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Investors risk perception effect on share prices: A case study on Kuwaiti cement companies

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Abstract
The aim of this study is to examine investors risk perception effect on the share prices of Kuwaiti cement companies listed at Kuwait stock exchange (KSE) over the period 2010-2018. The risk perception is driven by investors' expectations on the future financial soundness of companies they invest in. As a result, when investors have negative expectations this would lead them to reduce their investment in these companies resulting in lower share prices and vice-versa. In this research Zmijewski x-score model is used as risk proxy to evaluate the financial soundness of Kuwaiti cement companies and its effect on their share prices. The research uses ordinary least square regression (OLS) to examine the relation between x-score and the share prices. While OLS regression is used to examine the relation between the variables that relation does not necessarily imply any cause-and-effect relationship. For that matter Granger causality test was used to examine the cause-and-effect relationship. Results obtained from this study showed that Kuwaiti cement companies had a strong financial positions and are safe from bankruptcy, at least for the next two years. The research also revealed that there is a statistically significant relation between Zmijewski x-score and the stock price but at the same time Granger causality test showed that Zmijewski x-score does not cause the movement in the price of the share.

Keywords: Zmijewski x-score model, risk perception, financial distress, financial soundness, cement companies, Kuwait stock exchange, causality test, trend analysis

1. Introduction

With Kuwait vision of becoming a financial centre by the year 2035, an investment of almost $100 billion was set to achieve that goal. In order to accomplish that goal huge infrastructure is required where cement is an essential material that is needed. While there are many cement companies in Kuwait, only four of them are listed at Kuwait stock exchange. These four companies control over 75% of the cement market in Kuwait. These companies are Kuwait cement company (KCC), Hilal cement company (HCC), Portland cement company (PCC) and Acico cement company (ACC). The topic of financial distress has captured the attention of researchers for over 50 years, but that attention tends to increase during the periods of financial crises. Elloumi and Gueyie (2001) [15] describes a company with a negative net income for two consecutive years as being in a financial distress stage. Ward *et al*. (2006) [27] stated that a company facing financial distress risk is a company that has an interest coverage ratio of less than one, meaning that revenues generated from debt are less than the interest paid on the debt indicating difficulties in repaying their short-term obligations. While Zmijewski (1984) defines financial distress of firms as 'the act of filing a petition for bankruptcy'. Altman *et al*. (2017) [9] stated that financial distress prediction models provide help for the credit rating agencies, debt providers and equity holders to analyze the financial health of the firms. For corporate managers financial distress model serve as a whistle-blowing mechanism to initiate remedial measures. The Zmijewski x-score model is one of the most commonly used models for measuring the financial distress of companies. The model is based on the data of 40 bankrupt and 800 non-bankrupt industrial firms for the period 1972–1978 to develop the x-score model. Zmijewski (1984) [28] claimed that the model achieved a 99% accuracy rate in determining the bankruptcy of companies two years prior to their bankruptcy event. AlAli *et al*. (2018a) [5] used the Zmijewski x-score model to examine the financial soundness of companies on oil and gas companies listed at Kuwait stock exchange over the period 2010-2017.

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They concluded that Zmijewski x-score model was able to predict the delisting of companies from the stock market. Manalu *et al*. (2017) used Zmijewski x-score model to evaluate the financial soundness of shipping service companies listed at Indonesia stock market over the period 2010-2016. They found that all four companies under study had a healthy financial position over the study period except Berlian Laju Tanker (BLT) that had a high bankruptcy risk during 2010-2014 period. Suresh *et al*. (2019) [25] also used Zmijewski x-score to determine the financial soundness of Bhutan Telecom Company (BTC) over the period 2010–2018 and concluded that the company was in a good financial position with an x-score ranging from -2.653 to -3.993 over the study period. AlAli *et al*. (2018_b) [5] used Zmijewski x-score model to examine the financial soundness of mobile telecommunication companies listed at Kuwait stock exchange during the period 2013-2017. They concluded that Viva was furthest company from bankruptcy compared to Ooredoo and Zain companies. Zmijewski's x-score model is a model that is based on financial ratios that can be calculated using the financial statements of the company. Agarwal and Taffler (2008) [1] found that accounting-based bankruptcy prediction models outperform market-based bankruptcy prediction models after comparing the two types of models using all non-finance industry companies listed at London Stock Exchange (LSE) during the period 1985–2001. Husein and Pambekti (2014) [20] concluded that financial ratios found in a company's financial statement are an efficient way of analysing the financial soundness of a company, and can be used to anticipate future financial difficulties. Subramanyam and Wild (2013) [13] argue that financial analysis using financial ratios is a very useful tool that significantly assists business decision making and distinguishes the weak and the strong areas in a company. Almilia (2006) concluded that the results from his study demonstrated that financial ratios from a company's income statement, balance sheet and cash-flow statement had significant success in predicting financial distress. With a large number of financial-distress prediction models found in the literature, a great deal of research was conducted to compare the accuracy of these models. Husein and Pambekti (2014) [20] compared the accuracy rate for Altman, Zmijewski models, Springate, and Grover models using the data of 132 companies which are listed on the list of Daftar Efek Syariah (DES) over the period 2009-2012. They concluded that Zmijewski model was the most appropriate model to be used for predicting the financial distress. Using the data of 35 textile, ceramic and tile companies listed on the Tehran Stock Exchange during the period 2008–2013, Aminian *et al*. (2016) [10] compared the accuracy rate of Altman z-score model, Springate model, Grover model, and the Zmijewski x-score model. They concluded that Zmijewski x-score model was statistically significant in predicting a company's financial distress. Avenhuis (2013) [11] examined the prediction power of the Altman, Ohlson and Zmijewski models for Dutch companies over the period 2005–2012. When the original statistical techniques were used, the accuracy rates for the validation sample for the models of Altman, Ohlson and Zmijewski were 80.6%, 93.8%, and 95.3%, respectively. Fatmawati (2012) [17] used the data of 30 companies that had been delisted during the period 2003 to 2009 and 30

companies that were still listed on the Indonesia Stock Exchange in that period to compare the accuracy rate of Zmijewski, Altman and Springate models. The results of the research showed that Zmijewski x-score model was the most precise model in predicting the delisting of companies. Even though financial ratios are widely used by researchers, they have their limitations. Wadhwa (2019) [26] stated three limitations when using financial ratios. The first one is the lack of standardized terminology or manner of calculation for ratios. The lack of standardization over the proper calculation methodology for ratios leads to vagueness. The second being the distributional properties of financial ratios. Normality has been proved to be absent when the pattern of ratios was analyzed. Thus, due to this many parametric methods become unusable on financial ratios. The third limitation is the lack of comparability in ratios caused by different accounting standards used in different economies. The difference in accounting standards influence the financial statement and thereby impact the financial ratios. Even within the same accounting standards, difference in the accounting policies cause the financials to be incomparable and thus reduce the utility of financial ratios. Researches have proved how the impact of such change exists. Studies have shown how for the same accounting period when the accounting framework changes the financial ratios are affected to a great extent (Cinca *et al*., 2005; Liu *et al*., 2013; Faello, 2015) [13, 21, 16] . The financial soundness of any company is vital for any party that is associated with the company both internal and external. From the internal side, the score of the financial distress model represents a report card on the efficiency of top management performance and also a good financial position send a comfort message for the employees that they are unlikely to be laid off. In the external side, a positive financial distress score would mean for the creditors that the company is in a good position to repay its loans without delay or default. Investors on the other hand see the financial soundness of the company as an indicator to how well their investments in that company are doing and for that will affect the share price of the company. Al Saedi and Al Tamimi (2018) [2] examined the relation between Altman's z-score and the share price of industrial companies listed at Qatar stock exchange over the period 2008 to 2017 and found a statistically significant relation between them. AlAli (2019) [5] conducted a study on the effect of Altman's Zeta model score on the share price of healthcare companies listed at Kuwait stock exchange over the period spanning from 2013 to 2017 and came up with the same results that there was a statistically significant relation between Altman's Zeta score and the share price. On the other hand, AlKulaib and AlAli (2019) [5] used Altman z-score to examine the relation between the z-score and the share price of conventional insurance companies over the period 2010 to 2017. The result of the research showed that there was no statistically significant relation between Altman z-score and the share price of these companies. They concluded that financial distress prediction models scores might affects the share prices in a certain sectors of the market but it should not be generalized to all sectors.

2. Methodology
Zmijewski x-model is a model that is based on financial

ratios that measures profitability, leverage, and liquidity of the company. The model is one of the most common model used by researchers and practitioners in predicting financial distress of companies (Grice & Dugan 2003). The model is presented equation 1;

Zmijewski x-score = - 4.336 – 4.513 X1 + 5.679 X2 - 0.004 X3   (1)

Where;
X1 = Net Income/Total Assets   (Profitability)
X2 = Total Liabilities/Total Assets   (Leverage)
X3 = Current Assets/Current Liabilities   (Liquidity)

Djamaluddin *et al.* (2017) [14] divided Zmijewski x-score into two classes. If the x-score is negative (i.e., less than zero), then the company is classified as being in a healthy condition. If the x-score is positive (i.e., greater or equal to zero), then the company can be classified as likely to experience financial distress. The relation between Zmijewski x-score and the share price is measured using ordinary least squared (OLS) regression using equation 2.

$$SP_{it} = \alpha + \beta(X_{it}) + \varepsilon_{it}$$ (2)

Where;
SP_{it} is the share price of company *i* at time *t*.
B is the coefficient of the x-score
X_{it} is the x-score of company *i* at time *t*.
E is the error term.
Equation 2 is set to examine the following hypothesis;
H0: There is no relation between Zmijewski x-score and the share price of Kuwaiti cement companies.

3. Data and Empirical Results
Annual reports of the four cement companies spanning over the period 2010–2018 were used in this study. The annual reports were obtained from the website of the Kuwait stock exchange website and the Kuwait Institute of Banking Studies database. In examining the components of the model, it can be seen from table 1, that in terms of profitability (X1), Portland cement achieved the highest mean return on assets (ROA) of 10.7% compared to the other companies. On the other hand Hilal cement produced the lowest ROA of 1.3% during the study period. The industry average over the study period was 4.8% and for that matter it can be seen that only Portland cement company and Kuwait cement company were the two companies that achieved an average mean return that was higher than the industry average while the other companies were unable to achieve such average.

Table 1: (X1) Profitability Ratio

x1	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average
HCC	0.027	0.058	0.029	0.032	-0.011	0.013	0.006	-0.042	0.003	0.013
KCC	0.052	0.055	0.052	0.055	0.056	0.066	0.065	0.056	0.026	0.054
PCC	0.261	0.037	0.101	0.106	0.093	0.061	0.098	0.096	0.113	0.107
ACC	0.016	0.010	0.013	0.029	0.030	0.026	0.023	0.019	0.012	0.020
Average	0.089	0.040	0.049	0.056	0.042	0.042	0.048	0.032	0.038	

In terms of leverage (X2), the industry had a mean ratio of 37.84%. Acico cement company and Kuwait cement companies had a mean leverage of 67.7% and 38.7% respectively which was above the industry average. Portland cement company was the most conservative company since it had a mean leverage ratio of only 17.2%. Opler and Titman (1994) [23] concluded that highly leveraged companies tend to lose more market share that conservative companies during economy slowdown periods. Bhandari and Weiss (1996) [12] found that leverage is an important factor in measuring the financial distress of any company.

Table 2: (X2) Leverage Ratio

x2	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average
HCC	0.249	0.242	0.244	0.262	0.303	0.300	0.280	0.291	0.329	0.278
KCC	0.393	0.430	0.470	0.375	0.371	0.366	0.364	0.354	0.360	0.387
PCC	0.107	0.069	0.118	0.118	0.232	0.176	0.190	0.282	0.253	0.172
ACC	0.659	0.661	0.655	0.646	0.677	0.702	0.708	0.717	0.669	0.677
Average	0.352	0.350	0.372	0.350	0.396	0.386	0.386	0.411	0.403	

Liquidity ratio measures the ability of the company in honouring its short-term obligations, it works as a buffer against any unexpected financial liabilities that might occur. Al Najjar (2009) [8] found a statistically significant inverse relation between the financial soundness of companies and their current ratio. Portland cement company had the highest ratio of 6.67 times meaning that the hold current assets that is 6.67 time their current liabilities which makes them the most capable company in the industry in honouring any unexpected short-term liability that might occur. On the flip side, Acico cement company was the only company in the industry that had a current assets that are less than their current liabilities.

Table 3: (X3) Liquidity Ratio

x3	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average
HCC	3.815	3.770	3.384	2.857	2.175	2.421	2.733	3.022	2.637	2.979
KCC	1.159	1.191	2.259	1.627	1.614	1.417	1.529	1.561	1.317	1.519
PCC	8.055	12.774	7.301	9.108	4.033	5.958	5.242	3.342	4.179	6.666
ACC	0.639	0.689	1.444	0.822	0.800	0.688	0.939	0.961	0.837	0.869
Average	3.417	4.606	3.597	3.603	2.156	2.621	2.611	2.222	2.242	

The x-scores are shown in table 4, from the table it can be seen that Portland cement company had the best score in the industry while Acico cement company was the worst performer. Portland cement company had an average x-score of -3.871 followed by Hilal cement company with a score of -2.828. The industry average for the x-score was -2.417 over the study period.

Table 4: Zmijewski x-score

x-score	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average
HCC	-3.059	-3.239	-3.094	-3.005	-2.571	-2.702	-2.782	-2.506	-2.492	-2.828
KCC	-2.342	-2.147	-1.908	-2.461	-2.489	-2.562	-2.567	-2.584	-2.414	-2.386
PCC	-4.936	-4.164	-4.150	-4.181	-3.453	-3.633	-3.720	-3.181	-3.426	-3.871
ACC	-0.669	-0.633	-0.677	-0.801	-0.633	-0.473	-0.424	-0.353	-0.593	-0.584
Average	-2.751	-2.545	-2.457	-2.612	-2.286	-2.343	-2.373	-2.156	-2.231	

When looking at the trend analysis, as seen in figure 1, it can be seen that only Kuwait cement company had a negative beta which means that it is showing improvement in its x-score while all remaining companies had an upward trend indicating a deterioration in their x-scores.
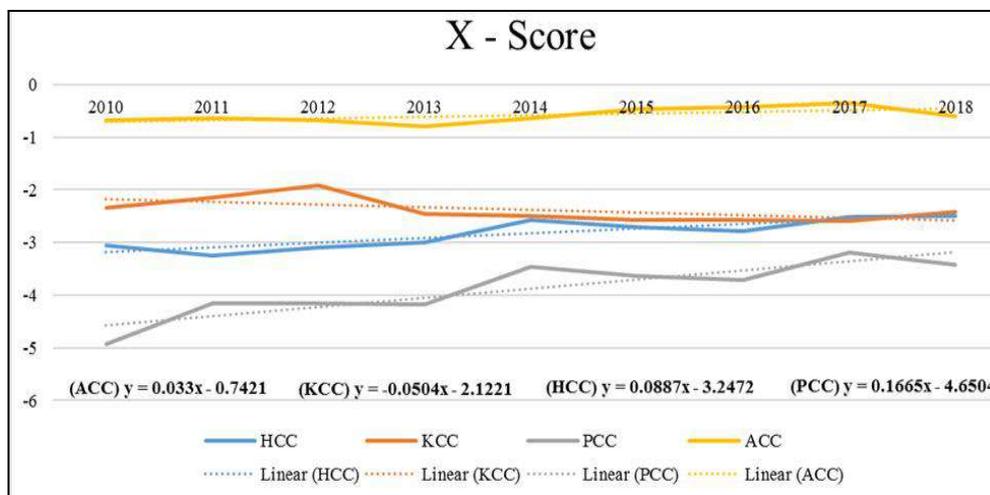

Fig 1: Zmijewski x-scores and Trend Analysis

The coefficient of determination (R square) for the regression shows 0.410 indicating that the model was able to explain only 41% of the variation between the Zmijewski x-score and the share price while the remaining 59% of the variation is due to other variables. But despite the low R square, since it is lower than 0.50, the model can still be labeled as a "good fit" since the significance F is lower than the 0.01.

Table 5: OLS Regression output

Multiple R	0.641	Significance F	2.58013E-05
R Square	0.410		
		t Stat	P-value
Intercept	-0.0067	-0.0563	0.956
X-Score	-0.2107	-4.863	2.58013E-05

According to Guajarati (2004) who stated that while the coefficient of correlation (multiple R) indicates the relation between two variables that relation does not necessarily imply any cause-and-effect relationship. For that matter Granger causality test was performed and the results show that Zmijewski x-score does not cause the movement of the stock price which is logical since the R square is less than 0.5.

Table 6: Granger Causality Test Results

Pairwise Granger Causality Tests			
Date: 12/08/19 Time: 02:45			
Sample: 1 36			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
S does not Granger Cause X	34	0.94288	0.4011
X does not Granger Cause S		0.67271	0.5181

4. Conclusion

The aim of this study was to examine the relation between investors risk perception and share prices. The study used Zmijewski x-score as a risk proxy and its effect on Kuwaiti cement companies share prices. Results obtained from this study showed that Kuwaiti cement companies had a healthy financial position and are far from the threat of bankruptcy. In examining the relation between the x-score and share prices, OLS regression results showed that there was a weak but statistically significant relation between Zmijewski x-score and the share prices of these companies. Furthermore, when determining the cause-effect relation between the two variables, results from Granger causality test showed that Zmijewski x-score does not have any effect on the changes in share prices.

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