice and Dugan (2003), frequently use Zmijewski model, founded on the 40 bankrupt and 800 non-bankrupt firms. Hence, the Z score model shows the performance of the firms while Zmijewski score model predicts whether the firm is headed towards bankruptcy.

$Z \text{mijewski Score} = -4.336 - 4.513 * (\text{Net Income (NI) / TA}) + 5.679 * (\text{TL / TA}) + 0.004 * (\text{Current Assets (CA) / Current Liabilities (CL)})$.

Firms with probabilities ≥ 0.5 states bankruptcy or complete data; Firms with probabilities < 0.5 states non-bankruptcy or incomplete data. The probit model of Zmijewski is preferred because it maps the value to a probability enclosed between 0 and 1, which is straightforward to understand. Firms with negative shareholder's equity, NI, and cash flow ratio are categorized as distressed and positive shareholder's equity, NI, and cash flow ratio are categorized as non-distressed [38]. As of 2015, no bankruptcy laws are existent in Kuwait.

Population and sampling strategy

The population used is all the listed firms in the Kuwait Stock Exchange. The firms are classified in the following categories: KSX15, also known as "Kuwait 15" index, Oil & Gas, Basic Materials, Industrials, Consumer Goods, Health Care, Consumer Services, Telecommunications, Utilities, Banks, Real Estate, Financial Services, Investment Instruments, Technology, and Parallel. The website Dissertation India states, "A sample lies between these two extremes, with between 30 and 400 respondents being a part of the study". Delice [39] suggests that "Causal-comparative and experimental studies require more than 50 samples". Since the quantitative methodology is used, the sample used for investigation is 196 companies listed in various sectors in the Kuwait Stock Exchange.

Instrument

The author used the original Altman Z-score model for exploring

the financial performance of the listed firms. However, for banks, the revised model of Altman's Z-score was used. Zmijewski score model was used to distinguish between distressed and non-distressed firms using the criterion: Zmijewski Score <0 shows distressed; and Zmijewski score >0 shows non-distress. Currently, no bankruptcy laws are existent in Kuwait. Hence, the probit model of Zmijewski i.e. it maps the value to a probability enclosed between 0 and 1 is not applicable here [40-45].

Data collection procedures

Resources and data needed for this paper are secondary and gathered using the annual reports from the company websites and financial reports available on the Kuwait Stock Exchange website for the period 2009-2014. The purpose of choosing, this time frame, was to study the market after the financial crisis of 2008. Therefore, the author fulfilled the content validity criterion [46-49].

Analysis and Presentation of Results

The data was gathered from the financial statements from the annual reports and Kuwait Stock Exchange website in relation to the questions posed previously. The result of the performance of the listed firms in the Kuwait Stock Exchange was discussed in this part. Two models, Altman Z-score and Zmijewski score, were used to predict the financial status and future of the listed firms in Kuwait [50-53]. To simplify the discussions, the author provided tables and pie charts that provide answers to the posed questions and hypotheses mentioned previously.

Demographic statistics

Tables 1 and 2 shows a comparison of the calculations using Altman Z-score and Zmijewski score formulae on the listed firms of Kuwait Stock Exchange from 2009-2014. The majority of the firms in the Kuwait Stock Exchange, for the years 2009 and 2010, show no data

Serial No.	Company Name	2009	2010	2011	2012	2013	2014
1	Aayan Real Estate Co.			3.07	3.97	6.06	5.66
2	Aayan Leasing & Investment Co.			-4.5	-3.64	-1.94	-2.44
3	Al Ahli Bank of Kuwait	3.82	4.51	4.56	4.28	3.96	3.18
4	Abyaar Real Estate Development	-1.66	-0.48	-0.13	-0.67	-0.61	-0.69
5	Acico Industries Co.	1.54	2.42	1.66	2.24	2.32	1.58
6	Advanced Technology Co.		2.88	3.01	2.32	2.73	3.15
7	Afaq Educational Services Co.			6.51	6.72	7.04	7.53
8	Agility Public Warehousing Co.	4.17	3.51	3.83	3.76	3.92	3.51
9	Ahli United Bank- Al Mutahed	9.8	9.91	9.93	9.93	9.92	9.93
10	Ahli United Bank B.S.C.	3.49	3.54	4.43	4.48	4.87	4.81
11	Ajial Real Estate Entertainment			1.57	11.12	12.18	7.89
12	Ajwan Gulf Real Estate Co.			163.32	206.09	503.32	645.2
13	Al Eid Food Co.			6.3	6.64	6.83	6.93
14	Al Masaken International Real			11.46	7.78	3.88	2.48
15	Al Mudon International Real			17.22	32.01	6.27	20.84
16	Al Qurain Holding Co.			1.5	-6.29	-2.31	-1.36
17	Al Safat Real Estate Co.				-3.94	-5.77	-4.33
18	Alafco Aviation Lease and	0.51	0.39	1.02	1.15	1.03	1.38
19	Al-Aman Investment Co.			0.43	2.16	3.49	38.19
20	Al-Araby Real Estate Co.	-1.85	-1.55	1.78	1.82	1.55	1.66
21	Alargan International Real Estate	2.21	2.22	3.12	3.91	3.65	3.62
22	Al-Bareeq Holding Co.			41.04	49.52	44.21	95.19
23	Al-Dar National Real Estate Co.			-1.44	-1.75	-1.89	-1.59
24	Al-Deera Holding Co.	-0.66	-0.95	-0.72	-1.63	-1.07	-1.97
25	Al-Enmaa Real Estate Co.	1.78	1.53	3.07	2.72	2.93	2.81
26	Allmtiaz Investment Group Co.	-0.42	4.33	5.19	3.68	1.6	3.94
27	AlKout Industrial Projects Co.	4.18	6.83	5.41	4.86	5.58	9.03
28	Al-Madar Finance and	-0.61	-3.47	-1.95	-3.55	-1.6	-2.89
29	Al-Madina for Finance and			0.98	0.61	-0.05	-0.64
30	Al-Maidan Clinic for Oral Health		-4.75	-5.42	-5.86	-3.65	-2.35
31	Al-Mal Investment Co.			-1.06	0.13	-0.07	1.06
32	Al-Mazaya Holding Co.	2.52	1.14	0.15	1.54	1.74	1.86
33	Al-Mowasat Health Care Co.			2.55	2.93	3.19	2.43
34	Al-Nawadi Holding Co.		4.57	2.67	1.57	-1.21	-0.95
35	AlRai Media Group Co.			1.58	2.47	3.86	5.71
36	Al-Safat Tec Holding Co.	4.58	3.83	1.68	2.92	1.28	0.94
37	AlSalam Group Holding Co.			6.67	16.83	11.77	15.6
38	AlShamel International Holding			6.9	9.87	8.62	5.22
39	Al-Themar International Holding		2.03	2.53	2.17	2.28	2.94
40	Amar for Finance and Leasing	3.17	5.7	4.28	5.33	7.15	11.96
41	Amwal International Investment	50.97	24.9	61.75	93.4	90.38	34.17

42	Aqar Real Estate Investments Co.	8.02	9.37	7.26	54.53	58.07	29.3
43	Arabi Holding Group Co.			1.61	2.08	2.09	4.22
44	Arkan Al-Kuwait Real Estate Co.			2.51	3.22	2	3.86
45	Arzan Financial Group for			3.31	5.58	4.17	4.91
46	Asiya Capital Investment Co.			9.39	12.52	11.27	5.7
47	Automated Systems Co.			10.91	13.65	11.58	10.92
48	Bayan Investment Co.	2.91	3.03	2.24	1.99	2.18	3.47
49	Boubyan Bank	5.11	5.53	5.36	5.4	5.11	5.15
50	Boubyan International Industries			5.31	4.74	15.12	13.59
51	Boubyan Petrochemical Co.	7.82	2.56	2.39	4.37	4.74	5.16
52	Burgan Bank	5.63	5.89	6.13	5.53	5.55	5.54
53	Burgan Co. for Well Drilling		-0.52	-0.94	0.21	0.77	-0.09
54	City Group Co.	6.03	2.61	2.15	5.68	6.72	8.62
55	Coast Investment &			3.61	3.51	3.29	4.29
56	Combined Group Contracting	3.84	4.48	3.36	2.93	2.33	1.7
57	Commercial Bank of Kuwait	5.03	5.2	5.48	4.86	5.58	6.06
58	Commercial Facilities Co.	2.36	2.81	2.77	2.53	2.24	2.19
59	Contracting & Marine Services			0.59	0.58	-0.11	0.08
60	Credit Rating & Collection			133.06	28.25	34.6	46
61	Dalaqan Real Estate Co.			177.75	152.87	86.87	71.14
62	Danah AlSafat Foodstuff Co.	14.04	14.55	4.8	2.6	2.6	3.02
63	Dar Al Thuraya Real Estate Co.			16.72	16.34	10.36	3.11
64	Educational Holding Group	0.25	0.66	-0.33	1.55	2.77	3.45
65	Egypt Kuwait Holding (S.A.E)	0.65	0.95	5.86	5.47	5.43	6.02
66	Ektitab Holding Co.			2.12	3.65	4.63	10.87
67	Equipment Holding Co.			-1.54	-1.38	1.62	1.45
68	Eyas for Higher & Technical			2.51	2.89	4.88	5.86
69	First Dubai for Real Estate			0.54	2.36	4.12	2.18
70	First Investment Co.			1.2	3.09	4.4	3.7
71	Flex Resorts & Real Estate Co.			23.44	11.04	6.88	4.97
72	Fujairah Cement Industries			0.48	0.87	0.76	0.88
73	Future Communications Co.			9.37	8.81	8.61	8.15
74	Future Kid Entertainment & Real			6.79	8.17	11.36	15.64
75	Gulf Bank	5.08	5.16	3.59	3.81	5.08	5.02
76	Gulf Cable and Electrical	2.44	3.32	4.31	3.2	2.34	2.07
77	Gulf Cement Co.			4.78	4.29	3.46	3
78	GFH Financial Group (B.S.C)	0.2	-5.63	-3.15	-1.14	0.37	4.77
79	Gulf Franchising Holding Co.			-4.62	2.58	2.71	2.9
80	Gulf Glass Manufacturing Co.			20.63	12.19	12.72	8.39
81	Gulf Investment House	-1.6	-3.79	-5.74	-4.44	-5.23	-4.02
82	Gulf North Africa Holding Co.	31.47	47.3	90.08	17.34	15.81	8.32
83	Gulf Petroleum Investment			0.62	0.67	1.81	1.51
84	Hayat Communications Co.			3.84	3.62	4.08	4.73
85	Heavy Engineering Industrise	0.81	1.56	1.08	0.95	1.27	1.34
86	Hilal Cement Co.			3.48	3.04	3.29	2.31
87	Hits Telecom Holding Co.	2.18	1.3	0.76	-0.78	2.17	6.21
88	Housing Finance Co.	-2.22	-1.9	-1.27	-2.06	-1.44	-1.63
89	Humansoft Holding Co.			2.96	2.77	3.21	3.92
90	IFA Hotels & Resorts Co.	1.2	-0.68	-0.56	-1.12	-0.32	-1.78
91	Independent Petroleum Group	1.14	1.09	0.33	0.76	0.9	0.82
92	Injazzat Real Estate	0.27	1.22	0.49	1.28	1.91	1.86
93	Inovest (B.S.C)	0.86	0.37	1.18	0.76	1.34	1.84
94	International Financial Advisors		1	1.98	1.84	1.91	1.63
95	International Resorts Co.			1.37	2.72	3.45	4.23
96	Investors Holding Group Co.			-8.17	-5.47	-6.12	-1.92
97	Ithmaar Bank (B.S.C)	3.09	4.41	4.41	4.44	4.4	4.21
98	Jazeera Airways Co.	-2.11	-1.39	-0.24	1.03	1.69	-1.58
99	Jeeran Holding Co.	3.3	2.61	1.32	1.7	1.71	2.99
100	KAMCO Investment Co. K.S.C	2.27	2.38	2.1	0.37	1.79	2.15
101	KGL Logistics Co. K.S.C.C.			4.89	8.65	11.21	7.78

102	Kout Food Group			5.3	5.74	4.54	4.44
103	Kuwait & Gulf Link Transport	0.43	0.47	-0.65	-1.05	0.94	0.91
104	Kuwait and Middle East	2.85	2.08	-0.03	1.26	1.48	2
105	Kuwait Bahrain International		8.36	8.06	8.88	9.27	10.32
106	Kuwait Building Materials			3.37	3.46	6.68	9.14
107	Kuwait Business Town Real			-0.44	-1.13	5.39	8.36
108	Kuwait Cable Vision			-9.94	-11.47	-3.45	-3.73
109	Kuwait Cement Co.		2.99	2.02	1.84	1.91	2.11
110	Kuwait Finance & Investment		-2.74	-1.43	5.95	5.82	5.8
111	Kuwait Finance House	7.37	7.06	7.48	7.45	7.58	7.43
112	Kuwait Financial Centre	5.26	5.35	3.31	3.89	4.64	3.36
113	Kuwait Food			3.48	3.63	3.96	4.06
114	Kuwait Foundry Co.			16.81	19.89	21.73	17.04
115	Kuwait Gypsum Manufacturing		3.47	2.67	3.6	4.76	6.27
116	Kuwait Hotels Co.			-0.39	0.84	1.14	1.18
117	Kuwait International Bank	7.9	8.09	8.04	8.12	8.12	7.85
118	Kuwait Investment Co.	6.13	6.8	2.18	2.69	3.42	2.67
119	Kuwait Medical Services Co.		2.34		0.71	-0.61	-1.4
120	Kuwait National Cinema	2.15	2.2	1.84	2.85	4.24	3.94
121	Kuwait Packing Materials		8.29	7.1	8.73	8.46	6.42
122	Kuwait Portland Cement Co.	8.47	11.11	10.29	9.05	11.24	5.84
123	Kuwait Projects Co. Holding			4.93	4.79	4.83	4.89
124	Kuwait Real Estate Co.			1.85	1.89	2.28	1.4
125	Kuwait Real Estate Holding Co.			-2.27	-0.6	-2.26	-0.67
126	Kuwait Remal Real Estate Co.		2.09	2.42	2.23	2.84	2.47
127	Kuwait Resorts Co.			0.24	0.1	2.49	2.57
128	Kuwait Slaughter House Co.		30.52	21.01	23.85	21.45	23.83
129	Kuwait Syrian Holding Co.			6.38	4.24	11.95	58
130	Kuwait Telecommunications	-7.15	-7.4	-6.13	-6.21	-3.27	0.2
131	Kuwait United Poultry Co.			6.68	6.77	10.31	11.05
132	Livestock Transport & Trading	15.89	12.12	10.81	10.27	9.6	8.1
133	Mabane Co.	0.3	1.62	1.33	1.52	2.58	1.69
134	Manafae Holding Co.			42.16	25.81	29.51	31.24
135	Manazel Holding Co.			-1.46	-1.79	2.53	4.54
136	Marakez			1.45	1.39	1.28	1.44
137	Mashaer Holding Co.	1.41	-1.69	1.5	1.9	4.33	1.99
138	Massaleh Real Estate Co.			0.87	0.51	-0.46	-0.31
139	MENA Real Estate Co.			1.38	0.82	-0.96	1.46
140	Metal & Recycling Co.			2.45	2.54	2.62	1.7
141	Mezzan Holding Co.			3.43	2.96	3.25	3.15
142	Mobile Telecommunications Co.	0.56	5.32	2.75	1.9	2.13	1.69
143	Mubarrad Transport Co.			4.69	-1.12	8.82	7.33
144	Munshaat Real Estate Projects	-2.82	-4.03	-3.09	-1.35	1.95	2.18
145	Mushrif Trading & Contracting			2.76	3.23	3.3	2.2
146	Nafais Holding Co.			0.52	1.63	2.84	5.98
147	National Bank of Kuwait	5.2	5.13	5.35	5.57	5.45	5.69
148	National Cleaning Co.			3.59	1.69	2.23	2.14
149	National Consumer Holding Co.			18.93	17.02	8.7	5.38
150	National Industries Co.			4.13	4.33	4.66	7.17
151	National Industries			0.05	0.33	0.39	0.52
152	National International Holding			7.13	5.43	21.46	19.53
153	National Investments Co.	8.54	9.38	6.75	30.17	28.88	16
154	National Petroleum Services Co.	5.29	5.96	6.67	8.1	7.26	7.69
155	National Ranges Co.			-2.76	-0.14	-0.32	-4
156	National Slaughterhouse Co.			27.29	28.08	23	20.36
157	Noor Financial Investment	-0.03	-0.01	0.7	1.57	1.88	1.46
158	National Mobile			4.12	2.68	1.73	1.3
159	Osoul Investment Co.			5.76	13.45	18.36	19.3
160	Oula Fuel Marketing Co.	5.91	5.9	5.1	5.57	6.16	5.05
161	Palms Agro Production Co.	10.99	9.18	8.45	6.7	7.35	8.11

162	Privatization Holding Co.			0.97	2.07	0.7	3.49
163	Qurain Petrochemical Industries	16.12	115.65	83.23		44.28	7.03
164	Ras Al Khaimah Co. for White			2.88	2.07	1.77	1.72
165	Real Estate Asset Management	10.11	9.76	10.4	10.22	3.02	6.34
166	Refrigeration Industries and			4.2	6.13	5.2	5.17
167	Safat Energy Holding Co.		7.61	4.08	6.86	6.24	-2.84
168	Safwan Trading & Contracting			3.33	3.31	2.63	2.53
169	Salbookh Trading Co.			-0.65	2.91	4.37	6.78
170	Salhia Real Estate Co.	2.84	2.55	3.18	3.2	3.64	3.37
171	Sanam Real Estate Co.			8.6	105.88	84.78	90.07
172	Securities Group Co.		2.45	2.03	3.17	1.52	2.96
173	Sharjah Cement & Industrial	2	1.45	0.87	1.29		
174	Shuaiba Industrial Co.			3.17	3.49	4.46	4.63
175	Sokouk Holding Co.	68.05	4.33	3.43	6.02	6.68	5.84
176	Soor Fuel Marketing Co.	8.16	7.21	5.75	6.02	6.3	5.42
177	Specialities Group Holding Co.	4.47	3.75	3.64	5.97	4.54	3.32
178	Strategia Investment Co.	-3.87	6.29	56.69	70.87	12.12	81.01
179	Sultan Center Food Products	-1.63	-3.71	-5.29	-4.05	-3.92	-2.41
180	Taameer Real Estate Investment			8.05	8.21	6.57	4.44
181	Taiba Kuwaiti Holding Co.			9.29	90.2	6.73	6.48
182	Tamdeen Investment Co.	1.83	2.44	3.47	3.38	3.86	1.69
183	Tamdeen Real Estate Co.			1.53	1.24	1.33	1.03
184	The Commercial Real Estate Co.			3.82	3.74	3.44	3.2
185	The Energy House Co.- AREF	3.18	7.45	5.59	3.02	6.43	8.51
186	The Kuwait Co. for Process Plant			2.39	2.55	1.55	2.24
187	The National Real Estate Co.		0.35	-0.65	-0.17	-0.06	-0.02
188	The Securities House Co.			3.01	1.22	0.98	0.74
189	Tijaria & Real Estate Investment			0.23	0.72	2.93	2.84
190	Umm Al-Qaiwain Cement			4.99	5.57	5.67	5.08
191	United Foodstuff Industries			2.53	3.27	-0.76	2.09
192	United Projects Co.	4.78	6.27	6.32	7.96	6.03	6.16
193	United Real Estate Co.	1.1	2.53	2.05	1.53	2.07	2.58
194	Warba Bank			8.68	7.13	8.29	8.32
195	Yiaco Medical Co.	2.01	2.61	2.66	2.67	2.41	2.33
196	Zima Holding Co.			4.43	5.68	9.28	5.8
	Total	401.41	507.47	1498.51	1613.22	1783.01	1999.1
	Mean	5.02	5.23	7.72	8.27	9.14	10.25
	Standard Deviation	10.22	13.19	22.35	22.81	37.73	47.6

Table 1: Altman Z-score calculations on the listed firms.

Serial No.	Company Name	2009	2010	2011	2012	2013	2014
1	Aayan Real Estate Co.			-1.95	-2.58	-2.72	-2.92
2	Aayan Leasing & Investment			1.1	0.37	-0.65	-0.65
3	Al Ahli Bank of Kuwait	0.65	0.37	0.37	0.32	0.34	0.39
4	Abyaar Real Estate	-0.42	-0.69	-0.88	-1.15	-1.19	-1.48
5	Acico Industries Co.	-4.4	-0.66	-0.63	-0.66	-0.79	-0.62
6	Advanced Technology Co.		-1.09	-1.03	-0.98	-0.99	-0.91
7	Afaq Educational Services Co.			-3.54	-3.59	-3.59	-3.62
8	Agility Public Warehousing Co.	-2.08	-2.23	-2.4	-2.39	-2.43	-2.37
9	Ahli United Bank- Al Mutahed	0.97	0.91	0.95	0.89	0.95	1.05
10	Ahli United Bank B.S.C.	-2.89	-2.92	0.72	0.69	0.66	0.64
11	Ajial Real Estate Entertainment			-2.18	-3.75	-3.85	-3.61
12	Ajwan Gulf Real Estate Co.			-3.91	-4.08	-2.72	-1.69
13	Al Eid Food Co.			-2.29	-2.31	-2.5	-2.5
14	Al Masaken International Real Estate Development Co.			-3.47	-3.57	-3	-2.68
15	Al Mudon International Real			-4.01	-0.32	-3.69	-4.18
16	Al Qurain Holding Co.			-2.25	0.16	-2.62	-3.17
17	Al Safat Real Estate Co.				0.66	-0.07	-0.34
18	Alafco Aviation Lease and	-0.13	0.17	-0.41	-0.45	-0.33	-0.46

19	Al-Aman Investment Co.			-0.84	-0.7	-1.31	-4.88
20	Al-Arabi Real Estate Co.	-0.83	-1.03	-0.87	-0.97	-0.8	-0.86
21	Alargan International Real	-2.08	-2.14	-2.16	-1.9	-1.62	-1.66
22	Al-Bareeq Holding Co.			-3.9	-4.14	-4.27	-4.17
23	Al-Dar National Real Estate Co.			0.28	0.61	0.69	0.46
24	Al-Deera Holding Co.	-1.74	-1.98	-1	-0.24	-0.96	-0.2
25	Al-Enmaa Real Estate Co.	-2.19	-2.46	-2.41	-2.17	-2.15	-2.08
26	AlImtiaz Investment Group Co.	-0.42	-2.72	-3.01	-2.32	-1.57	-2.73
27	AlKout Industrial Projects Co.	-2.51	-3.6	-3.2	-3.22	-3.68	-4.27
28	Al-Madar Finance and	-0.06	0.75	-0.71	0.21	-1.42	-0.97
29	Al-Madina for Finance and			-1.44	-1.48	-0.79	-0.53
30	Al-Maidan Clinic for Oral		0.59	0.84	1.08	-0.37	-1.04
31	Al-Mal Investment Co.			-0.06	-0.71	-0.22	-1.02
32	Al-Mazaya Holding Co.	-1.32	-0.61	-0.33	-0.91	-1.19	-1.13
33	Al-Mowasat Health Care Co.			-1.29	-1.53	-1.61	-2.41
34	Al-Nawadi Holding Co.		-3.31	-3.08	-2.8	-1.73	-1.96
35	AlRai Media Group Co.			-2.18	-2.7	-3.36	-3.52
36	Al-Safat Tec Holding Co.	-2.78	-2.36	-1.65	-2.2	-1.24	-1.8
37	AlSalam Group Holding Co.			-3.9	-4.31	-3.83	-4.16
38	AlShamel International Holding			-2.85	-3.58	-3.62	-1.87
39	Al-Themar International Holding Co.		-2.09	-2.35	-2.05	-2.09	-2.56
40	Amar for Finance and Leasing	-1.56	-2.67	-2.86	-3.13	-3.78	-3.9
41	Amwal International Investment	-4.21	-2.55	-4.01	-3.58	-4.02	-4
42	Aqar Real Estate Investments	-3.15	-3.49	-3.24	-4.58	-4.53	-4.07
43	Arabi Holding Group Co.			-0.6	-0.46	0.21	0.49
44	Arkan Al-Kuwait Real Estate			-2.86	-2.67	-2.54	-3.38
45	Arzan Financial Group for			1.59	-3.41	-3.28	-3.55
46	Asiya Capital Investment Co.			-3.35	-4.11	-3.88	-3.56
47	Automated Systems Co.			-3.61	-4.75	-3.85	-3.73
48	Bayan Investment Co.	-0.58	-0.59	-0.92	-0.76	-1.14	-1.89
49	Boubyan Bank	1.2	0.41	0.5	0.64	0.7	0.73
50	Boubyan International Industries			-3.03	-2.37	-3.24	-3.44
51	Boubyan Petrochemical Co.	-1.99	-2.1	-2.33	-2.61	-2.79	-3.11
52	Burgan Bank	0.76	0.64	0.64	0.75	0.88	0.65
53	Burgan Co. for Well Drilling		-0.62	-0.42	-0.58	-0.73	-0.82
54	City Group Co.	-3.59	-2.33	-1.7	-3.4	-3.74	-4.13
55	Coast Investment &			-1.11	-1.19	-1.59	-2.16
56	Combined Group Contracting	-0.5	-0.47	-4.31	-0.38	-0.01	0.14
57	Commercial Bank of Kuwait	0.66	0.55	0.64	0.5	0.6	0.61
58	Commercial Facilities Co.	-1.51	-1.98	-1.88	-4.26	-2.18	-2.01
59	Contracting & Marine Services			-1.3	-1.41	-1.12	-0.81
60	Credit Rating & Collection			-3.2	-3.02	-3.65	-3.17
61	Dalaqan Real Estate Co.			-4.07	-4.29	-3.99	-2.92
62	Danah AlSafat Foodstuff Co.	-4.14	-4.1	-2.99	-2.34	-2.57	-2.94
63	Dar Al Thuraya Real Estate Co.			-4.29	-4.51	-4.1	-3.02
64	Educational Holding Group	-0.82	-1.36	-1.8	-1.9	-2.4	-2.64
65	Egypt Kuwait Holding (S.A.E)	-3.72	-3.83	-2.23	-1.92	-1.92	-2.23
66	Ektitab Holding Co.			-2.4	-3.09	-3.19	-3.48
67	Equipment Holding Co.			-0.56	-0.6	-2.17	-2.14
68	Eyas for Higher & Technical			-2.29	-2.45	-3.46	-3.61
69	First Dubai for Real Estate			-1.97	-3.08	-3.66	-2.53
70	First Investment Co.			-2.54	-3.11	-3.11	-3.13
71	Flex Resorts & Real Estate Co.			-4.12	-3.89	-2.4	-3.31
72	Fujairah Cement Industries			-1.34	-1.74	-1.68	-1.84
73	Future Communications Co.			-3.25	-3.04	-3.07	-2.96
74	Future Kid Entertainment &			-3.69	-3.79	-3.98	-4.07
75	Gulf Bank	0.91	0.85	0.81	0.8	0.8	0.81
76	Gulf Cable and Electrical	-2.32	-3.09	-3.56	-2.82	-2.59	-2.33
77	Gulf Cement Co.			-5.48	-5.75	-5.33	-5.33
78	GFH Financial Group (B.S.C)	1.84	2.23	-0.28	-1.15	-1.79	-2.44

79	Gulf Franchising Holding Co.			-0.59	-1.77	-1.84	-1.88
80	Gulf Glass Manufacturing Co.			-4.45	-4.43	-4.3	-4.18
81	Gulf Investment House	-0.05	0.63	0.24	-0.24	-0.18	-0.14
82	Gulf North Africa Holding Co.	-4.36	-4.18	-3.53	-2.96	-3.89	-3.5
83	Gulf Petroleum Investment			-1.76	-1.98	-2.8	-2.64
84	Hayat Communications Co.			-1.15	-1.11	-1.48	-1.9
85	Heavy Engineering Industrie	-0.39	-0.99	-0.75	-0.4	-0.49	-0.46
86	Hilal Cement Co.			-3.19	-3.04	-2.94	-2.53
87	Hits Telecom Holding Co.	-2.55	-2.25	-2.2	-1.45	-1.97	-3.03
88	Housing Finance Co.	0.23	0.21	1.08	1.54	-0.88	-0.38
89	Humansoft Holding Co.			-2.68	-2.29	-2.65	-2.83
90	IFA Hotels & Resorts Co.	0.04	0.81	0.63	0.62	0.17	0.91
91	Independent Petroleum Group	0.11	0.05	0.47	0.07	-0.09	-0.22
92	Injazzat Real Estate	-0.11	-0.68	-0.54	-1.29	-1.73	-1.7
93	Inovest (B.S.C)	-3.64	-3.48	-1.61	-1.84	-1.8	-2.03
94	International Financial Advisors		0.17	0.24	0.47	-0.07	0.7
95	International Resorts Co.			-1.22	-1.91	-2.02	-1.22
96	Investors Holding Group Co.			0.01	-1.8	-1.75	-1.69
97	Ithmaar Bank (B.S.C)	-3.16	-0.29	-0.47	-0.63	-0.68	-0.61
98	Jazeera Airways Co.	0.34	0.91	0.24	-0.63	-1.07	-0.28
99	Jeeran Holding Co.	-1.39	-1.1	-0.34	-0.43	-0.25	-0.33
100	KAMCO Investment Co. K.S.C	-1.86	-1.77	-1.58	-0.49	-1.86	-2.11
101	KGL Logistics Co. K.S.C.C.			-3.62	-4.23	-4.35	-3.71
102	Kout Food Group			-3.05	-3.16	-2.57	-2.53
103	Kuwait & Gulf Link Transport	-0.5	-0.42	-0.17	-0.13	-0.21	-0.16
104	Kuwait and Middle East	-1.2	-1.3	-0.21	-1.13	-1.43	-1.19
105	Kuwait Bahrain International		-3.08	-3.17	-3.44	-3.51	-3.62
106	Kuwait Building Materials			-2.98	-3.28	-3.82	-3.86
107	Kuwait Business Town Real			-1.04	-0.72	-3.91	-3.92
108	Kuwait Cable Vision			0.03	-1.44	-0.37	-0.83
109	Kuwait Cement Co.		-2.33	-2.14	-1.89	-2.45	-2.48
110	Kuwait Finance & Investment		6.33	4.74	-2.02	-1.98	-2.3
111	Kuwait Finance House	0.32	0.38	0.46	0.44	0.6	0.63
112	Kuwait Financial Centre	-2.63	-2.82	-2.12	-3.09	-3.37	-3.08
113	Kuwait Food			-2.24	-2.3	-2.31	-2.34
114	Kuwait Foundry Co.			-3.78	-4.23	-4.3	-4.31
115	Kuwait Gypsum Manufacturing		-3.42	-3.35	-3.73	-3.49	-4
116	Kuwait Hotels Co.			-0.84	-1.37	-1.29	-1.32
117	Kuwait International Bank	0.53	0.32	0.26	0.33	0.46	0.5
118	Kuwait Investment Co.	-0.74	-1.18	-1.52	-1.45	-2.11	-2.13
119	Kuwait Medical Services Co.				-2.27	-1.76	-1.67
120	Kuwait National Cinema	-2.43	-2.61	-2.51	-2.82	-3.4	-3.37
121	Kuwait Packing Materials		-4	-4.44	-4.37	-4.19	-4.02
122	Kuwait Portland Cement Co.	-4.55	-4.28	-4.06	-4.09	-4.11	-3.42
123	Kuwait Projects Co. Holding			0.37	0.52	0.64	0.59
124	Kuwait Real Estate Co.			-2.42	-2.32	-2.61	-1.99
125	Kuwait Real Estate Holding Co.			0.45	-0.13	0.68	-0.53
126	Kuwait Remal Real Estate Co.		-2.06	-2.19	-2.09	-1.89	-1.91
127	Kuwait Resorts Co.			-0.27	-0.63	-1.57	-2.07
128	Kuwait Slaughter House Co.		-4.65	-4.7	-4.86	-4.74	-4.36
129	Kuwait Syrian Holding Co.			-2.85	-2.29	-3.51	-2.71
130	Kuwait Telecommunications	1.96	2.5	2.69	1.86	0.43	-0.83
131	Kuwait United Poultry Co.			-3.94	-3.77	-4.11	-4.19
132	Livestock Transport & Trading	-4.3	-3.48	-3.1	-2.98	-3.59	-3
133	Mabanee Co.	-1.84	-1.8	-1.67	-1.92	-2.4	-1.95
134	Manafae Holding Co.			-3.57	-3.37	-3.82	-4.22
135	Manazel Holding Co.			-0.58	-0.42	-0.98	-3
136	Marakez			-2.67	-2.67	-2.63	-2.71
137	Mashaer Holding Co.	-2.68	-0.34	-2.11	-2.54	-2.87	-1.91
138	Massaleh Real Estate Co.			-1.09	-0.86	-0.15	-0.15

139	MENA Real Estate Co.			-1.61	-1.94	-1.55	-2.7
140	Metal & Recycling Co.			-3.37	-3.23	-3.24	-3.26
141	Mezzan Holding Co.			-2.03	-1.95	-1.97	-2.13
142	Mobile Telecommunications	-1.29	-3.28	-2.85	-2.36	-2.2	-2.03
143	Mubarrad Transport Co.			-3.04	-0.91	-3.72	-3.92
144	Munshaat Real Estate Projects	0.71	0.65	0.94	0.03	-2.76	-2.69
145	Mushrif Trading & Contracting			-0.85	-0.88	-0.52	-0.93
146	Nafais Holding Co.			-2.14	-2.4	-2.81	-3.79
147	National Bank of Kuwait	0.5	0.31	0.34	0.47	0.55	0.64
148	National Cleaning Co.			-2.41	-1.31	-1.17	-1.06
149	National Consumer Holding Co.			-2.98	-3.88	-3.45	-3.24
150	National Industries Co.			-2.99	-3.08	-3.08	-3.66
151	National Industries			-0.52	-0.84	-1.01	-1.14
152	National International Holding			-3.31	-2.93	-4.24	-4.15
153	National Investments Co.	-2.61	-3.14	-3.04	-4.28	-4.26	-4.12
154	National Petroleum Services Co.	-2.86	-3.3	-3.55	-3.75	-3.67	-3.66
155	National Ranges Co.			0.18	-1	-1.02	-0.28
156	National Slaughterhouse Co.			-4.58	-4.49	-4.35	-4.24
157	Noor Financial Investment	-0.18	-0.29	0.18	-0.46	-0.61	-0.46
158	National Mobile			-3.46	-2.57	-2.09	-1.92
159	Osoul Investment Co.			-3.42	-3.94	-4.04	-4.07
160	Oula Fuel Marketing Co.	-3.55	-3.52	-3.33	-3.42	-3.59	-3.07
161	Palms Agro Production Co.	-3.91	-3.53	-3.34	-3.07	-3.17	-3.26
162	Privatization Holding Co.			-1.32	-2.35	-1.91	-2.1
163	Qurain Petrochemical Industries	-4.11	-4.21	-4.79		-4.5	-3.83
164	Ras Al Khaimah Co. for White			-3.3	-3.09	-2.87	-2.81
165	Real Estate Asset Management	-3.93	-3.85	-3.88	-3.9	-3.24	-3.58
166	Refrigeration Industries and			-2.17	-3.38	-2.81	-2.65
167	Safat Energy Holding Co.		-3.46	-2.61	-3.76	-3.06	-0.75
168	Safwan Trading & Contracting			-1	-0.97	-0.63	-0.47
169	Salbookh Trading Co.			-1.84	-1.88	-2.57	-3.19
170	Salhia Real Estate Co.	-1.66	-2.29	-2	-2.17	-2.58	-2.43
171	Sanam Real Estate Co.			-2.77	-4.22	-4.26	-4.11
172	Securities Group Co.		-1.94	-1.24	-2.29	-1.06	-1.41
173	Sharjah Cement & Industrial	-3.23	-3.05	-2.81	-2.96		
174	Shuaiba Industrial Co.			-3.53	-3.65	-3.73	-3.76
175	Sokouk Holding Co.	-2.33	-1.99	-2.51	-2.92	-3.42	-2.88
176	Soor Fuel Marketing Co.	-3.75	-3.56	-3.41	-3.48	-3.55	-3.39
177	Specialities Group Holding Co.	-3.22	-3.45	-3.45	-3.74	-3.69	-3.77
178	Strategia Investment Co.	0.84	-2.33	-4.18	-4.19	-4.13	-4.33
179	Sultan Center Food Products	-0.6	0.41	1.18	0.52	0.51	0.52
180	Taameer Real Estate Investment			-3.12	-3.35	-2.47	-1.57
181	Taiba Kuwaiti Holding Co.			-3.99	-5.1	-3.62	-3.55
182	Tamdeen Investment Co.	-1.78	-2.34	-2.49	-2.93	-3.06	-2.33
183	Tamdeen Real Estate Co.			-1.79	-1.82	-2.05	-1.77
184	The Commercial Real Estate			-2.64	-2.8	-2.81	-2.71
185	The Energy House Co.- AREF	-2	-3.26	-2.94	-2.64	-3.64	-3.64
186	The Kuwait Co. for Process			-1.55	-1.49	-1.26	-1.92
187	The National Real Estate Co.		-0.85	-0.4	-0.42	-1.02	-1.03
188	The Securities House Co.			-2.64	-1.33	-1.37	-1.82
189	Tijaria & Real Estate Investment			-0.94	-1.22	-2.91	-2.45
190	Umm Al-Qaiwain Cement			-4.12	-4.08	-4.1	-3.94
191	United Foodstuff Industries			-2.42	-2.67	-0.61	-2.29
192	United Projects Co.	-3.29	-3.53	-3.51	-4.15	-4.09	-3.81
193	United Real Estate Co.	-1.45	-1.85	-1.44	-1.51	-1.38	-1.28
194	Warba Bank			-3.08	-1.04	0.13	0.48
195	Yiaco Medical Co.	-1.01	-1.2	-1.27	-1.09	-0.85	-0.63
196	Zima Holding Co.			-2.75	-3.1	-3.49	-2.91
	Total	-124.48	-150.62	-369.79	-398.49	-426.23	-429.14
	Mean	-1.56	-1.57	-1.91	-2.04	-2.19	-2.2
	Standard Deviation	1.69	1.84	1.63	1.57	1.49	1.48

Table 2: Zmijewski score calculations on the listed firms.

available. The Altman's Z-score model represents the following: distress level less than 1.81 for companies, and less than 4.35 for banks (55 firms by 2014), safe level greater than 2.99 for companies, and greater than 5.85 for banks (106 firms by 2014), and neither safe nor distress level between 1.81-2.99 for companies, and between 4.35-5.85 for banks (34 firms by 2014) [54-59]. On the contrary, the Zmijewski score model represents the following: most distressed less than zero (148 firms by 2014), safe or non-distressed greater than zero (19 firms by 2014), and the least distressed less than negative one (28 firms by 2014). The mean in both tables' shows different directions, i.e., Table 1 mean is positive, whereas, Table 2 mean is negative. However, further analysis is explained in the next section. The sectors performing well and good for investment are banking, food, petroleum, slaughterhouses, technology, and parallel markets [60-62].

Details of analysis and results

Figures 1 and 2 for the year for the year 2009 illustrates that both Altman Z-score and Zmijewski score models were not in par with each other in predicting the status of the listed firms in the Kuwait Stock Exchange. Around 59.2% of the firms have no information. The Altman's Z-score model indicated 15.31% firms were safe while, Zmijewski's score model showed 8.67%. The Altman's Z-score model indicated

16.33% firms were distressed while, Zmijewski's score model showed 24.49%. Finally, the Altman's Z-score model indicated 9.18% firms were neither safe nor distressed while, Zmijewski's score model showed 7.65%. Therefore, the hypothesis H_{11} : The models Altman's Z-score and Zmijewski's Score contradict each other is true. (Figures 1-4) for the year 2010 illustrates that both Altman Z-score and Zmijewski score models were not in par with each other. Around 50.51% of the firms have no information. The Altman's Z-score model indicated 19.90% firms were safe while, Zmijewski's score model showed 11.73%. The Altman's Z-score model indicated 16.84% firms were distressed while, Zmijewski's score model showed 30.61%. Finally, the Altman's Z-score model indicated 12.76% firms were neither safe nor distressed while, Zmijewski's score model showed 7.14%. Therefore, the hypothesis H_{11} : The models Altman's Z-score and Zmijewski's Score contradict each other is true. Figures 5 and 6 for the year 2011 illustrates that both Altman Z-score and Zmijewski score models are not in agreement with each other. The Zmijewski score model shows a higher amount of distressed firms when compared to the Altman Z-score model. The Altman's Z-score model indicated 47.45% firms were safe while, Zmijewski's score model showed 15.31%. The Altman's Z-score model indicated 35.20% firms were distressed while, Zmijewski's score model showed 68.88%. Finally, the Altman's Z-score model indicated 16.33% firms were neither safe nor distressed while, Zmijewski's score model showed 14.80%. All positive ratios in Zmijewski model show a non-

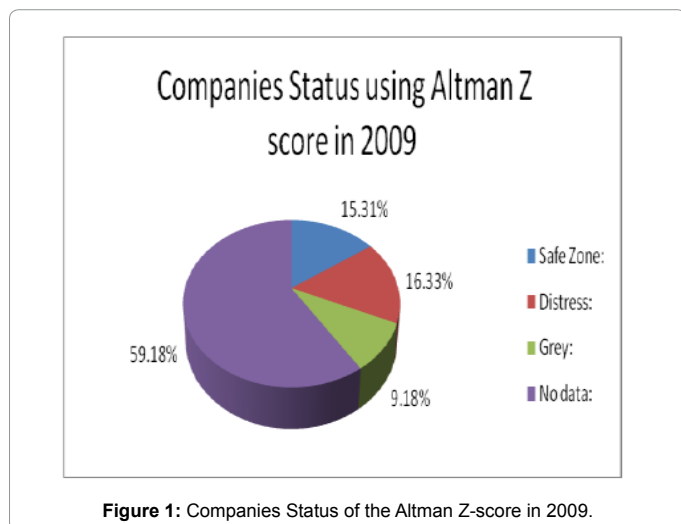


Figure 1: Companies Status of the Altman Z-score in 2009.

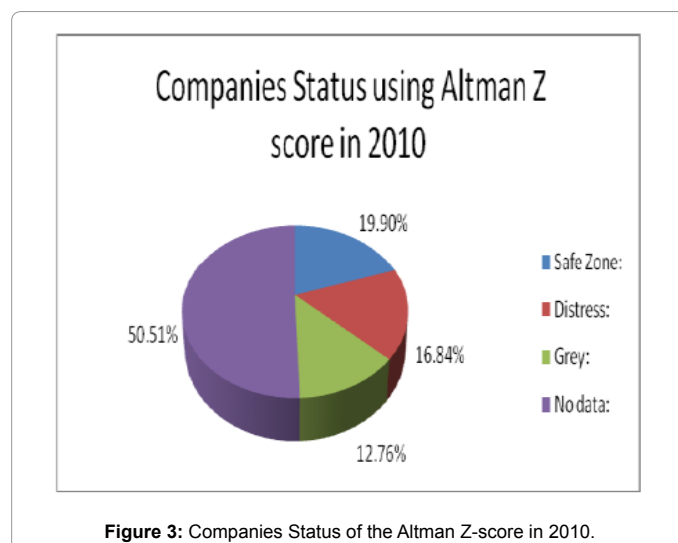


Figure 3: Companies Status of the Altman Z-score in 2010.

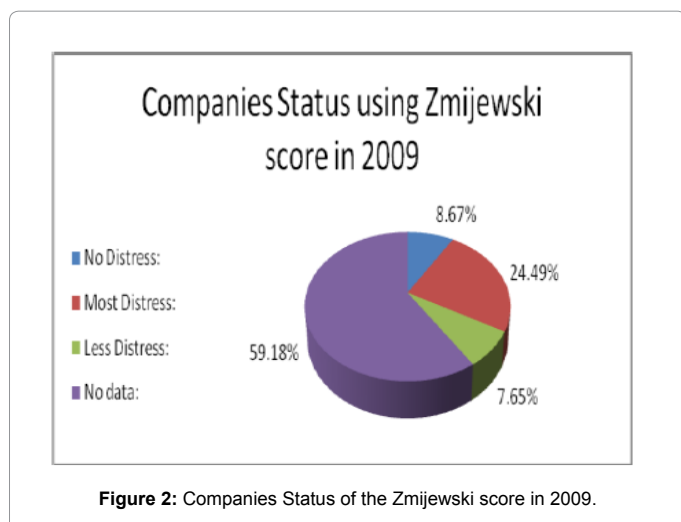


Figure 2: Companies Status of the Zmijewski score in 2009.

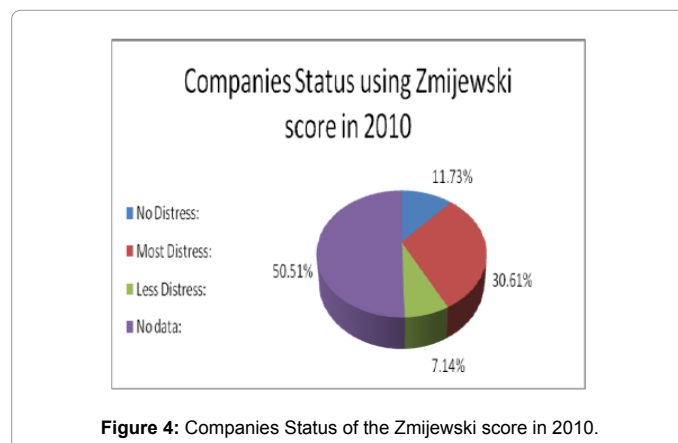


Figure 4: Companies Status of the Zmijewski score in 2010.

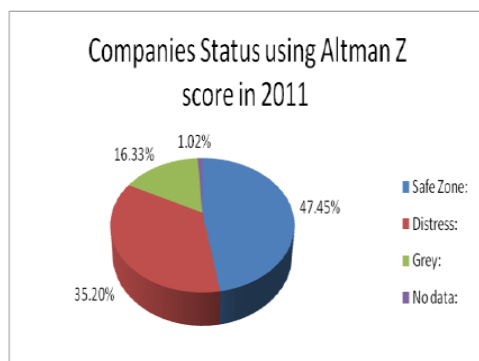


Figure 5: Companies Status of the Altman Z-score in 2011.

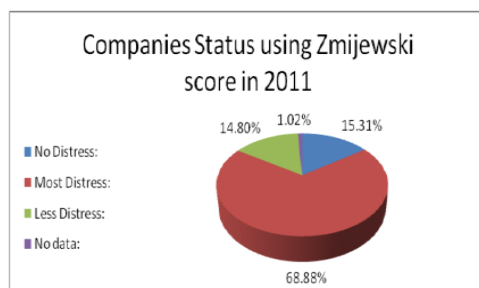


Figure 6: Companies Status of the Zmijewski score in 2011.

distressed firm and vice versa. Since, the theories behind Zmijewski model are contradictory, therefore, the hypothesis H_{11} : The models Altman's Z-score and Zmijewski's Score contradict each other is true. Figures 7 and 8 for the year 2012 illustrates the same pattern as above in 2011. The Zmijewski score model shows a greater amount of distressed firms when compared to the Altman Z-score model. The number of firms that were financially secure is 48.47% in Altman's Z-score model when compared to 12.24% in Zmijewski's score model. The Altman's Z-score model indicated 32.14% firms were distressed while, Zmijewski's score model showed 70.41%. Finally, the Altman's Z-score model indicated 18.88% firms were neither safe nor distressed while, Zmijewski's score model showed 16.84%. All positive ratios in Zmijewski model show a non-distressed firm and vice versa. Since, the theories behind Zmijewski model are contradictory, therefore, the hypothesis H_{11} : The models Altman's Z-score and Zmijewski's Score contradict each other is true. Figures 7-10 for the year 2012 illustrates the same pattern as previous years, 2011 and 2012. The Zmijewski score model shows a greater amount of distressed firms when compared to the Altman Z-score model. The number of firms that were financially secure is 51.53% in Altman's Z-score model when compared to 9.69% in Zmijewski's score model. The Altman's Z-score model indicated 27.04% firms were distressed while, Zmijewski's score model showed 76.53%. Finally, the Altman's Z-score model indicated 20.92% firms were neither safe nor distressed while, Zmijewski's score model showed 13.27%. All positive ratios in Zmijewski model show a non-distressed firm and vice versa. Hence, the theories behind Zmijewski model are contradictory. Therefore, the hypothesis H_{11} : The models Altman's Z-score and Zmijewski's Score contradict each other is true. Figures 11 and 12 for the year 2014 illustrates the same pattern as previous years,

2011, 2012, and 2013. The Zmijewski score model shows slightly lesser distressed firms when compared to 2013. The number of firms that were financially secure is 54.08% in Altman's Z-score model when compared to 9.69% in Zmijewski's score model in 2014. The Altman's Z-score model indicated 28.06% firms were distressed while, Zmijewski's score model showed 75.51%. Finally, the Altman's Z-score model indicated 17.35% firms were neither safe nor distressed while, Zmijewski's score model showed 14.29%. All positive ratios in Zmijewski model show a non-distressed firm and vice versa. Hence, the theories behind Zmijewski model are contradictory. Therefore, the hypothesis H_{11} : The models Altman's Z-score and Zmijewski's Score contradict each other is true. The hypotheses, H_{02} : Bankruptcy does not occur in two years if Zmijewski's Score is positive, and H_{12} : Bankruptcy can occur in

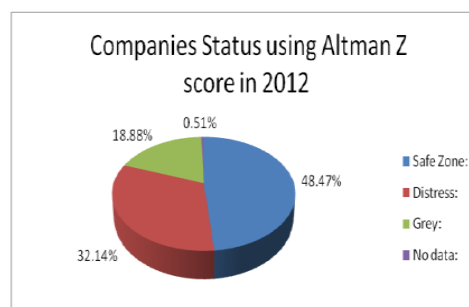


Figure 7: Companies Status of the Altman Z-score in 2012.

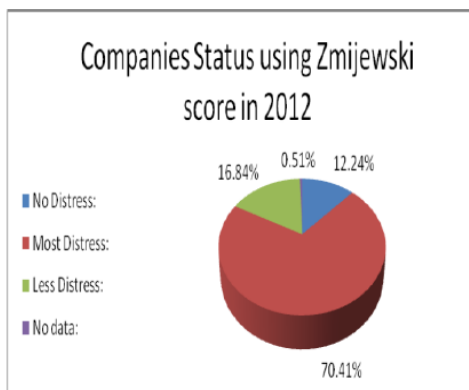


Figure 8: Companies Status of the Zmijewski score in 2012.

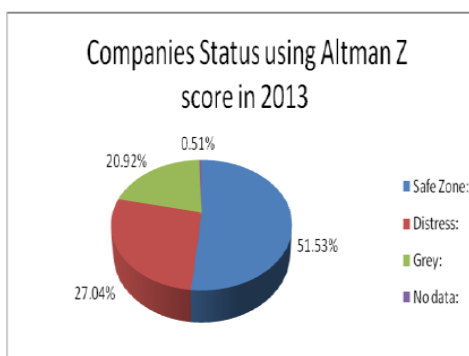


Figure 9: Companies Status of the Altman Z-score in 2013.

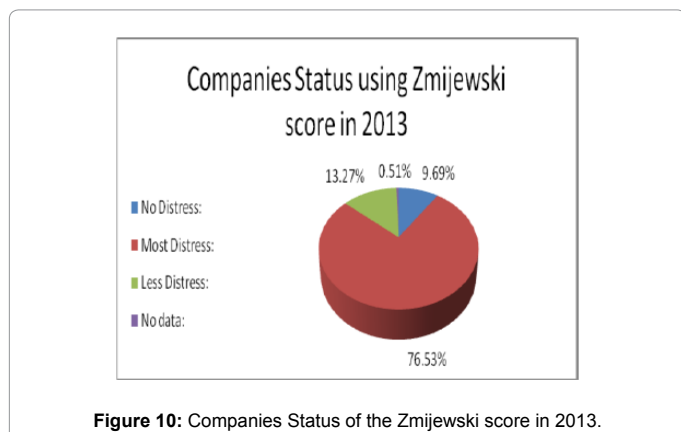


Figure 10: Companies Status of the Zmijewski score in 2013.

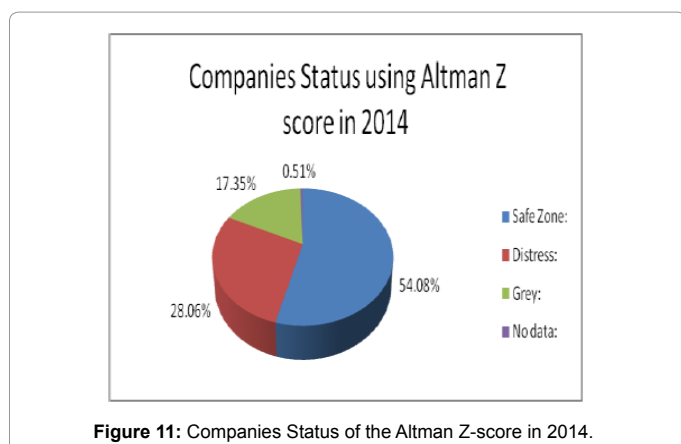


Figure 11: Companies Status of the Altman Z-score in 2014.

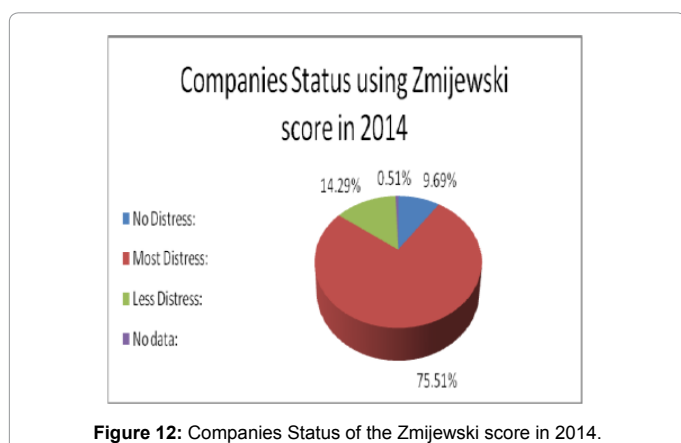


Figure 12: Companies Status of the Zmijewski score in 2014.

two years if Zmijewski's Score is negative are null in case of Kuwait as there are no established bankruptcy laws and all firms are in operation despite the presence of distress factor. However, approximately 75.51% of the firms in 2014 would be headed towards bankruptcy, according to the Zmijewski model.

Summary of results

To summarize, the results from the Altman Z-score model, the firms in the secure zone kept increasing from 15.31% in 2009, 19.90% in 2010, 47.45% in 2011, 48.47% in 2012, 51.53% in 2013, and 54.08% in 2014. This signifies that the listed firms in Kuwait Stock Exchange

are growing to be financially secure as the year's progress since the financial crisis of 2008. The firms in between the secure and distressed zone increased from 9.18% in 2009, 12.76% in 2010, and 16.33% in 2011, 18.88% in 2012, 20.92% in 2013, and further declined to 17.35% in 2014. The distressed firms kept increasing at a rapid pace of 16.33% in 2009, 16.84% in 2010, 35.20% in 2011, and 32.14% in 2012, declined to 27.04% in 2013, and increased to 28.06% in 2014. These points out that the majority of the firms listed on the Kuwait Stock Exchange are not performing well financially. On the contrary, the Zmijewski score results showed that the distress level of the listed firms in Kuwait Stock Exchange kept increasing from 24.49% in 2009 to 75.51% in 2014. This signifies that 75.51% should be hitting bankruptcy. The financially secure firms ranged from 8.67% in 2009 to 9.69% in 2014. However, 79.90% ratio in the Zmijewski model was positive, showing non-distressed firms. Hence, a contradiction has occurred in the results of this model.

Conclusions and Recommendations

Summary of the results

The Kuwait financial market has been untapped and unexplored by potential investors. In order to explore, financial performance of the listed firms on the Kuwait Stock Exchange must be assessed. The Kuwait Stock Exchange consists of 206 firms. This assessment was conducted using Altman Z-score and Zmijewski score models to predict the performance and the bankruptcy rate on 196 listed firms. A certain criteria scale was used by both models to calculate the results. The results of Altman Z-score shows that approx. 39.46% firms average for the period 2009-2014 were financially secure, approx. 25.94% firms average for the period 2009-2014 were distressed, approx. 15.90% firms average for the period 2009-2014 were neither secure nor distressed, and the balance 18.71% firms approx. on an average had no available data. While the results of Zmijewski score shows approx. 11.22% firms average for the period 2009-2014 were financially secure, approx. 57.74% firms average for the period 2009-2014 are bankrupt, approx. 12.33% firms average for the period 2009-2014 were neither secure nor safe, and the balance 18.71% firms approx. on an average had no available data.

Discussion of the results

Four hypotheses were created to answer the posed questions. The measures used for predicting these hypotheses were via Altman Z-score criterion model and Zmijewski score model. The criterion scale used for Altman Z-score model was Safe Zone= $Z > 2.99$ (risk free); Distress Zone= $Z < 1.81$ (bankruptcy); and Grey Zone= $1.81 \leq Z \leq 2.99$ (at risk). For banks, the Altman Z-score model criteria was $Z > 5.85$ Safe Zone; $4.35 < Z < 5.85$ Grey Zone; and $Z < 4.35$ Distress Zone. Alternatively, for Zmijewski score model, firms with positive scores were shown as non-distressed, while negative scores showed distressed firms. In the following section of this part, the main findings for each hypothesis are reviewed by the author followed by discussion and analysis of these findings.

H_{01} : The models Altman's Z-score and Zmijewski's Score do not contradict each other.

This hypothesis is null and inconclusive as Altman's Z-score and Zmijewski's score were in contradiction for all the years from 2009-2014.

H_{11} : The models Altman's Z-score and Zmijewski's Score contradict each other.

For the years 2009 and 2010, the models Altman's Z-score and Zmijewski's Score predicted different data. In 2009 and 2010, the risk free sectors were banks, consumer services, consumer goods, industrials, basic materials, and oil and gas. The distressed sectors were financial services, telecom, and health care. Around 59.18% of the firms have no information for the year 2009, and 50.51% in 2010. In 2009, the Altman's Z-score model indicated 15.31% firms were safe while, Zmijewski's score model showed 8.67%. The Altman's Z-score model indicated 16.33% firms were distressed while, Zmijewski's score model showed 24.49%. Finally, the Altman's Z-score model indicated 9.18% firms were neither safe nor distressed while, Zmijewski's score model showed 7.65%. In 2010, the Altman's Z-score model indicated 19.90% firms were safe while, Zmijewski's score model showed 11.73%. The Altman's Z-score model indicated 16.84% firms were distressed while, Zmijewski's score model showed 30.61%. Finally, the Altman's Z-score model indicated 12.76% firms were neither safe nor distressed while, Zmijewski's score model showed 7.14%. For the years 2011-2014, the models Altman's Z-score and Zmijewski's Score predicted different data. In 2011, the risk free sectors were oil and gas, basic materials, industrials, consumer goods, consumer services, banks, technology, and parallel market. The distressed sectors were real estate, financial services, telecom, and health care. The Altman's Z-score model indicated 47.45% firms were safe while, Zmijewski's score model showed 15.31%. The Altman's Z-score model indicated 35.20% firms were distressed while, Zmijewski's score model showed 68.88%. Finally, the Altman's Z-score model indicated 16.33% firms were neither safe nor distressed while, Zmijewski's score model showed 14.80%.

In 2012, the risk free sectors were oil and gas, basic materials, industrials, consumer goods, consumer services, banks, technology, and parallel market. The distressed sectors were real estate, financial services, telecom, and health care. The number of firms that were financially secure is 48.47% in Altman's Z-score model when compared to 12.24% in Zmijewski's score model. The Altman's Z-score model indicated 32.14% firms were distressed while, Zmijewski's score model showed 70.41%. Finally, the Altman's Z-score model indicated 18.88% firms were neither safe nor distressed while, Zmijewski's score model showed 16.84%. In 2013, the risk free sectors were oil and gas, basic materials, industrials, consumer goods, consumer services, technology, and parallel market. The distressed sectors were real estate, financial services, telecom, and health care. The number of firms that were financially secure are 51.53% in Altman's Z-score model when compared to 9.69% in Zmijewski's score model. The Altman's Z-score model indicated 27.04% firms were distressed while, Zmijewski's score model showed 76.53%. Finally, the Altman's Z-score model indicated 20.92% firms were neither safe nor distressed while, Zmijewski's score model showed 13.27%. In 2014, the risk free sectors were basic materials, industrials, consumer goods, technology, and parallel market. The distressed sectors were oil and gas, real estate, financial services, telecom, consumer services, and health care. The number of firms that were financially secure are 54.08% in Altman's Z-score model when compared to 9.69% in Zmijewski's score model in 2014. The Altman's Z-score model indicated 28.06% firms were distressed while, Zmijewski's score model showed 75.51%. Finally, the Altman's Z-score model indicated 17.35% firms were neither safe nor distressed while, Zmijewski's score model showed 14.29%. Hence, the hypothesis was true in all the years from 2011-2014.

H_{02} : Bankruptcy does not occur in two years if Zmijewski's Score is positive.

Due to the contradiction in theories of Zmijewski score results

and absence of bankruptcy laws in Kuwait, this hypothesis is null and inconclusive.

H_{12} : Bankruptcy can occur in two years if Zmijewski's Score is negative.

Due to the contradiction in theories of Zmijewski score results and absence of bankruptcy laws in Kuwait, this hypothesis is null and inconclusive. However, with the established and implemented bankruptcy laws in Kuwait, this can be predicted using Zmijewski score model.

Conclusions and Practical Recommendations

A primary conclusion of this exploration is that it is possible to predict accurately the level of financial distress in Kuwait using the financial data from annual reports and financial statements from the Kuwait Stock Exchange website. However, the bankruptcy model Zmijewski score, produced contradictory results. Hence, the bankruptcy rate hypotheses were inconclusive as no bankruptcy laws exist in Kuwait. The dependable model in the case of Kuwait is Altman's Z score Model showed 54.08% financially secure firms in 2014 and roughly 28.06% firms distressed in 2014. The balance of the firms was neither distressed nor secure financially. The Zmijewski score Model was the worst model to apply in Kuwait. This paper provides insight into the financial distress level in Kuwait. The high level of distress shows that major changes are necessary in firms. This also shows that the operations are not running smooth. The sectors that are performing well for investment: petroleum, food, slaughter houses, and banks. Surprisingly, the distressed firms continue to operate despite the losses. Real estate and telecommunication sectors are the worst performers, and yet, they continue to expand their projects/operations respectively. Bankruptcy laws, like Chapter 11, are required for firms operating in distress. This allows the business entrepreneurs to default and fresh start their new operations. New competition in the market will help the existing firms to rise up to the new business trends and to improve their functionality. This will improve the market and attract more profitable investments around the globe.

Recommendations

According to Kim [63], the blow of catastrophic events can be examined by computing change on the whole default probability of firms after the event. The continuous type of credit risk measure has the higher foretelling power to recognize financially distressed firms, one year prior to the bankruptcy because of growing investor involvement and enhanced market transparency in the recent market. This credit risk measure helps to estimate the financial impact on different industries, for instance, the China market crash, has an impact on oil and gold industry. The option-based measure is another alternative prediction tool for scholars and practitioners. However, the author did not provide evidence that the option-based model is a better predictor than variables in Altman's Z-score model.

The outcomes of the evaluation using the Altman model for the period 2011-2014, revealed that on average 25.94% firms are financially distressed, while the Zmijewski model identified 57.74% firms as bankrupt. Thus, the models Altman and Zmijewski were in contradiction for the period 2009-2014. As for the period 2009-2010, no data were available for approx. 54.85% firms. Hence, it is recommended that firms assess their financial performance using both models of Altman and Zmijewski. The Altman Z-score model will assess whether the firm is safe and sound, while Zmijewski will

predict if the firm is headed towards bankruptcy. The Zmijewski score model can be successful only if the bankruptcy laws well established and implemented. This will prevent in the contradiction of theories in case of Zmijewski model. Therefore, the results with respect to Zmijewski model are inconclusive at this point. Future researchers can analyze the bankruptcy rate in Kuwait using the bankruptcy laws, whenever established. They can create their own criterion for bankruptcy level. Therefore, in further studies, new combinations of financial ratios could be added to the Altman Z-score model in order to search for better model designs and reach more satisfactory results based on different sectors/industries based in Kuwait. This paper could challenge and encourage a new platform to the prospective researchers for developing and enhancing models that are applicable to the countries in the Gulf region.

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