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ON THE APPLICATION OF ALTMAN'S Z SCORE MODEL: THE CASE OF SEARS HOLDINGS COMPANY

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ABSTRACT

Professor Edward Altman created the Z score model in 1968 to predict the financial distress of organizations and this model has been used very frequently by academics and researchers as a tool to gauge the financial health in organizations ever since. In this case study, Altman's Z score model has been applied to the available accounting data of Sears Holdings Company between 2008 and 2018. The subsequent analyses reveal the financial distress of Sears Holdings Company with remarkable precision. The objectives of this study have been to test the Z score model on the Sears accounting data and also to interpret the results of this analysis from a managerial perspective. A case study method has been applied to this study and data has been collected from secondary sources. Limitations of this study and scope for future research has been discussed. Some factors leading to the financial demise of Sears from a corporate management perspective has also been highlighted.

KEYWORDS

Altman's Z score model, sears, multiple discriminant analysis, financial distress, solvency ratio.

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INTRODUCTION

Business organizations are profit oriented micro – economic engines which drive the macro – economic vehicle of any nation. In the capitalistic market-oriented economies healthy competition amongst firms benefit the society in general and the employees, shareholders, investors and the community members in particular. However, when large organizations fail it can have disastrous consequences for any given community, employees, stakeholders, investors and creditors. The bankruptcy filings of Enron Corporation in 2001 or the massive collapse of Lehmann Brothers in 2008 are just two examples in a vast number of these adverse situations. Accounting based financial ratio analyses was adopted as a tool to predict credit worthiness in the US since the latter half of the nineteenth century (Aquino, 2010). With the advent of the modern times more sophisticated financial analytical tools were developed to assess the financial health of organizations. Thus in 1968, Professor Edward Altman's pioneering research on the prediction of financial distress in organizations led to the creation of Multiple Discriminant Analysis which in turn is based on the statistical methodology wherein quantitative accounting-based characteristics of an organization is simultaneously taken into consideration alongside the qualitative characteristics of a company being bankrupt or not bankrupt (Acquino, 2010). According to Shilpa and Amulya ((2017), financial distress of a firm is its inability to fulfil its present financial obligations. The case of Sears Holdings company is a classic example of flawed decision making by its corporate leadership wherein an ailing large retail organization like Kmart is merged with a well-established large organization like Sears and the subsequent merged organizations known as Sears Holdings Company files for Chapter 11 bankruptcy in 2018 being unable to fulfil its immediate obligations with its creditors. (Young, et.al, 2018). This study has VIII sections. Section I has the introduction, Section II has the Importance and Relevance of this study, Section III has the Literature Review, Section IV has the Objective of this study, Section V has the research methodology of this study, Section VI has the Z score analysis of this study and it is subdivided into Part A which deals with the Z score analysis of the Sears accounting data and Part B has the interpretation of the Z score analysis in terms of Sears' corporate management perspective, Section VII has the Limitations of this study and scope for future research and section VIII and has the Conclusion.

In this case study Altman's Z score model has been tested with reference to the available accounting-based data of Sears Holdings Company and the same has been retrieved from <https://www.macrotrends.net/stocks/charts/SHLDQ/sears-holdings/financial-statements>

IMPORTANCE AND RELEVANCE OF THIS STUDY

At a time when COVID 19 has been creating havoc in travel, hospitality and other industries with job losses and furloughed employees being common place, this global pandemic had been providing a negative impact on internal company functions like supply chain (Browning, 2020). Plummeting revenues in certain industries are common place. Against the backdrop of this economic downturn, corporate financial officers, stakeholders, employees and community members would be interested to know about the financial health of a company. Hence the application of Altman's Z score model on the available accounting data of organizations may help corporate managers of organizations assess its financial health of an organization and act accordingly.

However, the paradox of this case study is that Sears filed for Chapter 11 bankruptcy even before the COVID 19 appeared on the face of this blue planet. Besides the quantitative analysis an attempt has been made to reveal the downfall of Sears from a managerial perspective.

LITERATURE REVIEW

Ratio analysis of accounting-based data had been familiar to financial analysts and corporate managers since the latter half of the nineteenth century. During the sixties William Beaver was the first person to create a Univariate Discriminant Analysis to make predictions of business failure in organizations. Beaver's model focused on two ratios as the indicators of business failure and they were: cash flow / total debt and net income/ total debt (Acquino, 2010). Altman (1968) found the following five ratios to be most valuable in the creation of the Z score model which predicts business failure in organizations with a high degree of accuracy and the same has been holding good for over fifty years. Altman's five ratios are X1 = Working Capital/ Total assets, X2 = Retained Earnings / Total Assets, X3 = EBIT / Total assets, X4 = Market value of Equity / Book value of total liabilities and X5 = Sales / Total assets. So, Altman expressed his Z score model as follows:

$$Z = 1.2 * X1 + 1.4 * X2 + 3.3 * X3 + 0.6 * X4 + 1.0 * X5$$

And if $Z < 1.81$, the company is in the financially distressed zone, if $1.81 < Z < 2.99$, the company is in the "Grey Zone" and if $Z > 2.99$, the company is in the safe zone. Though Altman and others extended the Z score model to create the proprietary ZETA model, the original Z score model created in 1968 by Professor Edward Altman is still an excellent tool to predict financial distress in organizations with a level of 95% accuracy one year before filing bankruptcy and 72 % accuracy two years before filing bankruptcy (Altman, 1968). In his initial study Altman (1968) chose 66 firms for his Multi Discriminant Analysis and out of the 66 firms 33 firms were bankrupt and 33 firms were non-bankrupt. Organizational decline is usually caused by financial distress and it is a situation wherein the organization is unable to fulfil the obligations towards its creditors. Creditors may seek legal remedy by forcing organizations (in financial distress) to file for bankruptcy. In the US there are two classifications of bankruptcy and they are Chapter 11 and Chapter 7. Usually large organizations file for Chapter 11 bankruptcy to get back on their "financial feet". Chapter 7 bankruptcy is filed by organizations which are liquidated. (Gyarteng, 2019). Using the Z score model Panda and Behera (2015) conducted a study to assess the financial health of organizations in the Indian Pharmaceutical industry comprising of five pharmaceutical organizations wherein one company was in the acute financial distress zone, one company was in the safe zone and remaining three organizations were in the "Grey zone". Mohammed (2016) conducted a case study to assess the financial health of a cement manufacturing company in Oman using the Z score model and it was found to be in the "Safe

zone". Shilpa and Amulya (2017) conducted a study to assess the financial health of the automobile industry in India using the Z score model and found that the commercial vehicle manufacturers are in the "Grey zone". Mehta et.al. (2020) conducted a case study to assess the financial health of an energy solutions provider in India. After applying the Z score model to the available accounting data of this organization, the authors found that this organization was in financial distress. The study conducted by Aquino (2010) pertain to the assessment of financial health in an industry or in an organization and gives an overview of various models which predict financial distress.

Thus, none of the aforementioned studies address the relationship between the Z score model analysis and the corporate managerial actions of an organization (s). Hence there seems to be a gap in the literature and this case study attempts to address this gap in literature by providing interpretations of the results obtained after the Z score analysis on the accounting-based data of Sears Holdings company with relationship to this company's flawed corporate management decisions and actions or inactions.

OBJECTIVES

1. To test the Altman's Z score model on the accounting-based data of Sears Holdings company.
2. To explain the results of the Z score analysis of Sears Holdings company from an appropriate corporate managerial perspective.

METHODOLOGY

The method of performing research in this study is by means of case study. "A case study is an empirical inquiry that investigates contemporary phenomenon..." (Ebernyain and Moghadam,2018, p 1). In this case study the contemporary phenomenon is the financial distress in organizations and Altman's Z score model is the assessment tool which investigates this phenomenon. Altman's Z score model has been applied to the accounting-based data on Sears between 2008 and 2018 and analyses has been performed and inferences made. Data has been collected from the secondary sources and the same has been retrieved from <https://www.macrotrends.net/stocks/charts/SHLDQ/sears-holdings/financial-statements>

Z SCORE ANALYSIS

The discussion of this case study has been subdivided into two parts: Part A and Part B. Part A consists of the application of the Altman's Z score model to the available accounting data of Sears and the results obtained from the Z score model application has been used to interpret the failures of Sears corporate management.

PART A

TABLE 1

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
.1183	.1146	.1069	.1197	.0483	.044	.0424	.0203	.0535	.0336	-.1519

(Source: Author's computation)

- a) With reference to the table 1 above, $X1 = \text{Working Capital} / \text{Total Assets} = (\text{Total Current assets} - \text{Total Current Liabilities}) / \text{Total assets}$. Hence as seen from the 2018 computed results from the table 1, Sears total current assets is less than the total current liabilities which has resulted the ratio to be (-0.1519) which means that the outstanding current liabilities of Sears has exceeded the value of its assets. Also, with reference to the table1, the values corresponding to the X1 row shows a decreasing trend as shown by the downward sloping trend line. The decreasing values of X1 of Sears between 2008 and 2018 suggest continued operating losses. (Altman, 1968).

TABLE 2

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
.1646	.18	-.1934	-.2024	.0872	.0458	-.0263	-.164	-.2903	-.5888	-.8118

(Source Author's computation)

- b) With reference to the Table2 above, $X2 = \text{retained earnings} / \text{Total Assets}$ and this ratio is an index of cumulative profits or losses of a firm. However, as seen from the above table, the computed values corresponding to the X2 row have been negative since 2014 up until 2018 which means the company has been running on a cumulative loss since 2014. (Altman,1968).

TABLE 3

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
.0579	.0119	.0269	.0179	-.0702	-.0433	-.0508	-.1144	-.0882	-.2113	-.0592

(Source: Author's computation)

- c) With reference to the table 3 above, $X3 = \text{Earnings before Income tax} / \text{Total assets}$ indicate the earning power of a firm from its assets. Further with reference to the above Table 3, the values corresponding to the X3 row of Sears has been negative between 2012 and 2018 suggesting corporate failure. (Altman, 1968)

TABLE 4

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
.6669	1.3787	1.2479	.6898	.534	.6319	.4384	.2566	.1235	.0447	.0068

(Source: Author's computation)

- d) With reference to the above table 4, the ratio, $X4 = \text{Market value of Equity of the firm} / \text{Book Value Total Liability}$ and this ratio indicates the amount by which the assets decline in value prior to the situation wherein the liabilities exceed the value of the assets before the firm becomes insolvent. As seen from the table 4, the X4 values of Sears show a continuous decreasing trend from 2009 until 2018 wherein the market value of equity divided by the book value of liabilities have a continuous decreasing trend. So, the X4 ratio (which is also known as solvency ratio) has a continuous decreasing trend from 2008 to 2018 and this emphatically point towards insolvency of Sears. (Altman,1968).

TABLE 5

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1.8507	1.8456	1.7478	1.7514	1.9441	2.0607	1.9817	2.3662	2.218	2.3647	2.2999

(source: Author's computation)

- e) With reference to the above table 5, the ratio $X5 = \text{Sales} / \text{Total Assets}$ and this ratio indicates the revenue generating capacity of the firm's assets and it is not of importance as a stand alone ratio hence any further discussion about this is redundant. (Altman,1968)

FIGURE A

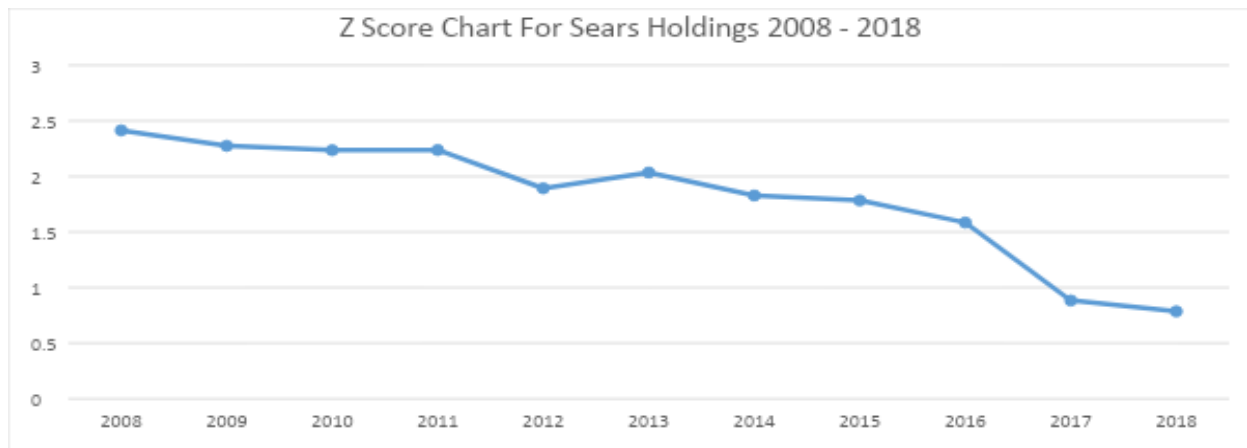


TABLE 6

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2.4144	2.2747	2.2359	2.2375	1.8926	2.0349	1.8282	1.7835	1.5847	.8834	.7857

(Source: Author’s computation)

As seen from Fig. A and table 6, the Z Score value of Sears was in the grey zone ($z < 2.99$) since 2008 and continuously decreased over time till it reached a value below 1.81 (financial distress zone) since 2015 (1.78356) and in 2017 they were .88341 and .785 respectively implying acute financial distress and financial insolvency. (Altman, 1968).

PART B

DISCUSSION OF THE DOWNFALL OF SEARS FROM THE CORPORATE MANAGERIAL PERSPECTIVE

The Sears company timeline

1886: Richard sears launches a watch company in Minneapolis, MN and in 1887 it moves to Chicago, IL. An experienced watchmaker by the name of A. Roebuck is hired by Sears and eventually the for the Sears, Roebuck and company together.

1895: Realizing that the US consumers are living scattered all over the country and in the rural areas in particular, Sears launches a 532-page catalogue displaying its product line consisting of apparel, fishing tackle, watches and jewelry.

1901: The stocks of Sears are traded in NYSE

1913: Sears introduces the famous Kenmore appliances brand.

1925: Realizing that the US consumers have easy access to transportation and that they can travel long distances, Sears opens its first brick and mortar stores in Chicago, IL.

1931: Sears’ retail store operations account for more than 53.4% of the total \$180 million in revenues.

1945: Sears sales exceed \$1 billion.

1985: Sears partners with Discover Credit card to offer the same to its members as a means to buy its products.

1999: Realizing the advent of online retailing, Sears.com is started and this online business platform integrates internet business operations with specialty catalogues and telemarketing.

2004: Sears merges with Kmart and as seen from the following discussion, this event marks the beginning of the end of Sears. (Young,V et.al. 2018)

In 2005, Eddie Lampert the CEO of ESL investments company that bailed out Kmart out of its bankruptcy in 2003, took over the Sears corporate management leadership as the chairman of the board of directors and subsequently he became the CEO of Sears after he was instrumental in merging Kmart with Sears in 2004 (Young, et.al., 2018).

The following quote from Arthur Martinez, Chairman CEO and President of Sears between 1995 and 2000 sum up the malaise of Sears corporate management (led by Eddie Lampert), “Eddie Lampert had a complete disregard for investment needs – store environments, marketing, inventory, people and significantly in the online commerce platform...”(Source: Young et.al,2018, page 6). Martinez labels Eddie Lampert as the architect of Sears’ downfall. Lampert is an outside investor, creditor and largest shareholder of Sears at the time of its (Sears’) bankruptcy in 2018. (Young, et.al, 2018). Lampert stepped down from his CEO position after Sears filed bankruptcy in 2018 but continued to serve as its Chairman. (Young, et.al, 2018).

In a nutshell, the following are the wrong corporate managerial actions of Sears:

Deficiency in the investments in marketing, advertising, social media and upgrades at the store level and no attempt made by Sears corporate management to address these issues.

High turnover of highly skilled and experienced store level staff because of lack of adequate compensation

The sale of reputed brands like Kenmore could not offset the chronic operating losses as demonstrated by the continuous diminishing values of X1 ratio in Section 6 Part A, a) table 1 and fig.1 of this discussion.

Sears eliminated their in-store Sears loyalty shopper program thus losing the trust of their loyal shopper market segment thereby adversely affecting Sales.

The fact that Sears Holdings Company had a \$11.94 billion liabilities which was almost twice as its assets of \$6.94 billion just before filing bankruptcy (Young et.al., 2018) supports this author’s findings in Part A, Table 4 number 4 above of this discussion that Sears became financially insolvent.

LIMITATIONS OF THIS STUDY AND SCOPE FOR FUTURE RESEARCH

Norita (2016) tested Zmiejewski model of predicting financial distress on the accounting-based data of global telecommunications manufacturers like Nokia, Apple, Samsung etc. besides of course Altman’s Z score model. Norita (2016) found that Altman’s method predicted financial distress for Nokia between 2011 – 2013, however, Zmiejewski’s method predicted Nokia’s financial distress only for 2012. Hence a critical study on the application of financial distress models other than Altman’s Z score model may also be undertaken to compare the applications of those models on Sears and similar bankrupt organizations and discuss their findings. Altman’s Z score model may also be applied to Sears (a bankrupt organization) and Home Depot (a non-bankrupt organization for instance) and the findings discussed.

Drawing inferences about the functioning of an organization from the case study analysis perspective is usually limited to the organization about which the study is being conducted.

CONCLUSIONS

Altman's Z score model is one of the most important tools to assess financial health in organizations universally. The Sears case study serves as a classic example wherein the application of Altman's Z score model to the accounting-based data predicts financial distress with remarkable precision. This case study also highlights the lack of vision and foresight of Sears' corporate management while deciding to merge Sears with Kmart. Hence it is highly recommended that Sears corporate management apply Altman's Z score model data to their accounting-based data and critically review the scenarios before venturing into any further future mergers or acquisitions if they (Sears) can get back on their "financial feet" after bankruptcy.

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