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The University of Southern Mississippi

Bankruptcy Prediction, Gold, and the Great Auto Bailout

by

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A Thesis
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The University of Southern Mississippi
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of the Requirements for the Degree of
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Abstract

With recent economic instability, bankruptcy prediction is a tool that is useful to companies and researchers who are interested in the financial stability of an industry or company. This thesis studies bankruptcy prediction during the most recent recession that occurred in the United States for General Motors with Ford as a comparison company and compares the possibility of bankruptcy to the price of gold per ounce for the corresponding year. The multiple discriminant analysis model was used to complete this research. This model uses financial ratios to predict bankruptcy. This research yielded an inverse relationship between the price of gold per ounce and the z-scores for both Ford and General Motors. This inverse relationship shows a correlation between bankruptcy prediction and the price of gold.

Key Terms

Bankruptcy Prediction Model

Multiple Discriminant Analysis

Traditional Ratio Analysis

Automobile Bailout

Table of Contents

1. Motivation	1
2. Literature Review	3
3. Methodology	11
4. Results	16
5. Conclusion	20
Works Cited	21

1. Motivation

Bankruptcy modeling is based on the concept that a formula can be used to determine whether a company will become bankrupt in the next year based on financial ratios extracted from the current financial statements. This formula is complicated and involves several different factors such as revenues and expenses, which are the components of net income. Some factors that indirectly affect bankruptcy cannot be modeled. Therefore, this formula is not foolproof. Knowing that this formula is not foolproof, one can look at other occurrences external to the company to which the bankruptcy formula is being applied to observe what could be used in addition to the formula to improve the accuracy. To observe the change of the Z-score, which is the measure of bankruptcy risk derived from the formula, to a standard or benchmark, would allow the observer determine if such a standard could benefit the accuracy of bankruptcy prediction. By using the results of Altman's Z-score model, can the likelihood of bankruptcy for General Motors in the ten years preceding the auto bailout be related to the price of gold in America?

The external factors that affect whether a corporation will become bankrupt are not always the same as the factors that will affect an individual becoming bankrupt. Examples of external factors that may affect bankruptcy prediction of a company are the stock market, the stockholders, and the governmental regulations in that field. Examples of external factors that affect individuals may be the unemployment rate, the jobs that they hold, and how long they have held those jobs. Any of these factors could change financial status from stable to bankrupt rather quickly. Current studies examine differences in the

accuracy of bankruptcy prediction when considering manufacturing businesses versus non-manufacturing businesses. Many scholars do not know the reasons for this inaccuracy; however, the more research that is done on this topic, the more accurately bankruptcy can be predicted. However, even with more research, the bankruptcy prediction model will never be one hundred percent accurate, as bankruptcy is an idiosyncratic event that does not occur at any set intervals.

Many officials throughout the business world use bankruptcy prediction. Banks use bankruptcy prediction to know whether to extend a company a loan, while industries use bankruptcy prediction to determine how financially healthy the companies in the industry are during that year. Bankruptcy prediction may also be used in archival research. In reviewing the automobile bailout that occurred in 2008, other companies in the automotive industry can observe the warning signs of bankruptcy in this industry. In 2008, a recession hit the country. This recession was brought on by economic instability, which resulted in automotive companies such as General Motors being forced to file for bankruptcy. This thesis observed the financial statements of General Motors for ten years before its bailout and during the time of its bailout. The financial statements of Ford Motor Company were evaluated for comparison to General Motors during this time. The information from these statements was used to derive the Z-score for both companies for each year. Even though General Motors did not completely fail, without government support this company would have been forced to declare bankruptcy.

2. Literature Review

Bankruptcy Prediction Types

Bankruptcy prediction models can be divided into several categories. These categories are statistical, artificially intelligent expert systems (AIES), and theoretical models. The statistical models focus on the symptoms of failure based on the company's accounts in a multivariate (several symptoms considered together) or univariate (each symptom considered separately) nature following the classic model procedures. The AIES model focuses on symptoms of failure using company accounts in a multivariate nature using technological advancements as the basis. The theoretical models focus on qualitative reasons for failure using information that could settle a theoretical argument rather than the company's financial data (Aziz, 19, 2006). Statistical and AEIS models are more static, while a theoretical model is more dynamic. For the purpose of this research, the statistical category was further evaluated because of the need for bankruptcy prediction based on a static moment in time to conduct the thesis research. Beaver (1966) is considered a pioneer who first used a dichotomous (bankrupt or non-bankrupt) classification test in a univariate framework, and he also laid the foundations of prediction models (Kočišová, 1148, 2013). Beaver used one simple ratio consisting of cash flow divided by total debt. This primitive model of bankruptcy prediction led to the advancement of the different bankruptcy prediction models that followed Beaver's study (Kočišová, 1148, 2013). Beaver shows that bankruptcy is commonly based on cash management or the failure of cash management. "The failure of cash management can be defined as an imbalance between cash inflows and outflows" (Laitinen, 893, 1998). This idea of cash management can be found throughout the types of bankruptcy prediction further discussed below.

There are several methods to calculate bankruptcy prediction; two of these methods are Traditional Ratio Analysis (TRA) and Multiple Discriminant Analysis (MDA). Traditional Ratio Analysis can be dated back to the early 1900s (Altman, 590, 1968). “Formal aggregate studies concerned with portents of business failure were evident in the 1930s” (Altman, 590, 1968). TRA is a bankruptcy prediction model that measures ratios that reflect profitability, liquidity, and solvency to detect bankruptcy. However, the significance of these ratios was never discovered, making TRA the inferior form of bankruptcy prediction when compared to MDA (Altman, 590, 1968).

Since the 1930s, bankruptcy prediction has been studied in several different ways. Some of these studies compared one year of a bankrupt company to one year of a non-bankrupt company, while others compared multiple years of a bankrupt company to multiple years of a non-bankrupt company. Throughout this time, researchers used these statistics to see what would make bankruptcy prediction more accurate. The text states, “The question becomes, which ratios are most important in detecting bankruptcy potential, what weights should be attached to those selected ratios, and how should the weights be objectively established?” (Altman, 591 1968). These questions are all questions of how to improve bankruptcy prediction. The results of past research of these questions showed that MDA is the most appropriate statistical technique. The interested reader should refer to Zavgren (1983) and Jones (1987) for detailed review of the various other bankruptcy prediction models that have been developed in the accounting and finance literatures.

A more recent paper notes that cash flow from operations (CFFO) is not a “significant predictor of corporate bankruptcy” (Gombola, Haskins, Ketz, Williams, 1987, p. 1). This research mentions what previous researchers thought about CFFO. There are two

issues that these researchers discovered from past research. “They do not adjust for all accruals in deriving an estimate of cash flow from operations (CFFO), and they do not isolate discrete time periods in which a cash flow effect may or may not be present (Gombola, Haskins, Ketz, Williams, 1987, p. 1).” However, when these researchers considered this past research, with both of these issues in mind, they realized that CFFO was not an accurate predictor of bankruptcy.

Bankruptcy Prediction Formula: Multiple Discriminant Analysis

The Multiple Discriminant Analysis mentioned in the previous section is a formula also known as the Altman Z-score model. The MDA model is a “linear combination (a bankruptcy score) of certain discriminatory variables. The bankruptcy score is used to classify firms into bankrupt and non-bankrupt groups according to their individual characteristics” (Aziz, 20, 2006). This formula was used throughout this research. The Altman Z-score model consists of ratios and coefficients that lead the user to the corporation’s Z-score. The Z- score is interpreted based a range scale (Easton et al., 2010 p. 3-27). “The Z - Score measures how closely a firm resembles other firms that have filed for bankruptcy” (June, 31, 2012). The following chart describes the relationship between the Z-score and what the Z-score means for the company.

Z-Scores and Their Interpretation

From Easton, McAnally, Fairfield, Zhang, and Halsey (2010)

Z-Score	Interpretation
Z score > 3.00	Company is healthy, and there is low bankruptcy potential in the short term.
2.99 > Z-score > 1.80	Gray area where the company is exposed to some risk of bankruptcy. Caution is advised.
1.80 > Z-score	Company is in financial distress, and there is high bankruptcy potential in short term.

Table 1

The interpretations of the Z-scores found when calculating bankruptcy prediction come from Altman's original research. "Altman developed his well-known Z-score model using a matched sample of 33 bankrupt and 33 non-bankrupt manufacturing firms from 1946 – 1965" (Grice & Ingram, 2001, p. 31). By observing these different companies, he used the results to form the assumption of which Z-scores indicted bankruptcy versus non-bankruptcy. Altman's Z-score formula is as follows:

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + .999X5$$

Where,

X1 = Working Capital / Total Assets

X2 = Retained Earnings / Total Assets

X3 = Earnings Before Interest and Taxes / Total Assets

X4 = Market Value of Equity / Total Liabilities

X5 = Sales/ Total Assets

(June, 2012, p. 32)

Two types of known errors exist when calculating bankruptcy prediction, Type I and Type II. The Type I error is where a company is predicted to be a healthy company with a Z-score above 3.00, but instead the company becomes bankrupt. The Type II error is the opposite of the Type I. A Type II error happens when a company's Z-score predicts bankruptcy, but the company continues on with very few problems (Easton et al., 2010, p. 4-28). A Type I error is be more costly to a company (Wikil, Xiaoyan, & Jinlan, 2012, p. 522) than a Type II error because a Type I error creates a lost sense of the going concern principle of accounting. Financial statements are prepared as if a company will continue and not file bankruptcy (June, 2012, p. 32). The going concern assumption is the idea that

the company will have an indefinite life. Despite the number of failed companies, there are still many companies that continue. It is expected that companies continue long enough to fulfill their objectives and commitments (Kieso, Weygandt, and Warfield, 2012, p. 57).

When the company does not have the support of the going concern, then the entire structure of the business changes. Therefore, for a company to believe it is bankrupt, but not be bankrupt motivates it to change the way of conducting business toward liquidation.

No known solution exists to these errors; however, according to recent research it has been discovered that, “there is evidence that the Z- Score coefficients should be re-estimated for the prediction of corporate distress involving different time periods or different industries” (Grice & Ingram, 2001, p. 31).

Accounting, Economics, and Industry

When analyzing financial statements, many companies take into consideration the changes in the economy and industry. A statement from Marshall Field and Company’s 1975 Annual Report states, “Reflecting the change in the national *economy*, operating results for your company improved during 1975 from the recession-weakened first half to a strong recovery in the second half” (Foster, 1978, p. 136). Observing this example of a statement taken from a past financial report shows the reader of the report the reasons why the numbers are the way that are. This explanatory statement is very useful when conducting financial analysis.

Researchers have taken this idea and expanded the theory by observing failed companies during a specific time period and comparing the bankruptcy results to inflation, interest rates, and the business cycle, which is commonly known as periods of recession and expansion. Past research states that, “A reason for suspecting nonstationarity is that

the characteristics of external economic environments which might be expected to affect the financial condition of firms change over time” (Mensah, 1984, p. 383). When comparing bankruptcy prediction to the economic standing of a country, the results show the observer where the company is compared to the country as a whole. The bankruptcy may arise from the inability to compete with other companies because of a lack of technological support on which the rest of the economy is thriving:

A firm is characterized as technically inefficient if it is not able to reach maximum output given its available resources and technology. By two reasons, analyzing the relationship between BP (bankruptcy prediction) and economic efficiency is particularly important for firms. First, economic-based efficiency measures are reasonable indicators of the long-term health and prospects of firms (Baek and Paga'n 2002). Second, given the finding in Becchetti and Sierra (2003), that ex-post failed firms are ex-ante significantly more technically inefficient, there is a linkage between BP and technical inefficiency (Hwang, Chung, & Chu, 2011, p. 264).

The quote above explains the correlations among the economy, technology, and bankruptcy prediction. Economic efficiency, which is considered important to firms as stated above, is the way a firm knows how well it is doing compared to the economy as a whole. It is possible for a company to be meeting its internal goals, while not obtaining the same level of achievement as the rest of the economy. By considering a company's place in the economy and assessing its economic efficiency as it compares to the company's long-term health, the company can then determine what its long-term prognosis is going to be. If this concept is not included in the

company's thoughts when observing bankruptcy, then it has potentially omitted part of what could cause the company to become bankrupt.

Financial Crisis

Throughout the history of America, there have been multiple financial downfalls, just as there are in every country. During the nineteenth century, financial unrest was very common. A total of eight financial crises occurred. However, during this century, there was a calm period following the Second World War (Shachmurove, 2011, p. 28). However, before the Second World War, the Great Depression hit the country. The Great Depression was known as the most severe recession until the recession of 2008 (June, 2012, p. 31). The financial crisis that occurred in 2008 and caused this severe recession can be explained by a theory known as the boom and bust. The idea behind the boom and bust is that the economy outgrows itself. The economy cannot grow at a high steady pace for a long period of time without busting. The Great Depression was caused by a boom and bust. "Critics have long maintained that financial crises, booms and busts are an inherent part of the capitalist system" (Shachmurove, 2011 p. 28). The 1920s boom can be directly related to the boom that occurred before the 2008 financial crisis. However, the bust that caused the Great Depression is described in this way, "The U.S. economy boomed until June 1929, especially its interest- sensitive heavy industries (Phillips, McManus, and Nelson 1937), and asset prices rose until October 1929" (White, 2011, p. 428). These details of the 1920's boom and bust mirror the bust in the early 2000s. The automobile market flourished in the period of time leading up to the bust. A primary example of a company that suffered from the economic bust is General Motors.

General Motors is an automobile company that was founded in 1908. General Motors, also known as GM, began with manufacturing only one type of automobile, but this situation did not last very long. Soon, GM would come to acquire around twenty well-known car companies. These companies include Buick, Cadillac, and Oldsmobile. Throughout the 1900s, GM expanded and improved its vehicles. During the 21st Century, GM has experienced a rollercoaster of operation. During this time, the firm created many new innovations for its vehicles, while also experiencing a recession and a credit crisis. It was this recession that led to the governmental bailout of GM in 2008. Without operating cash, the company could not produce any vehicles (“Company,” 2013).

The government put approximately 49.5 billion dollars into the bailout of GM and lost around 10.5 billion dollars on this investment. The formulation of a governmental bailout for GM began during the Bush administration and continued into President Obama’s term (Higgins, 2013). Both administrations tried to deter the automotive company from “collapse after years of mismanagement brought to a head by a crippling credit crisis and economic recession” (Muller, 2013). There has been an ongoing debate about whether the government bailout of GM and other automakers, such as Chrysler, was the best approach to take. However, the government bailout did save the jobs of many employees in the automotive industry. By saving these jobs, the government saved the United States from another Great Depression (Muller, 2013). It is estimated that the bailout saved approximately 2.63 million jobs in the automotive industry for 2009. The bailout also saved the companies to which GM owed money from losing \$105 billion in payments and loss of insurance for the years of 2009 and 2010 (Higgins, 2013).

The Price of Gold and the Gold Standard

Since its discovery, gold has been known as one of the most precious metals that can be found. Throughout history, the prosperity of the U.S. economy has been based on the price of gold. The U.S. was founded with funds based on gold; however, in 1933 the U.S. was taken off of the gold standard around the era of the First World War. During the First World War era, there was a change in the price of gold and then a change in the economy upon which this gold was based (Toraman, Başarır, & Bayramoğlu, 2011, p. 37).

The varying price of gold had been compared to other natural resources in different research studies. In 2003 Vural studied the sensitivity of gold prices using other variables such as industrial production index, oil prices, interest rates, and silver and copper prices for a thirteen-year period between 1990 and 2003. These comparisons showed a positive relationship between the variables and the price of gold (Toraman, Başarır, & Bayramoğlu, 2011, p. 39). The comparisons that were made throughout this research will be discussed in greater detail in the methodology section of this paper.

3. Methodology

By using gold as a standard, one can observe how the price of gold affects the tendency of bankruptcy in an industry. When considering recent U.S. history, the financial crisis that occurred during 2008, discussed in the literature review, is the most recent economic tragedy that this country has experienced. By considering the automobile industry at this time, specifically the company General Motors, bankruptcy prediction can be observed during the economic recession. However, when considering that the Z-score from Altman's formula during this time, there is nothing against which to compare this number. By considering the Z-score for the period of time leading up to the financial crisis

and comparing it to the price of gold, a standard or benchmark is created. Historically, gold has been considered a standard as discussed above in the literature review. Even though the U.S. does not use gold as the standard, for research purposes gold may be used as a standard.

To predict bankruptcy, one must first have access to the financial documents where the information that is inputted into the formula is found. This information can be achieved through access to online databases that store historical documents of different companies' financial statements such as the Bloomberg database or the WRDS database. By using data from Bloomberg, the Z-score for General Motors can be calculated and used to find a trend in their probability of bankruptcy. While considering the trend of the Z-score, one should also look at the trend of the sales numbers and the trend of expenses. By comparing graphs that portray this information, a link may exist among these factors.

By comparing the cost of the expenses used by GM to produce cars, the sales brought in by selling these cars, the net income, and the Z-score with the price of gold, the comparison holds more substance because gold is a valued standard. When observing a standard that will always have the same bartering value but a changing monetary value, the observer can see the effect of inflation on the economy. This inflation that can be interpreted from the gold standard can affect the probability of a company becoming bankrupt. This economic component may be a factor that could be observed by companies when they are planning to evaluate their company based on the bankruptcy prediction model.

This research is based on the financial statements of two automotive companies, General Motors and Ford, and the price of gold. To complete this research, working capital,

total assets, retained earnings, earnings before interest and taxes, total liabilities, market value of equity, and sales are needed. The majority of this information can be found in the financial statements for the two companies observed in this research. The Wharton Research Data Services (WRDS), sponsored by the University of Pennsylvania, and the Edgar databases, which are sponsored by the Securities and Exchange Commission (SEC), are used to extract the required information from the financial statements. The information found in the financial statements for General Motors and Ford from the years 1993 to 2008 are then inputted into the Z-score formula. To perform this mathematical procedure for General Motors for the year 1993, the following information would be used.

General Motors Financial Statement Information for 1993

Total Assets	\$188,200.90
Working Capital	\$2,823.00
Retained Earnings	\$-7,644.20
Earnings Before Interest and Taxes	\$7,617.80
Market Value of Equity	\$39,515.76
Sales	\$135,696.80
Total Liabilities	\$182,153.40

Table 2

Total Assets, Total Liabilities, Retained Earnings, Earnings Before Interest and Taxes, Market Value of Equity, and Sales were found using WRDS. When using WRDS, the database searches for a company selected using a TIC, which for General Motors is GM. WRDS also lets the researcher choose what he or she is looking for on the financial statements stored on the database. For this research, this database yielded all of the

numbers above. However, the Market Value of Equity was further derived from the numbers provided by the database. The database yielded the numbers for the closing stock price at the end of the fiscal year and the number of outstanding common shares for each company. For the year 1993, for General Motors, the closing stock price was \$54.88, and the number of common shares outstanding was 720. These two numbers multiplied amount to the market value of equity number of \$39,515.76. The number for working capital was found using the formula: $\text{working capital} = \text{current assets} - \text{current liabilities}$. The numbers for current assets and current liabilities were found on the Edgar database. This database gives the researcher the opportunity to analyze the financial statements that a company submits to the SEC. To find working capital for the year 1993, one would take the current assets number of \$38,032 and the current liabilities number of \$35,209, and subtract. The difference is the working capital number of \$2,823. At this time, the numbers found in the table are analyzed using the bankruptcy prediction formula. This can be observed with the 1993 General Motors example. To find X1, the number for working capital of \$2,823, derived above, is divided by the total assets number of \$188,200.9. Once divided, these numbers are multiplied by a constant. This constant of 1.2 yields an X1 of 0.017999914. This concept is used throughout the bankruptcy prediction formula. Retained earnings, earnings before interest and taxes, and sales are divided by total assets and then multiplied by a constant. Market value of equity is divided by total liabilities and then multiplied by a constant.

Once the calculations were completed, the answer to the formula yielded the Z-score used in bankruptcy prediction. This information can be found in Table 3 and Table 4. The Z-scores, found in Table 3 and Table 4, were compared to the price of gold per ounce during

the years between 1993 and 2008. This information is compared in Table 5. The information in Table 4 is also shown on Graph 1 and Graph 2. Graph 1 contains the changes in the Z-score for Ford Motor Company and General Motor Company. Graph 2 shows the changes in the price of gold per ounce. General Motors is the test company that is being examined to determine whether there is a link between bankruptcy prediction Z-scores and the price of gold per ounce. Ford Motor Company is the comparison company in this research. The information in the tables and the line graphs are used to demonstrate the rise and fall of the price of gold per ounce and the Z-scores to analyze whether or not the change in the Z-score is correlated with the change in the price of gold per ounce. The correlation between the Z-score and the price of gold per ounce is further evaluated using the Pearson's correlation coefficient. A negative coefficient yields an inverse relationship between the data being observed. A positive coefficient yields a positive relationship between the data. This statistical correlation is found using excel. The correlation function found in excel calculated the coefficient used the Z-scores for General Motors for each year and the price of gold for each year to discover how the trend of the numbers related to each other over time. This study could be expanded by observing the financial statements of General Motors and Ford for the years ensuing the automotive bailout to the last financial statements filed with the SEC. By evaluating the post-bailout financial statements using the bankruptcy prediction model employed in this research, the results can be compared to the price of gold per ounce over the same years. This research could be used to evaluate whether the government bailing out General Motors benefited the company or if General Motors is still predicted as being on the verge of bankruptcy. This research also could be

expanded based on the recent findings of unethical behavior in the company's management when addressing with the safety of vehicles the company manufactures.

4. Results

The results of the Z-scores for Ford and General Motors are found in this section. This section also shows the Pearson's correlation coefficient used to determine the relationship between the Z-scores and the price of gold per ounce for a given year. The comparison of the numbers found in these results are used to conclude the type of relationship General Motors's Z-score has with the price of gold per ounce leading up to the automotive crisis.

Ford Z-scores for 1993-2008

Year	Z-score
1993	0.898631196
1994	1.019832161
1995	0.971633238
1996	0.961678963
1997	1.067962392
1998	1.177286474
1999	1.093276084
2000	0.972017181
2001	0.663872104
2002	0.691872003
2003	0.689831723

2004	0.781860776
2005	0.799971252
2006	0.473047725
2007	0.750513105
2008	0.369998965

Table 3

General Motors Z-score for 1993 to 2008

Year	Z-score
1993	0.945171757
1994	1.052903228
1995	1.119894404
1996	0.999613174
1997	1.018668641
1998	0.833205648
1999	0.907912247
2000	0.789655908
2001	0.594306222
2002	0.516927206
2003	0.517436677
2004	0.494458988
2005	0.342994569
2006	1.219696042

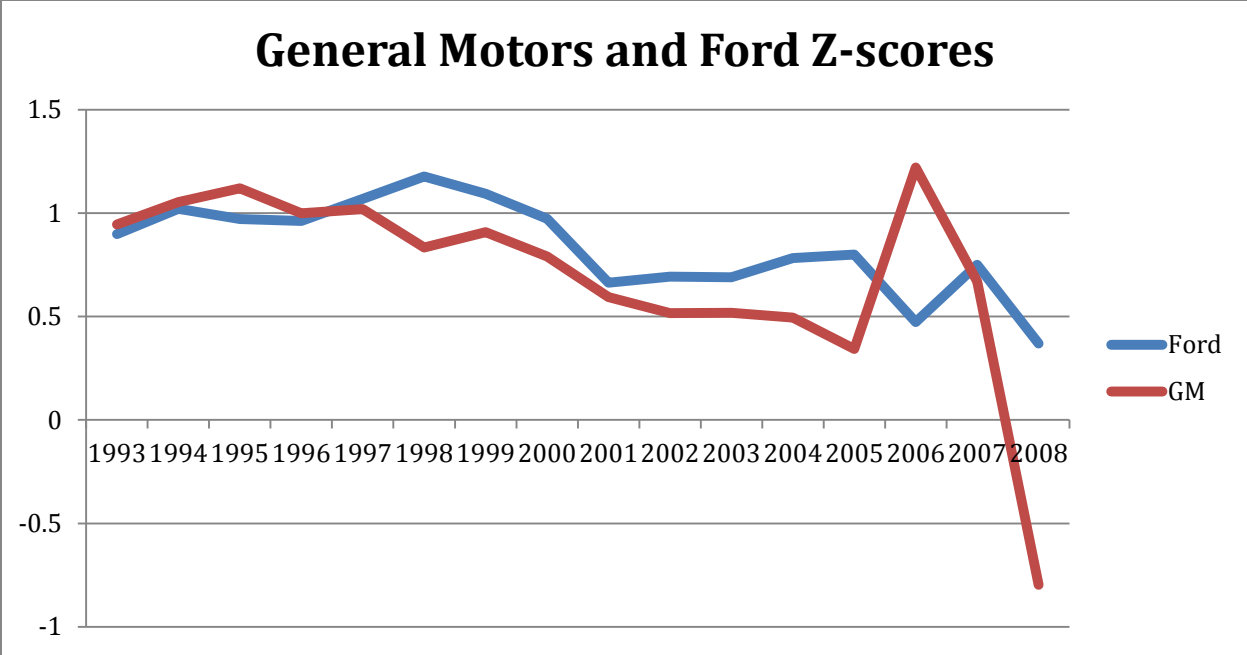
2007	0.669830353
2008	-0.797583152

Table 4

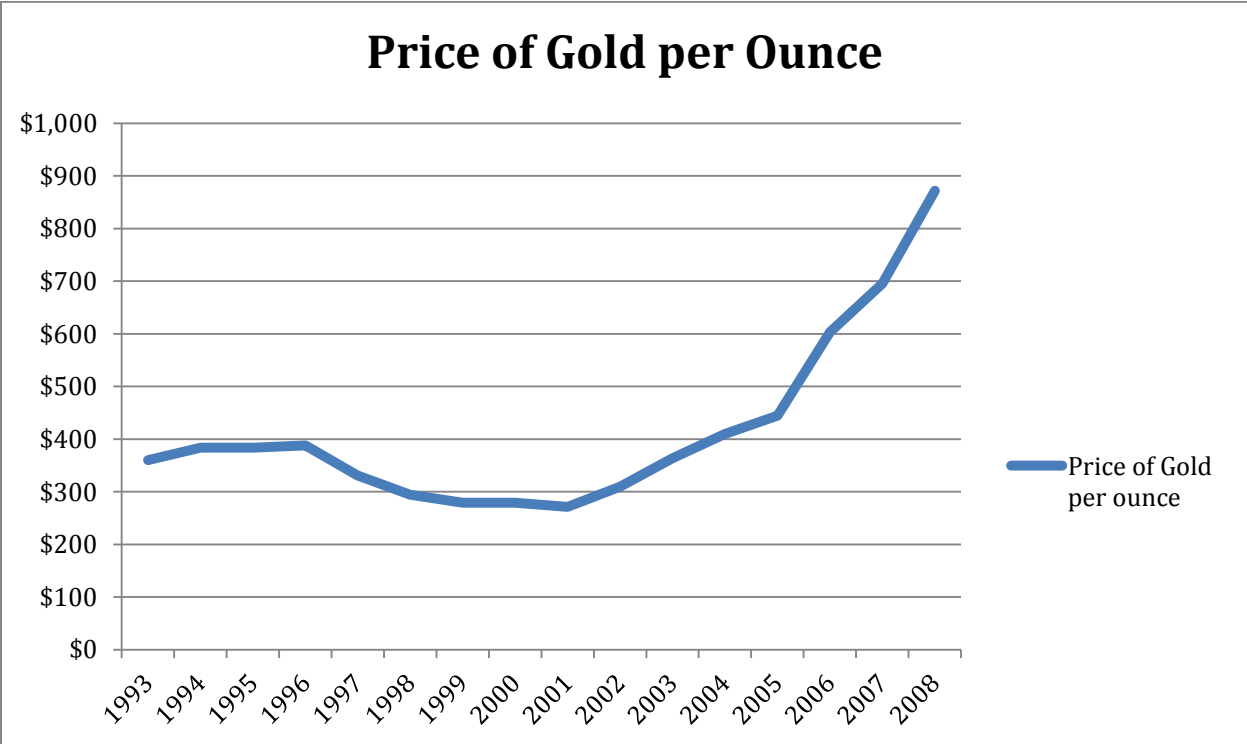
The Price of Gold and Z-scores for GM and Ford for 1993-2008

Year	Z-score GM	Z-score Ford	Price of Gold
1993	0.945171757	0.898631196	\$359.77
1994	1.052903228	1.019832161	\$384.00
1995	1.119894404	0.971633238	\$383.79
1996	0.999613174	0.961678963	\$387.81
1997	1.018668641	1.067962392	\$331.02
1998	0.833205648	1.177286474	\$294.24
1999	0.907912247	1.093276084	\$278.98
2000	0.789655908	0.972017181	\$279.11
2001	0.594306222	0.663872104	\$271.04
2002	0.516927206	0.691872003	\$309.73
2003	0.517436677	0.689831723	\$363.38
2004	0.494458988	0.781860776	\$409.72
2005	0.342994569	0.799971252	\$444.74
2006	1.219696042	0.473047725	\$603.46
2007	0.669830353	0.750513105	\$695.39
2008	-0.797583152	0.369998965	\$871.96

Table 5



Graph 1



Graph 2

The Pearson's correlation coefficient for General Motors Z-score and the price of gold per ounce over the observed period of time is -0.5767. The coefficient for the Ford Motor Company Z-score and the price of gold per ounce is -0.6879.

5. Conclusion

The Z-scores for Ford and General Motors trend gradually downward over the observed time period with the exception of 2006 for GM (Graph 1). This shows that General Motors and Ford were both affected by the automobile crisis that occurred in 2008. The Z-score for General Motors in 2008, the year the company declared bankruptcy, is negative and shows the company had no other option than to declare bankruptcy when the automotive bubble burst. Until that time, the Z-scores suggested that the automotive industry was not doing as well as expected. The Z-scores for General Motors and Ford Motor generally show a negative trend with one outlier for General Motors in 2006. During 2006 the automotive bubble had not yet burst, and General Motors had not been hit by bulk of the financial disaster. The price of gold per ounce has an inverse relationship with the Z-score for General Motors. This is shown by the correlation coefficient, which is -0.5767. This inverse relationship shows that as the price of gold per ounce rose from 1993 to 2008, the Z-score for General Motors decreased. An inverse relationship can be determined for Ford's Z-scores and the price of gold per ounce. The correlation for Ford and the price of gold per ounce is -0.6879. This inverse relationship is slightly larger than the inverse relationship between General Motors and the price of gold per ounce. This research does not confirm that the rise of the price of gold per ounce is a factor that directly affected the automotive crisis and General Motors bankruptcy. However, the inverse relationship does indicate a correlation between the numbers.

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