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Private Equity – the Rescue or Destruction of Financially Distressed Investments

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Private Equity – the Rescue or Destruction of Financially Distressed Investments

submitted to
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ABSTRACT

This paper investigates the effect PE-backing has on portfolio companies in financial distress. Inspired by the more recent questioning of the morality of the Private Equity industry, this paper analyzes the change in financial health after a PE buyout transaction and directly compares that of financially distressed firms during the same time period that were not PE-backed. This study utilizes a dataset made up of financially distressed, public US firms as of 2009, and assesses the change in Z-score ~10 years after PE investment to determine whether PE-backing has an effect on the change in financial health. The negative coefficient in the regression results suggest that PE-backing has a negative effect on difference in Z-score between 2009 and the last twelve months financials. However, these results are insignificant at the 90% and 95% confidence level and I am unable to conclude that PE backing hurts companies in financial distress in the general population. Limitations in the availability of data that resulted in a much larger sample of non-backed financially distressed firms than those that are PE-backed may have contributed to the insignificance of the results for this sample.

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1. Introduction

The Private Equity (PE) boom and the Leveraged Buyout transaction made their first noticeable presence in the late 1980's, however PE booms have made their mark on many more periods since then. In 1991, new transactions totaled $7.5 billion and by the end of 2006, the market had reached more than $500 billion (Cain 2015). PE-backing and the LBO strategy aim to transform portfolio companies using the resources and financing the PE managers bring. More specifically, one popular LBO strategy primarily focuses on investing in under-performing companies they strongly believe can be restructured and transformed into money-making vehicles. In parallel, there are many firms suffering from financial distress that have sought out PE investors to help save their company from bankruptcy. The growing market for the Private Equity industry and proven profitable track record for both PE managers and portfolio companies has heavily influenced millions of new PE shops to arise and managers to take on additional risks, proven by the growth in total assets under PE management. However, these great successes that have attracted many to the industry have been heavily publicized while the losses, many of which have consequently led to the destruction of less notable PE-backed businesses, have been swept under the rug.

Over the years, the intentions and reputation of Private Equity firms have been increasingly called into question. Recent studies have been examining whether these firms actually intend on helping their portfolio companies or if PE managers, like many, are simply interested in generating profit no matter the cost. The sector is set to manage over $5.8 trillion worth of assets by 2025 according to studies by Deloitte, and one argument claims that in order for the market to reach this size, many portfolio companies

will be destroyed in the process. PE firms have been accused of (1) asset stripping for the purpose of reselling assets within short periods of time (asset flipping); (2) initiating corporate restricting within firms that negatively impacts portfolio companies' culture and employees; and (3) using leverage and off-shore holdings companies to reduce tax charges or contribute to positive investment performance (Acharya, 2007).

The most prominent example where a Private Equity investment was blamed for leading to the destruction of a struggling portfolio company was the case of KKR, Bain, and Vornado Realty Trust acquiring Toys R Us in July 2005. Toys R Us had been struggling to keep up with consumer and retail trends in the industry, and KKR, Bain and the Vornado Realty Trust invested in Toys R Us because they believed the firm's profits could be turned around under their financing and management. However, the reality was after acquiring the firm for $6.6 billion, their PE backers drowned Toys R Us in over $5 billion worth of debt (Harvard Business Review, 2021). In addition, investors attempted to cash out through an IPO strategy however ended up being forced to cancel the $800 million IPO due to "market conditions." Subsequently, after $1.3 billion invested by the three PE firms, the investors refused to put in anymore. Suffering from distressed financial results in all compacities, Toys R Us finally liquidated the firm and declared bankruptcy seven years later in September 2017 (Morgenson and Rizzo, 2018).

Many ponder whether Toys R Us would have been able to save itself without the overarching investors and quadrupled debt that this transaction brought with it. Furthermore, without the bad publicity of the deal's failure, it's possible that future investors and the overall market may have been more interested in a Toys R Us IPO. However, although this buyout intended on sprucing up the company strategy, cutting

costs, and overhauling the business in 3-5 years, the investors levered the company up with debt whose profits couldn't upkeep holding, ultimately leading to its demise.

This paper will examine the role of a PE firm that sought out or agreed to invest in a distressed company and the impact it had on improving the portfolio company's financial health. The main question I aim to answer is whether or not firms in financial distress are better off restructuring from within, or depending on outside investors to take control of their business through an LBO transaction. In my analysis I included additional explanatory factors such as the size and debt levels of the firm being bought out, which may contribute to the attractiveness from the perspective of the PE investor or the magnitude of the firm's change in financial health. Finally, from my sample results I attempt to determine whether companies in financial distress have a better chance of improving their overall financial health with or without investment by a Private Equity firm and furthermore, whether PE investment hurts or helps firms in financial distress.

Section 2 takes a deeper dive comparing my research question to the already established literature surrounding PE investment, probability of default and bankruptcy. In Section 3 I outline how the dataset was compiled to create a sample of distressed firms, including both firms PE-backed and non PE-backed. After, the empirical tests and results are described in detail and although insignificant, a negative regression coefficient on PE backing suggests that there may be a negative relationship between PE-backing and change in Z-score. In Sections 4 and 5 this paper concludes by discussing the meanings behind these results and further research that can be conducted which could reach a more significant conclusion.

2. Literature Review

Similar studies have been conducted investigating Private Equity firms' ability to help their target companies escape financial distress. The most similar study was conducted by Hotchkiss, Smith, and Stromberg (2021) examining the role of PE firms in the resolution of financial distress, more specifically analyzing the relationship between PE backing, financial distress, and bankruptcy. This study took firms with rates below Moody's investment grade (Ba1 or below), at some point between 1997 and 2011, and compared their probability of default to a similar sample of firms in financial distress that were later bought out by PE firms through LBO transactions. Although their results suggested that there was a higher probability of default among PE-backed companies, these results were not statistically significant and other factors may have contributed to their findings.

Furthermore, Tykova and Borell (2012) conducted a study comparing PE-backed and non PE-backed bankruptcy rates as well as levels of financial stress for both private and public firms in Europe. Although they found PE-backed companies suffered from higher distress risk after buyout than non-backed companies when looking at Altman's Z-score calculation, PE-backed companies overall did not result in higher bankruptcy rates than comparable non-backed companies. In fact, in some cases backing from experienced PE firms resulted in the their portfolio company's probability of bankruptcy to be lower. This contradicting point supports other theories arguing that PE firms may actually help portfolio companies in the long run.

Further supporting the contradicting side claiming PE firms positively impact portfolio companies, Cain (2015) researches the power of reputational concerns and their

ability to incentivize PE firms to keep their portfolio companies in good standing. This research focuses on possible consequences PE firms may face if portfolio companies are left in worse positions than they were found. Cain explains it's likely that if a private equity firm were to default on a contract today, the firm runs the risk of losing the trust of future transaction personnel or being forced into less appealing contracts in the future. Cain then empirically finds that private equity firms are willing to bear losses on pre-agreed transactions for up to 9% of their fund sizes. These results indicate that in many cases, the firm's reputation is worth more than losing money on a transaction. These reputational consequence incentives can also be applied when explaining why PE firms should be motivated to help bring portfolio companies out of financial distress. Because PE firms are repeat players who invest in many companies over a long time horizon, investing in a financially distressed company that later declares bankruptcy can lead to more impactful consequences than a sole monetary penalty. Poor reputations or results can influence future target companies and possibly lead to less deal flow in the future, therefore incentivizing managers to care about saving portfolio companies from financial distress in addition to creating the best possible monetary outcome.

In addition, other studies have provided evidence showing that experienced PE investors who specialize in managing financially distressed companies improve portfolio companies in the long run significantly better than inexperienced counterparts. Huang, Ritter, and Zhang (2016) use bond yield spreads and firms' IPO data that's results suggest PE firms help their portfolio companies reduce their overall costs of debt. This evidence also supports that PE firms do not hurt their portfolio companies, but actually improve them. Andrade and Kaplan (1998) make a similar argument after sampling 31

LBO transactions in the 1980's, studying the possible benefits of PE intervention 10 years after the transaction took place. They also find that value gains outweighed the costs of financial distress. However, neither of these samples included a control group of comparable companies in similar positions that may have created even more value on their own, without the intervention of PE firms.

I test against these positive theories and continue research using Altman's Z-score as the initial measure of financial distress to investigate financially distressed companies' relationships with PE backing. After using Altman's Z-score to identify firms in financial distress, I examine the effect PE investment has on the change in Z-score. Altman's Z-score takes into account many of the financial distress ratios discussed by Hotchkiss, Smith, and Stromberg, combining them into one overarching score. More specifically, the Z-score equation acts as a measure of liquid assets in relation to firms' size, cumulative profitability reflecting the firm's age, cash supply available to creditors, and market capitalization which takes into account the stock market's price change which may foreshadow pending problems. Altman believes that this ratio is a more effective financial distress prediction than simplified book values such as operating profit or financial leverage. In addition, using this change in score to assess the change in each firm's financial health will encompass the main argument I am testing, which is whether PE-backing helps or hurts financially distressed portfolio companies overall.

Furthermore, my study consists of a more recent sample of financially distressed companies from the tail end of 2009, after the peak of the Private Equity boom, attracted by the availability of credit and the rising stock market (Cain, 2007), and following the Great Financial Crisis. I will analyze the statistical significance of the difference in Z-

score for those bought out by PE firms and those operating on their own ~10 years later, using the 2009 and most recent LTM financials. The model will be constructed with a PE-backed dummy variable, and also account for additional explanatory variables that could affect my sample.

My hypothesis predicts I find a negative relationship between PE-backing and change in Z-score. If proven true and statistically significant, these results would support those arguing that PE firms primarily focus on making individual financial profits and PE investment hurts target companies in financial distress rather than helps them. In addition, these findings would add to existing critiques of Private Markets and the finance industry as a whole which holds numerous opinions believing that the industry is full of selfish managers that prioritize money and profit more than saving the portfolio companies they invest in. My hypothesis lies in line with the research conducted by Hotchkiss, Smith and Stromberg and financial distress measures of Tykova and Borell, however it directly contrasts some of the previous research by others stating that PE-backing leads to improved bankruptcy rates and overall improvement of portfolio companies. In addition, if true these findings would argue against the previously studied reputational theory. My sample is most closely aligned with the previous studies conducted by Hotchkiss, Smith, and Stromberg (2021) and Tykova and Borell (2012), however my sample consists of companies already in financial distress according to their Altman's Z-score instead of according to Moody's rating; I also assess the improvement or destruction of the firms' financial health rather than testing for bankruptcy and default probability. My findings present discrepancies in PE-actions and incentives, using a sample from a more recent

time period and focusing on public companies not solely based in any geographic location.

The negative coefficients on the PE backing dummy variable from my regression results suggest that PE-backing has a negative effect on the improvement in the financial health of the portfolio company. However, the insignificance of these results lead to an inconclusive effect of PE backing on financially distressed firms. These results are in line and add to the already established literature by Hotchkiss, Smith and Stromberg and Tykova and Borell by further questioning the positive effect of PE investment on firms in financial distress. Furthermore, these findings add to the research by assessing a different private equity boom time period and a unique measure of financial health improvement. Although it is impossible to assess how these firms would have performed without PE-backing, the direction of results from this paper as well as the previous literature lead to suspect that these PE-backed, financially distressed firms might have been better off on their own.

3. Data

3.1 Data Introduction and Filtration

I primarily use CapitalIQ to identify the sample of financially distressed companies that I test. The first and most important identifier is the extraction of Public, US companies in financial distress as of CY 2009. For all companies, I assess the improvement of financial health by calculating the change in Z-score between 2009 and LTM financials. I identify PE-backed companies from my sample that recorded deal transactions between 01-01-2010 and 12-31-2012 using information and data provided by PitchBook. Therefore, the variable I include to help answer my thesis question, does PE-backing help or hurt firms in financial distress, is a PE-backed dummy variable, worth 1 for previously PE-backed firms and 0 for non-backed, that is regressed against the change in Z-score.

My dataset consists of all distressed public companies trading on US exchanges with Z-scores below 1.81 as of CY 2009. According to Altman's Z-score, a firm with a score below 1.81 means the company is in extreme financial distress and has a high probability of going bankrupt within the next two years. If this threshold was greater or closer to 2.0 or 2.5, it would increase my sample size. However. I used 1.81 as the threshold for public, US companies in order to create a sample made up of firms in very similar distressed positions and to analyze the most extreme cases where improvement may result with the support of PE-backing. In addition, because of the prior research finding cases showing that PE firms will do anything to turn a profit, this low threshold

produced a sample that if a lesser increase in Z-score is proved for PE-backed companies, this would imply PE companies hurt firms defined by Altman as the most distressed.

Next, to clean the downloaded data from CapitalIQ I filtered out any companies that were first listed on Pink Sheets LLC (OTCPK) as well as any companies that did not have a primary exchange listed. If I were to have included companies listed on the Pink Sheets, this would have negatively affected my sample given that firms listed on this exchange do not really function as public companies and are placed on this exchange right before liquidating or declaring bankruptcy. Finally, I filtered for companies that only formally listed US public exchanges as their first exchange rather than secondary.

After applying these filters, I entered the remaining 768 firms into Pitchbook with the dates mentioned above, to identify which firms were formerly PE-backed. In total, there were 82 companies that were bought out by PE investors between 2010 and 2012 across 69 different investors. Generally, research has shown that PE deals should see results between 3-5 years, however I will be testing for financial health improvement according to LTM financials, ~10 years after the transaction took place. I chose this larger gap after investment to account for the 3-year transaction date range and to allow for a higher probability improvement results have surfaced. In addition, I entered the 768 firms into the WRDS database to retrieve relevant supplemental firm specific information.

3.2 Empirical Results

A. *Summary Statistics*

Table 1 contains the full sample of financially distressed firms and the proportion of PE-backed and non PE-backed (768 total firms, 89.3% non PE-backed and 10.7% PE-backed). **Table 2** contains the summary statistics for change in Z-score for the entire sample, as well as selected summary statistics after separating the PE-backed and non PE-backed firms. After initially looking at these results, the most significant difference is the difference in the means between the PE-backed and non PE-backed companies. The higher mean and median for the non PE-backed companies suggest that on average, non PE-backed companies in financial distress improve the financial health of their business more than PE-backed financially distressed companies.

However, the standard error for PE-backed companies is almost half of the mean, and kurtosis is incredibly high suggesting that there is extreme variance in the difference in Z-score within my sample. Similarly, the standard error for non-PE backed companies is also almost a third of the mean meaning that there is extreme variance in the difference in Z-scores among non PE-backed firms as well. The extreme outliers in my sample may be heavily affecting the third moments of measurement as well as the mean and standard error in my sample, especially in the non PE-backed group.

Additionally, it is interesting to note that very few of these financially distressed companies were actually saved completely. According to Altman's Z-score a company is considered financially healthy if their score is above 3.0. Furthermore, a score of 3.0 signifies that the firm is in the safe zone and is unlikely to file for bankruptcy. The results in **Table 3** show that of all the 768 companies, only 180 are now out of financial distress (12 PE-backed, 168 non-backed). Although on average the Altman's Z-score did improve overall for both PE-backed firms and non PE-backed firms, these results indicate that

regardless of PE-backing, it is incredibly difficult for firms to completely escape financial distress and end up in the financially healthy realm even over 10 years later.

B. Regression Analysis PE-backing on Difference in Z-Score

I assess whether PE involvement has a negative effect on change in Z-score by regressing a PE-backed dummy variable against difference in Z-score. At first glance, **Table 4** shows regression results suggesting that PE-backing has a negative effect on difference in Z-score where β_1 has a coefficient of -10.78. In addition, the R^2 measure of .4484 and R of .6696 indicate that the correlation between PE-backing and difference in Z-score is around 67%. Furthermore, 44.84% of the variance in difference in Z-score can be explained by PE-backing. However, when taking a closer look, the T-statistic of -0.76 indicates that these results are not statistically significant. Therefore, the null hypothesis cannot be rejected.

C. *Regression Analysis PE-backing on Difference in Z-Score with Added Control Variables*

In order to control for varying firm and financial characteristics, I also included a regression with various financial ratios that affect some or all parts of the Z-score calculation in **Table 5**. I retrieved these numbers from WRDS, and the fewer number of observations in the regression analysis (408 compared to 768 in the original regression) is due to the limited data that WRDS provided. The additional explanatory variables were included to control for varying firm-specific characteristics, in order to get a better understanding of whether PE-backing has a negative effect on difference in Z-score.

Once again, there is a negative coefficient of -4.87 on the PE-backed dummy variable. Although the absolute value of the coefficient is lower, indicating a smaller effect of PE-backing on difference in Z-score, the standard error has also decreased meaning that these control variables helped determine a more true effect of PE-backing. This is also indicated by the increase in absolute value of the T-statistic from 0.76 to 1.29.

Although the absolute value of the T-statistic is closer to 1.96, which would make the results significant at the 95% confidence level, I again cannot reject the null hypothesis that PE-backing has no effect on difference in Z-score.

4. Discussion

My thesis question examines whether PE companies hurt or help portfolio companies in distress. In other words, I am investigating whether financially distressed firms that seek out help or are sought out by PE investors, or a combination of both, would be better off improving the financial health of their firm without an official deal transaction. Through regression analysis with many control variables, I have discovered that PE-backing has a negative coefficient on the difference in Z-score in my sample. In addition, although not extremely high, the correlation of almost 44% indicates that there is somewhat of a relationship between PE-backing and difference in Z-score. However, the insignificance of these results do not allow me to conclude that the general population of financially distressed firms are hurt from PE investment; these results only further add to questioning whether financially distressed firms would be better off on their own.

My results are in line with results that were found by Hotchkiss, Smith, and Stromberg (2021) finding that non PE-backed financially distressed firms are generally better off than those that are PE-backed, but like their test, my results are not statistically significant. The results found in my sample are also in line with those found by Tykova and Borell (2012) where financial stress was higher for PE-backed companies when looking at Altman's Z-score calculations. On the other hand, my results do not significantly disprove positive theories stating that PE investment helps firms improve their business and overall profitability.

5. Conclusion

Motivated by the recent theories questioning the underlying morality of the Private Equity industry and individual investment priorities, this paper takes a unique approach in examining whether PE investment has a negative effect on financially distressed firms based solely on overall financial health change. This study specifically focuses on financially distressed firms rather than healthy firms in order to further question whether PE investors are willing to fully dismantle portfolio companies in order to turn a profit on the investment. Although the results from the regression analysis I conducted are inconclusive due to the insignificance of the effect of the primary PE-backing variable on difference in Z-score, they do not support that financially distressed firms are better off with PE-backing.

My sample could have been improved and led to statistically significant results if there was a more even ratio of PE-backed to non PE-backed companies, and specifically more PE-backed data points to analyze. In both groups it's probable outlier data points skewed my overall results and more data points could have led my results to be less affected by these outliers. Furthermore, it is also likely that additional or unlimited access to data on the sponsors and their targets would complete this investigation and find more significant results of the negative effect of PE-backing on financial health improvement. Because the use of control variables led to a reduction in the standard error and an increase in significance, the testing of other control variable combinations may have also help lead to a concrete conclusion.

My sample was also filtered based on Z-scores as of CY 2009, only one year after the Great Financial Crisis. The heightened number of firms across all industries that were

effected opened opportunity for distress PE investors, however made it more difficult to decipher which firms were structurally suffering and which were just still reflecting backlash from the financial crisis. Therefore, studies on additional time periods could have also led to more significant results.

More research in this area can also be conducted using a different dependent variable other than Altman's Z-score to measure improvement. Similarly, datasets can be filtered uniquely to find results that would also help answer my research question. Varying Z-score boundaries or a different measure of financial distress when choosing the initial sample would create a sample that would also analyze overall PE effect on distressed firms. In addition, I solely looked at formerly PE-backed firms that are no longer financed by Private Equity investors. Future research could investigate various other types of private transactions, including current versus non-current backing of any capacity to assess the effect of Private investment. Finally, in order to be safe, I analyzed the difference in Z-score ~10 years after the transaction took place. Because prior research states that it only takes 3-5 years for effects of PE investment to result in portfolio companies, it may also be beneficial to analyze dependent variables defining financial health improvement either more recent to the transaction date or even longer after the transaction takes place.

6. References

Altman, Edward I., et al., 2019 "Corporate Financial Distress: Introduction and Statistical Background ." *Corporate Financial Distress, Restructuring, and Bankruptcy: Analyze Leveraged Finance, Distressed Debt, and Bankruptcy*, John Wiley & Sons, Inc., Hoboken, NJ, 2019.

Andrade, G. and S. N. Kaplan, 1998, "How costly is financial (not economic) distress? Evidence from highly leveraged transactions that became distressed", *Journal of Finance* 53, 1443- 1493.

Acharya, Viral V., et al. 2007, "Private Equity: Boom and Bust?" *Journal of Applied Corporate Finance*, vol. 19, no. 4, pp. 44–53

Cain, Matthew D., et al. 2015, "Broken Promises: The Role of Reputation in Private Equity Contracting and Strategic Default." Journal of Corporation Law, vol. 40, no. 3, p. 565-598. HeinOnline

Corporate Finance Institute, 2020, "Altman's Z-Score Model." *Corporate Finance Institute*.

Harvard Business Review. 2021, "The Strategic Secret of Private Equity." *Harvard Business Review*.

Huang, R., Ritter, J., & Zhang, D. 2016, "Private Equity Firms' Reputational Concerns and the Costs of Debt Financing". *Journal of Financial and Quantitative Analysis, 51*(1), 29-54. doi:10.1017/S0022109016000053

Hotchkiss, Edith S. and Stromberg, Per and Smith, David Carl, 2021, "Private Equity and the Resolution of Financial Distress". AFA 2012 Chicago Meetings Paper, ECGI - Finance Working Paper No. 331/2012.

Morgenson, Gretchen, and Lillian Rizzo. 2018, "Who Killed Toys 'R' Us? Hint: It Wasn't Only Amazon." *The Wall Street Journal*, Dow Jones & Company.

Tykvova, T. and M. Borell, 2012, "Do private equity owners increase risk of financial distress and bankruptcy?" *Journal of Corporate Finance* 18, 138-150.

7. Tables and Appendix

Table 1: Sample Proportions – PE-backed vs. Non PE-backed

This table shows the proportion of PE-backed to Non-PE backed financially distressed firms in my dataset. There is a much greater number of Non-PE backed firms – this is not surprising given the fact that PE transactions are not extremely common and that PE transactions for financially distressed firms are even less common. The firms are taken from CapitalIQ and the PE-backing information is provided by Pitchbook.

	Number of firms	% of full sample
PE-backed firm	82	10.7%
Non PE-backed Firms	686	89.3%
Total	768	100.0%

Table 2: Summary Statistics for PE-backed, Non PE-backed, and Total Sample Change in Z-Score

This table includes selected summary statistics for change in Z-score from 2009 to the LTM of PE-backed, Non-PE-backed, and combined financially distressed firms. These summary statistics are calculated from CapitalIQ and PE-backing information is taken from Pitchbook. What is most interesting to note is that the mean and median change in Z-score is much higher for Non PE-backed financially distressed firms than those that are PE-backed. However, the positive mean shows that PE-backing does not necessarily hurt portfolio firms in financial distress. In addition, the third moments, kurtosis and skewness, are very large meaning that there are many outliers that could have affected these results.

	PE-backed	Non PE-backed	Total
Mean	2.42	13.20	12.05
Standard Error	1.15	4.91	4.39
Median	0.88	0.96	0.96
Standard Deviation	10.38	128.53	121.56
Kurtosis	49.30	530.92	593.35
Skewness	6.50	22.16	23.42
Count	82	686	768

Table 3: Firms That Improved Their Z-Score to Above 3.0

This table shows the number of firms that have increased their Z-score from below 1.81 in 2009 to above 3.0 from their LTM financials. This data was taken from CapitalIQ results. These results prove that it is incredibly difficult for firms below 1.81 in Z-score to improve their Z-score to a financially healthy score of 3.0 regardless of PE investment. This is shown by only 23.4% of all firms were able to achieve this, almost all of them being Non PE-backed firms.

	Number of firms	% of full sample
PE-backed firm	12	1.6%
Non PE-backed Firms	168	21.9%
Total	180	23.4%

Table 4: PE-backed Against Difference in Z-Score Regression Results

This table shows the regression results running the PE-backing dummy variable against change in Z-score. Although the T-statistic of -0.76 indicates insignificance, the negative coefficient on PE-backing means that PE-backing has a negative effect on change in Z-score and therefore supporting the direction of my hypothesis. In addition, the 44% R^2 value indicates that the model is not perfect, however almost half of the variability in change in Z-score can be explained in PE-backing. All data is taken from CapitalIQ.

Difference in Z Score	Coefficient	Std. Error	T
PE-backed	-10.78	14.207	-0.76
Constant	13.20	4.642	2.84

Number of obs	=	768
F (8, 399)	=	0.58
R-squared	=	0.4484

Table 5: PE-backed and Control Variables Against Difference in Z-Score Regression Results

This table shows the multiple variable regression on difference in Z-score. The following explanatory variables were chosen to control for the discrepancies between the sample firms such a size and other varying financial characteristics. In addition, many of the control variables in this regression contribute to the Z-score calculation. The regression results show a more significant negative effect on PE-backing on change in Z-score, again supporting my hypothesis.

Difference in Z Score	Coefficient	Std. Error	T
PE-backed	-4.87	3.77	-1.29
Market/Book	-0.00014	0.00054	-0.26000
Market Cap	-1.33E-05	3.79E-05	-3.50E-01
Debt/Market Cap	0.0000835	0.000351	0.24
Interest Exp/Total Debt - 10YR	0.0428	0.0299	1.43
Gross Profit Margin	0.0009506	0.0033	0.29
Debt/Equity	0.0008012	0.0047	0.17
Fixed Assets/Total Assets	0.0056271	0.0402	0.14
Constant	5.72	1.28	4.48

Number of obs	=	408
F (8, 399)	=	0.52
R-squared	=	0.0104

Table 6: PE-Backed Firms – Summary of Financial Characteristics

This table consists of firm-specific ratios and financial characteristics to paint a general picture of the financially PE-backed, public US distressed companies with Z-scores below 1.81 as of 2009. Some of the most defining characteristics that exemplify these PE-backed firms started out in financial distress are the extremely high mean leverage ratios. In addition, given these firms are struggling both with high debt levels and with profitability, it is not surprising that the mean gross profit margin is below -100%. The varying n values that are not all equal to the full sample size of 82 PE-backed firms is due to the limited data collection that was provided by WRDS.

	N	Mean	Median
Total Assets	59	4287.98	1286.18
Revenue	58	2127.23	297.79
EBIT	58	172.61	61.71
Pre-Tax Income	59	-0.70	-0.13
Total Debt	57	2395.64	670.37
Gross Profit Margin	58	-104.14	0.32
Total Debt/Equity	58	94.43	1.10
Market Cap	60	603.06	189.85
Total Fixed Assets/Total Assets	59	25.10	0.17
Interest Exp/Total Debt - 10 years Treasury Yield	53	5.91	0.00
Debt/Market Cap	52	1889.82	1.38

Table 7: Non PE-backed Firms – Summary of Financial Characteristics

This table consists of firm-specific ratios and financial characteristics to paint a general picture of the financially non PE-backed, public US distressed companies with Z-scores below 1.81 as of 2009. High leverage means and medians and debt levels are some of the most defining characteristics that exemplify these non PE-backed firms are in financial distress. In addition, given these firms are struggling both with high debt levels and with profitability, it is not surprising that the mean gross profit margin is below -30%. The varying n values that are not all equal to the full sample size of 686 are due to the limited data collection that was provided by WRDS.

	N	Mean	Median
Total Assets	515	7375.34	355.00
Revenue	516	3103.18	213.19
EBIT	513	252.63	0.49
Pre-Tax Income	515	296.58	-5.65
Total Debt	509	2567.53	79.62
Gross Profit Margin	514	-33.13	0.38
Total Debt/Equity	517	45.38	0.24
Market Cap	605	2590.80	187.30
Total Fixed Assets/Total Assets	515	4.71	0.14
Interest Exp/Total Debt - 10 years Treasury Yield	428	7.27	0.04
Debt/Market Cap	535	1100.28	0.14

Table 8: Total Sample – Summary of Financial Characteristics

Firm-specific ratios and financial characteristics to paint a general picture of the financially public US distressed companies with Z-scores below 1.81 as of 2009. Some of the most defining characteristics that exemplify these firms are in financial distress are the extremely high mean leverage ratios for these firms, regardless of PE-backing. In addition, given these firms are struggling both with high debt levels and with profitability, it is not surprising that the mean gross profit margin is below -40%. The varying n values that are not all equal to the full sample size of 768 are due to the limited data collection that was provided by WRDS.

	N	Mean	Median
Total Assets	574	7058.00	446.59
Revenue	574	3004.57	216.89
EBIT	571	244.50	2.95
Pre-Tax Income	574	266.03	-5.04
Total Debt	566	2550.22	120.78
Gross Profit Margin	572	-40.33	0.37
Total Debt/Equity	575	50.33	0.26
Market Cap	665	2411.46	187.30
Total Fixed Assets/Total Assets	574	6.81	0.14
Interest Exp/Total Debt - 10 years Treasury Yield	481	7.13	0.05
Debt/Market Cap	587	7.12	0.04

Table 9: Complete Summary Statistics for PE-backed, Non PE-backed, and Total Sample Change in Z-Score

The following table includes full summary statistics for the PE-backed, Non PE-backed, and total sample change in Z-score. All data is calculated using data from CapitalIQ.

	PE-backed	Non PE-backed	Total
Mean	2.42	13.20	12.05
Standard Error	1.15	4.91	4.39
Median	0.88	0.96	0.96
Mode	#N/A	0.34	0.34
Standard Deviation	10.38	128.53	121.56
Sample Variance	107.84	16519.75	14776.10
Kurtosis	49.30	530.92	593.35
Skewness	6.50	22.16	23.42
Range	93.91	3201.33	3201.33
Minimum	-9.58	-41.43	-41.43
Maximum	84.33	3159.90	3159.90
Sum	198.72	9055.39	9254.11
Count	82	686	768