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# Aggressive Capital Structure and the Myth of Negative Book Equity Firms

## Abstract

We present the evidence that there is an increasing trend of negative book equity firms over the past 50 years, from less than 1% up to over 10%. A great proportion of negative book equity firms are neither financially distressed nor likely to go bankrupt in near future. These health negative book firms are highly leveraged with book leverage ratio over 100 percent. Comparing with a constructed reference set, health negative book equity firms tend to have less tangible assets and smaller in size. Unlike other negative book equity firms, health firms pay much less tax. The risk adjusted returns are positive on average for health negative book equity firm. Also, more tangible assets tend to increase the returns, and R&D expenditure may have larger effects on stock returns for health negative book equity firms.

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# I Introduction

What is the optimal capital structure of a firm? A question studied by Modigliani and Miller 56 years ago and hundreds of papers thereafter is still not clear today. Even though academicians have clearly made some progress on the theory of capital structure, very little is known about relevance of the different theories empirically. From established theories, we understand that firm's value is related with its capital structure because of some very important departures from unrealistic assumptions made by Modigliani and Miller. So the next question is that how the firm value related with managers' decision on capital structure. Hundreds of empirical studies have been produced to investigate the factors that drive manager's decision on how much debt finance should a firm use. The amount of evidence is large and results are varying. Although no consensus exists based on various empirical evidence that is supported by various theories, existing literatures imply that capital structure decisions are not only dynamic and changing over time, but also varying across firms. This paper add to the pool of empirical studies on determination of capital financial policy by analyzing a unique subsample of dataset containing accounting and financial market information for nonfinancial publicly-traded firms with negative book equity.

A firm's book value of equity represents book value of residual claim for its common shareholders, that is, the remaining amount after all debt are paid out from assets. Although limited liability of shareholders guarantees that shareholder's value

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will never be negative in real life, in financial statements, however, book value of equity can be negative in the case that amount of liabilities exceeds amount of assets, and firms are required to report negative book value of equity according to accounting rules. The existence of negative book equity firms is a complex issue and various potential reasons could cause a firm's book equity drop below zero. The most common reason is that accumulative negative earnings on or before the date when firm first report negative book equity, and this group of firms are usually considered financial distressed. Although negative earnings explanation seems appeal and indeed describe majority of negative book equity firms, it is not the only reason. Firms may report negative book value for other reasons. For example, negative book equity can occur through the accounting treatment of good will, such as goodwill impairment, when companies with significant potential are takeover by larger companies. Also, for young startup companies at their initial stage, the supply of capital may not meet the demand of capital and firm may report negative book equity even though they have strong future growth potentials and not technically financial distressed. Even in the examples where firms report negative earnings, it is not always the case that such firms are financially distressed. For example, the excess of expense relative to income could result from increase in Research and Development (R&D) expenditure or marketing and advertising expenses, which are potential intangibles that will bring future cash inflows but are expensed in advance.

Previous studies consider firms with negative book equity as a group of financially

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distressed firms that are more likely to report negative future earnings and unlikely to survive for a long period. These negative book equity firms are generally small by market capitalization and are often excluded from discussions of cross sectional variation of stock returns because they are rare (Fama and French 1993). However, a recent study by Jan and Qu (2012) found that the frequency of negative book equity firms increase from 5% (1976-1985) to 15% (1996-2005) among all COMPUSTAT firms excluding financial and utility firms. Brown, Lajbcygier and Li (2008) also conclude that approximately 5% of all listed stock have negative BE since late 1980s. In addition, Jan and Qu (2012) find that 81.8% of firms with negative book value are loss firms but only 23.3% loss firms are firms with negative book value of equity (that is, most of loss firms are firms with positive book value of equity). These results imply that those loss firms are not necessarily the same as firms with negative book value equity. In contrast, some negative book value firms, such as DirectTV and Revlon, are financially healthy firms with strong earnings. In this study, we show the trend that increasing number of financially and operationally strong firms choose to have negative equity by aggressively shift their capital structure towards 100 percent debt. Accordingly, investors are not treating these firms as traditional distressed firms. The existence of these firms may indicate that investors value negative book equity firms in a different way as they value positive book equity firms. Therefore, these firms give us a natural experiment to observe aggressive capital structure decisions among firms and how such decisions influence the operational performance and stock performance of those firms.

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In this paper, we first documented an increasing trend in frequency of non-financial firms with negative book value of equity. From 1960 to 1980, the proportion of non-financial firms with negative book equity is, on average, only 0.95 percent of all non-financial firms in COMPUSTAT. This ratio has increased to 10.64 percent in 1998, almost 12 times bigger compared to its pre 1980 level. From 1991 to 2013, proportion of negative book equity non-financial firms has been remained stable around 7 percent of total non-financial COMPUSTAT firms. With such increasing trend of negative book value observations, it would be inappropriate to ignore these firms and exclude them from empirical research in accounting and finance as suggested by many previous researches (Fama and French (1992), Vassalou and Xing (2004) and Griffin and Lemmon (2002)). Among these negative book equity firms, majority of them are indeed financial distressed firms. However, about 35 percent of firms, on average, are firms with positive net income and retained earnings. Also, when we look at the number of years that firms have survived after first reporting negative book equity, the average is about 15 years. These results suggest that a large proportion of negative book equity firms do not appear to be financially distressed.

On the other hand, the level of leverage for these negative book equity firms with positive earnings is extremely high. If we use total liability over total asset as the measure of leverage, this ratio is about 1.2 over the total sample period and 1.3 after 1980, as compared to 0.47 for positive book equity firms. Some other measurements of

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leverage also yield similar results. Book leverage ratio <sup>1</sup>for negative (positive) book equity firms are, on average, 85% (29%). Market leverage ratio for negative (positive) book equity firms are, on average, 50% (28%). The existence of such highly levered but financial stable firms are puzzling, especially after several studies showing that the optimal leverage for firms is relatively low. For example, Hackbarth and Mauer (2012) find optimal leverage ratios as low as 12% as a result of debt overhang and debt dilution in dynamics. Goldstein, Ju, and Leland (2001) obtained leverage ratio of 36% by using dynamic model. Most interestingly, a few recent empirical studies even documented a persistent zero leverage phenomenon (Devos, Dhillon, Hagannathan, and Krishnamurthy (2008), Bessler, Drobetz, Haller, and Meier (2010), Minton and Wruck (2001), and Strebulaev and Yang (2013)). The prevalence among firms to carry zero leverage makes negative book value firms even more puzzling because their aggressive capital structure decisions. A firm's financial leverage is directly related with its overall risk and cost of capital. The value of firms and shareholder's wealth are determined by the sources of capital which including debt, equity, and hybrid financing securities. Even though debt is the least costly form of capital, increasing the leverage by aggressive use of debt simultaneously increase financial risk such as risk of default for a firm. In addition, excessive borrowing also increases the return on equity and its volatility of earnings per share. Although mixed views exist about potential optimal

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<sup>1</sup> Following most capital structure papers (Graham and Leary (2001), Leary and Roberts (2010), Strebulaev and Yang (2013) etc), *Book leverage ratio* =  $\frac{\text{long term debt} + \text{debt in current liabilities}}{\text{total asset}}$  and

*market leverage ratio* =  $\frac{\text{long term debt} + \text{debt in current liabilities}}{\text{long term debt} + \text{debt in current liabilities} + \text{year end shares outstanding} \times \text{year end share price}}$

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capital structure that maximizes the value of firm, most literature suggests less than 50% of debt in firm's capital structure (Hackbarth and Mauer (2012) and Goldstein, Ju, and Leland (2001)). Negative book equity firms are clearly exceptions and in contrast to what described by previous studies. With total amount of liabilities exceeds total amount assets, these firms are operating at the edge of cliff by pushing leverage to the extreme.

This paper extends the literature in the following ways. First, this is the first study, to my knowledge, to explore the capital structure decisions for firms with negative book equity. As opposed to previous studies that simple categorize negative book equity firms as financially distressed loss firms, the main argument of this paper is that many negative book equity firms are financially health and choose to operate at extreme capital structure where liability exceeds asset. Second, this paper shows the heterogeneous characteristics among negative book equity firms by examine their distress risk and market expectation. We argue that, in contrast with previous empirical studies, negative book equity firms are not so rare that should be ignored in cross sectional returns analysis. There is an increasing trend of percentage of negative book equity firms over time and a large proportion of negative book equity firms can stay in the market for a long period after they first report negative book equity. Third, this paper examines how market valuate negative book equity firms. Common measurements may not apply to these negative book equity firms because of the abnormality of valuation ratios and signaling effect of negative book equity. The investigation of stock returns

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show that mispricing maybe more pronounced among negative book equity firms.

## **II Literature Review**

### **2.1 Negative Book Equity Firms**

Academic studies on negative book equity firms are not sufficient. One of the reasons is that there are not many negative book equity firms existing before 1980, and negative book equity has no economic interpretation and make common valuation ratios hard to interpret. Fama and French (1992) and most of the paper following the same approach exclude negative BE stocks because they argue that the number of negative book equity firms is small in their samples. For example, Fama and French (1992) claims that only about 2% of firms each year has negative book equity. In addition, negative book equity firms are similar to high BE/ME firms in that both are signals of poor earnings prospects. Thus, negative book equity firms are usually viewed as financially distressed and at the edge of bankruptcy. For example, Dichev (1998) and Chan, Haomao and Lakonishok (1991) both assert that firms with negative book equity have relatively high average monthly returns compare to their high BM counterparties and consider financially distressed firms. Consistent with this distress argument, Brown et al. (2008) find that, once negative book equity stocks are included in the sample, Fama and French three factor model has higher value factor loading which is perceived as the proxy for financial distress. Li et al. (2007) find that negative book equity stocks



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have higher default risk compared to their positive book equity counterparts.

Based on these findings, one may easily conclude that negative book equity firms are rare in the universe of stocks and are equivalent to financially distressed firms or value stocks which carries higher value premium for potential bankruptcy risk. However, some recent literature supply different empirical evidence with opposite conclusion. Jan and Ou (2012) find that, excluding financial and utility firms, negative book equity firms increase from 5% to 15% over past 30 years. They attribute such high increase to expanded R&D expenses and conclude that market acknowledges R&D as a positive value attribute when pricing negative book value firms. Brown et al. (2008) also find that number of stocks with negative book equity increased to 5% of all listed stocks. Applying a new technique in classifying these stocks in value/growth groups, they find that these negative book equity firms can be either in value or growth classification. Ang (2013) find that firms with large negative book equity appear to be ones that experience a nonrecurring shock on earnings and book equity. These firms are not in distress which is measured by probability of bankruptcy.

## 2.2 Firm Leverage, Distress Risk and Stock Returns

The direct relationship among leverage, distress risk and stock returns are not clear although it is common finding that there is a negative relationship between leverage and returns. The oldest discussion about leverage and return can be trace back to well-

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known Modigliani and Miller (1958), where market beta of equity is equal to the firm's asset beta plus a factor proportional to the firm's leverage ratio. A related but more recent study by Penman, Richardson and Tuna (2007) show that a firm's book to market equity ratio can be decomposed into asset and leverage component. Returns are positively related to the asset component but negatively related to leverage. George and Hwang (2010) find that firms with high distress risk optimally choose low leverage to avoid distress costs. However, choose to have low leverage does not entirely neutralize the effect of high costs on systematic risk. Therefore, low leverage firms have low distress probabilities and greater exposures to systematic risk than high-leverage firms. That is why we observe negative relationship between leverage and return and negative relationship between return and probability of distress.

### 2.3 Empirical Evidence of Firms' Capital Structure Decisions

Studies on firm's capital structure decisions are luxuriant and results are vary. On the one hand, research find that, on average, firms have low leverage ratios relative to what would be expected from various models of capital structure, or low-leverage puzzle. Graham (2000) finds that firms are not fully using their debt tax benefits when making capital structure decisions. These firms are substantially under-levered but tend to be more stable and profitable. Dang (2013), using a sample of UK firms over the period 1980 to 2007, find that extreme debt conservatism is a common practice for various firms. Some firms adopt zero leverage policy because of financial constraints while others intent to avoid debt to mitigate investment distortions such as

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underinvestment. Minton and Wruck (2011) find that, for firms adopt a persistent policy of low leverage, pecking order style policy plays the critical role. The stockpiles of debt capacity is used later for acquisitions and capital expenditures. Strebulaev and Yang (2013) present the evidence that zero-leverage behavior is a persistent phenomenon among COMPUSTAT firms from 1962 to 2009. Firms carry zero debt tend to pay more dividends so that the overall payout ratio is constant over time.

On the other hand, some research document the increasing leverage level in general over time. Graham, Leary and Roberts (2014) studied the corporate balance sheet data from 1920 through 2010 and find that, for unregulated industrial sector, increase their liabilities from less than 20% in the 1930s to more than 60% by 1990. This shift was largely driven by a systemic change in financial leverage and firms of all sizes and all industries are affected. More interestingly, they find that the cash balances fell from 25% of assets to 6% of assets in 1980s which leads to an even greater change in net leverage. DeAngelo and Roll (2014) find that capital structure is never stable over time. Over 1950 to 2008, leverage increased more frequently than it decreased among firms, which is the evidence of wholesale abandonment of conservative leverage. Philippon (2009) find increase in average book leverage over the postwar period for non-financial firms with at least five years of non-missing values.

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# III Data, Summary Statistics and Preliminary Results

## 3.1 An Overview of Sample Size and Distributions

Before we start, a general overview of distribution of negative book equity firms will be helpful. To make our study comparable with previous researches, we use similar data set as constructed by Fama and French (1992), but with focus on firms report negative book equity in their financial statements. Following Fama and French (1992), book value of equity here is defined as book value of equity for common stocks plus deferred taxes plus investment tax credit minus book value of preferred stocks. With no restrictions on stock exchange listing, the original sample consist of 33515 firm-year observations. Table 1 below summaries the sample described:

Table 1: Sample Characteristics

Table 1 shows the percentage and relative frequency of positive and negative book equity firms by year. Consistent with previous studies, Table 1 shows an increasing trend in terms of frequency of negative book equity firms over year. Before 1980, negative book equity firms are rare as suggested by Fama and French (1992). However, the number of negative book equity firms has been increased dramatically since 1980, especially during 1985 to 1990, and stay approximately at the same level ever since. The rapid increase in the number of negative book equity firms is not surprising. Several studies have documented a downward shift in average earnings among firms after 1980. Fama and French (1995) show that, for small firms, there is a consistently drop in

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earnings during 1980s and remain low throughout the rest of their sample period. Opler and Titman (1994) find that the events of industry distress increased substantially after 1980 but such events are rare during 1970s. Therefore, the frequency of negative book equity firms increased along with an increasing trend of losses and distress. These might also be the reason why previous research treat negative book equity firms as financially distressed firms.

To calculate various leverage ratio and distress measurement, we need to impose more restrict sample selection criterion. The sample must consists of all firms from COMPUSTAT database that report negative book equity (NBE) and traded on New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ from 1965 January to December 2013. All accounting data are from the previous December on COMPUSTAT. Firms with missing book equity value are dropped form the sample. We also exclude financial companies (Standard Industrial Classification (SIC) codes 6000-6999), non-US companies (entries in Compustat with International Standards Organization country code of incorporation (FIC) not equal to USA). All accounting data are winsorized at 1% to reduce the effects of extreme values. We also require firms must have non-missing accounting values to calculate various leverage ratios in all years. After imposing these restriction, our sample consist of 7963 firm-year observations with 3245 unique firms.

#### Table 2: Reduced Sample Characteristics

Table 2 shows the same increasing trend in terms of percentage of negative book

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equity firms as Table 1. The proportion of negative book equity firms peaked in 1998 at 10.64%. One reason for such increase quantity of negative book equity firms is that many firms suffered loss during the year, as evidenced by the observation that percentage of negative book equity firms with positive earnings reached record low at the same year. In contrast to increasing percentage of negative book equity firms, earnings status are relatively stable for after 1980. Although earnings shift downward after 1980, as documented by other studies, proportion of positive earnings firms with negative book equity stay around 27%. Panel B and Panel C present some interesting relationship between book equity and earnings. As explained in the introduction, most of negative book equity firms have negative earnings. However, for negative earnings firms, only very few firms have negative book equity. The majority of loss firms are those with positive book equity. Therefore, it is inappropriate to simply classify negative book equity firms as loss firms.

### **3.2 How to Filter out Health Negative Book Equity Firms**

As we argued previously, loss firms, as well as other negative book equity firms, are not equivalent to financial distressed firms. How to distinguish non-distressed firms from negative book equity firms is crucial in this paper. Only when the sample of financially healthy firms are determined, we will be able to investigate their capital structure decision factors. To separate health negative book equity firms from unhealthy ones, one approach is to calculate and compare their probability of bankruptcy. Existing

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models of bankruptcy prediction such as Altman (1968) and Ohlson (1980) are widely used in empirical research and in practice. Because both models incorporate leverage level as one of components in predicting bankruptcy and posit positive relationship between leverage and bankruptcy risk, the average bankruptcy risk are on average higher for negative book equity firms as compared with positive book equity firms by design.

Although O\_SCORE is widely accepted as a measure of bankruptcy risk, it might not fully reveal all possible information about firm's distress risk. As an alternative, BM ratio is commonly used in empirical research as a measurement of distress risk because firms with high BM ratio are thought to be ones with greater risk of distress. For example, Fama and French (1995) and Chen and Zhang (1998) documented that high BM ratio firms tend to have low future earnings, higher financial leverage, higher earnings volatility, and are more likely to cut dividends. These studies exclude firms with negative book equity firms in their sample either because rareness of negative book equity firms or because these firms are hard to categorize. If one sort firms by BM ratio then negative book equity firms are on the bottom of the ranking and should be included into low BM ratio firms and assigned a low risk premium. At the same time negative book equity firms are also perceived to be distressed firms and should be assigned a higher risk premium. The contradiction here make grouping negative equity firms a problem so they are excluded from the studies.

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A better way to distinguish truly distressed firms while fully utilize both measure of distress risk is probably to sort firms by both measurements. Griffin and Lemmon (2002) studied firms with high distress risk measured by O-score and find that, among firms with high O-score, low BM ratio firms do not appear to exhibit same characteristics as high levels of distress risk. For example, these growth firms within the highest O-score ranking usually have higher capital and R&D expenditures than other group of firms, have high sales growth, and experience low subsequent returns that are significantly lower than those of other growth firms. The implication here is that O-score itself may not be an all-inclusive measurement for distress risk. When combined with BM ratio, high o-score firms exhibit heterogeneous distress risk level. In this study, we use the same approach to separate, within all negative book equity firms, financially health firms (health NBE firms) that only appears to be financially distressed from unhealthy firms that are indeed financial distressed. Specifically, each June, portfolios of negative book equity firms are formed from three independent rakings, using 30<sup>th</sup> and 70<sup>th</sup> percentile breakpoints, on BE/ME and O-SCORE developed by Ohlson (1980). Several summary statistics of the characteristic variables, which are calculated as simple average of the means of the time series portfolios for firms in each group, are reported in Table 3.

Table 3: Summary Statistics of Firm Characteristics for Two-Way sorted  
Portfolios



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As shown in Table 3, except for the low O-SCORE quintile, there is no direct relationship between market to book equity ratio and O-SOCRE, as suggested by Dichev (1998) that O-SCORE has a relatively low correlation with the ME/BE ratio. Within the low O-SCORE quintile, probability of bankruptcy for different portfolio increase monotonically from 0.81 to 1.24 as firms move from low to high market to book equity ratio. Notice that market to book equity ratios are all negative, so the lowest quintile of ME/BE firms actually have the highest absolute value of ME/BE ratio. Among all the ME/BE and O-SOCRE portfolios, low ME/BE portfolios within low O-SCORE firms have the least probability of bankruptcy. Interestingly, this portfolio also contains the most of negative book equity firms, specifically, 78% of negative book equity firms are within this group. This finding is consistent with our argument that most of negative book equity firms are not essentially the most financially distressed ones. Three leverage measurements suggest that these firms are highly leveraged, as they supposed to be. On average, firms with least probability of bankruptcy survive 8 years after they first report negative book equity. Although these firms have negative retained earnings, they have positive net income on average.

### 3.3 Finance Performance of Health Negative Book Equity Firms

From previous discussion, the increasing percentage of negative book equity firms are surprising and it is interesting to see if comparable firms have same leverage ratio. To proceed, we construct, for every health negative book equity firm year observation, a reference set of proxy firm-year observations. Specifically, we match for each healthy

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NBE firms at least three comparable firms in each calendar year by industry (3 digit SIC code) and size (logarithm of sales). Note here we do not put any matching restrictions on leverage so that the reference firms can have negative book equity as well. Table 4 reports various descriptive statistics for negative book equity firm, health negative book equity firm and their reference firms. Statistics are produced by taking equally weighted average within each group first<sup>2</sup>, then the statistics are weighted equally across entire sample period.

Table 4 Descriptive Statistics for Negative Book Equity Firms, Health Negative Book Equity Firms and Reference firms.

As shown in Table 4, over the sample period, ratio of total liability over total asset is 44% for reference firm, while this ratio is 159% and 161% for negative book equity firms and healthy negative book equity firms. Book leverage ratio (market leverage ratio) is 19% (18%) for reference firms while for negative book equity firms and health negative book equity firms these ratios are 80% (51%) and 83(39%), respectively. By construction, reference set are built on industry and firm size rather than capital structure decisions, therefore such significant difference in leverage between reference firm and health negative book equity firms cannot be explained by either industry or size. Table 4 also reveals that health negative book equity firms tend to have more capital expenditures and research and development expenditures, which is consistent

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<sup>2</sup> To produce statistics for reference firms, for each negative book equity firm, first take equally weighted average across reference, then take equally weighted average for each year and then annual statistics are averaged.

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with Jan and Ou (2012) that research and development expenditures plays important role in valuing negative book equity firms. In addition, health negative book equity firms tend to have less tangible assets and smaller in size relative to reference set. By carrying excessive debt, those health negative book equity firms also pay significantly less tax relative to reference firms. Most interestingly, health negative book equity firms pay significantly less tax compare to entire negative book equity firms as a whole, implying that those firms utilize tax deductibility of debt more effectively.

### **3.4 Stock Performance of Health NBE Firms.**

In this section, we investigate how market valuate the firms with negative book equity firms. It is well recognized in investment community that investment decisions should not base on book value of equity which only represent the historical cost or initial investment of shareholders. Although investors may not care too much about book value of equity for most of time, this might not be the case when the book equity drops below zero. When liability of a firm in excess to its asset and make book equity become negative, any rational investors must respond by changing their trading behaviors and trading positions, which can be reflected by stock returns of these negative book equity firms. To investigate this issue, we will look at the stock performance for three portfolios: health negative book equity firms as we defined in previous sections, reference firms that we created based on industry and size, and all negative book equity firms. We will first look at raw returns and market adjusted returns for each portfolio.

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Table 5 Raw Returns and Market Adjusted Returns for Health NBE firms,  
Reference Firms and All NBE firms

Table 5 above reports the raw monthly returns and market adjusted monthly returns for each portfolio by calendar year as well as time-series geometric and arithmetic average returns. It is not surprising that the returns for all groups are low<sup>3</sup>. The medium raw (market adjusted returns) returns are 1.89% (0.48%), 1.90% (0.47%) and 1.61% (0.48%) for health NBE firms, reference firms and all NBE firms, respectively. Such low returns are consistent with previous findings on high O-score firms (Dichev (1988) and Griffin and Lemmon (2002)). These returns, although small, are positive on average and negatively skewed. When compare among portfolios, health NBE firms and reference firms exhibit similar stock performance over 1970 to 2012 while all NBE firms gain slightly more. The simple glance on stock performance on health NBE firms show that market did not treat these group of firms as typical value firms and reward investors with high premium by investing these stocks.

Next, we adopt the Fama-French's 3-factor model to explain the structure of stock returns for these negative book equity firms. Then we use Fama-Macbeth regress to test the statistical relationship between several firm specific characteristics variables of negative book equity and stock returns.

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<sup>3</sup> The average risk free rate for the period is 0.37%.

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Following previous studies, we will use three Fama-French variables: MP, SMB, and HML to examine the excessive returns for negative book equity firms. The regression model is as follows:

$$r_{i,t} = \alpha_{i,t} + aMP_{i,t} + bSMB_{i,t} + cHML_{i,t} + \varepsilon_{i,t}$$

Where a, b, c, are regression coefficient of the intercept, and

$r_{i,t}$  = stock return minus the risk free rate for that period

$MP_{i,t}$  = the excess return on the value weighted return of all CRSP firms

$SMB_{i,t}$  = average return on the small portfolios minus the average return on the big portfolios

$HML_{i,t}$  = average excess returns on the value portfolios minus the average return on the growth portfolios

The intercept of the model, so-called Jensen's Alpha for portfolio returns, should be 0 on average because three factors proposed by Fama and French should be able to explain much of the returns cross sectional variation on average. The significant positive intercept indicate positive risk adjusted performance over and above that predicted by asset pricing model. Table 6 below reports the results of Fama French 3 factor regression each year and on average.

Table 6: Risk Adjusted Return for Health NBE firms, Reference Firms and All

NBE firms Using Fama-French 3 Factor Model

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As shown in Table 6, risk adjusted returns are positive most of the time for all three portfolios. On average, risk adjusted returns are 0.48%, 0.47% and 0.63% for health NBE firms, reference firms and all NBE firms, respectively. All returns are statistically significant. All negative book equity firms portfolio provides the most positive returns, followed by health NBE firms. The risk adjusted returns for all negative book equity firms are 31.25% higher than health NBE firms, the difference in risk adjusted returns are mainly due to difference in size premium and value premium between these two portfolios. Reference firms exhibit similar stock performance as health NBE firms with slightly lower risk adjusted returns. In addition, all loadings on 3 factors are significant. Health NBE firms carries higher HML loading relative to all negative book equity firms portfolio, indicating higher value premium awarded by market. On the other hand, Health NBE firms carry lower SMB loading relative to all negative book equity firms portfolio, indicating health NBE firms are on average bigger in size relative to all negative book equity firms.

The results of both raw returns and risk adjusted returns are interesting, but our main interest is focusing on how level of leverage affects investors' perspectives on firm as reflected by stock returns, after controlling other potential risk factors. Previous researches show various evidence on this issue. Some argued that high leverage is associated with high market beta and probability of default, and returns of high leverage firms should be high due to additional risk premium required by investors ( Griffin and

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Lemmon2002; Chava and Purnanandam 2009;) On the other hand, some studies show that the relationship between leverage and returns is more complicated and depends on the level of leverage. For example, George and Hwang (2009) find that such relationship is positive for low leverage firms but negative for high leverage firms. In this paper, we investigate this issue on the sample of negative book equity firms, which are group of firms with not only high leverage but push their leverage to the extreme level where liabilities exceeds assets.

To proceed, we apply Fama-Macbeth regressions to test the relationship between leverage and stock returns for three separate samples, health negative book equity firms, reference firms and all negative book equity firms, after controlling for factors that are potentially affect stock returns. In the model, size is measured by nature log of firm's book assets, leverage is measured by total liability over total assets. *dEBIT* is a dummy variable takes value of 1 if earnings are positive, Debt coverage is defined as earnings before interest and tax standardized by total liabilities; Capital expenditure is calculated as capital expenditure over book assets; profit measures profitability of the firm and calculated as earnings before interest and tax over book assets; RD calculated as ratio of research and development expenses to sales. Tangibility is defined as fixed assets to book assets; tax is defined as taxes paid to book assets

Using Fama and MacBeth (1973) approach, we first estimate the cross-sectional regression for each month in the sample period and compute the sample mean of the estimated slope coefficients. Then we test whether the average monthly slope

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coefficient is significantly different from zero. To obtain the market betas that are going to be used in each monthly cross-sectional regression, we estimate the rolling betas. Specifically, for each regression, market betas are estimated using data from the period preceding each month, the estimation periods are over 30 month before current regression month.

Table 7 Fama-Macbeth Monthly Regressions of Health NBE Firms, All NBE Firms and Reference Firms

Table 7 reports the results from the Fama-Macbeth regression, and different sample groups are reported separately in Panel 1, 2 and 3, respectively. As show in the table, the only significant variables for both sample groups are tax and cash. Tax has the most positive impact on returns for health negative book equity firms, followed by all negative book equity firms. In contrast to previous research, size have insignificant effects on returns for health negative book equity firms, although size effects are significant for reference firms and all negative book equity firms. Interestingly, asset tangibility has different effects on stock returns for all negative book equity firms and health negative book equity firms. For health negative book equity firms, more tangible assets tend to increase the returns, but we observe the opposite effects on all negative book equity firms. The role played by R&D expense is not clear here. Although insignificant in all samples, the coefficient on R&D variable is largest for health NBE firms. The relationship between distress risk, as measured by O-score, and returns are



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consistent with previous studies in that more distressed firms tend to have not higher but lower returns. All coefficients on market betas are not significant, which is expected and consistent with previous studies that market beta could not explain stock returns (Fama and MacBeth 1973). Also notice that the intercepts are not significantly different from zero for both all negative book equity firms and health negative book equity firms, indicating no abnormal returns after more risk factors are controlled in the model.

## **IV Conclusion**

In this paper, we are interest in the sample of negative book equity firms. We first documented an increasing trend in frequency of non-financial firms with negative book value of equity. The proportion of non-financial firms with negative book equity is, on average, only 0.95 percent of all non-financial firms in COMPUSTAT. This ratio has increased to 10.64 percent in 1998 which is almost 12 times bigger compared to its pre 1980 level. To separate health negative book equity firms from all negative book equity firms, we use two way sorting by Market-to-Book Ratio and O-score. The result is surprising: most of negative book equity firms are among the lowest quintile of O-score. On average, firms with least probability of bankruptcy survive 8 years after they first report negative book equity. Although these firms have negative retained earnings, they have positive net income on average. To further investigate the characteristic of health negative book equity firms, we construct, for each negative book equity firms, a set of

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reference firms based on size and industry. The comparison among health negative book equity firms, all negative book equity firms and reference firms reveals that health negative book equity firms tend to have more capital expenditures and research and development expenditures. In addition, health negative book equity firms tend to have less tangible assets and smaller in size relative to reference set. By carrying excessive debt, those health negative book equity firms also pay significantly less tax relative to reference firms. Most interestingly, health negative book equity firms pay significantly less tax compare to entire negative book equity firms as a whole, implying that those firms utilize tax deductibility of debt more effectively. We then turn to stock performance. By applying Fama and French three factor model, we show that risk, on average, adjusted returns for health negative book equity firms are significantly positive over the sample period. Moreover, we performed a Fama-Macbeth regression to compare among health negative book equity firms, all negative book equity firms and reference firms. Results show that Tax has the most positive impact on returns for health negative book equity firms. In contrast to previous research, size have insignificant effects on returns for health negative book equity firms, although size effects are significant for reference firms and all negative book equity firms. Also, for health negative book equity firms, more tangible assets tend to increase the returns. R&D may have larger effects on stock returns for health negative book equity firms.

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Table 1: Sample Characteristics

The sample consists of all firms from COMPUSTAT database with non-missing values. Book equity is defined the same as Fama and French (1993): BE=Book Value of Equity + Deferred Taxes + Investment Tax Credit – Book Value of Preferred Stock. PBE firms refer to firms with positive book equity. NBE firms refer to firms with negative book equity. Relative frequency is calculated as number of negative book equity firms divided by number of positive book equity firms.

<i>Data Year</i>	<i>Number of PBE firms</i>	<i>Number of NBE firms</i>	<i>Number of total firms</i>	<i>Percentage of NBE firms</i>	<i>Relative Frequency between PBE and NBE firms</i>
1960	246	2	248	0.81%	0.81%
1961	2153	12	2165	0.55%	0.56%
1962	2434	17	2451	0.69%	0.70%
1963	1509	7	1516	0.46%	0.46%
1964	1765	11	1776	0.62%	0.62%
1965	2070	13	2083	0.62%	0.63%
1966	2744	20	2764	0.72%	0.73%
1967	3038	18	3056	0.59%	0.59%
1968	3653	26	3679	0.71%	0.71%
1969	3891	29	3920	0.74%	0.75%
1970	4079	42	4121	1.02%	1.03%
1971	4216	68	4284	1.59%	1.61%
1972	4370	61	4431	1.38%	1.40%
1973	4753	76	4829	1.57%	1.60%
1974	6174	239	6413	3.73%	3.87%
1975	6167	298	6465	4.61%	4.83%
1976	6164	334	6498	5.14%	5.42%
1977	6170	350	6520	5.37%	5.67%
1978	6076	324	6400	5.06%	5.33%
1979	5724	267	5991	4.46%	4.66%
1980	6016	314	6330	4.96%	5.22%
1981	6103	303	6406	4.73%	4.96%
1982	6447	410	6857	5.98%	6.36%

Table 1: Sample Characteristics (continued)

The sample consists of all firms from COMPUSTAT database with non-missing values. Book equity is defined the same as Fama and French (1993): BE=Book Value of Equity + Deferred Taxes + Investment Tax Credit – Book Value of Preferred Stock. PBE firms refer to firms with positive book equity. NBE firms refer to firms with negative book equity. Relative frequency is calculated as number of negative book equity firms divided by number of positive book equity firms.

<i>Data Year</i>	<i>Number of PBE firms</i>	<i>Number of NBE firms</i>	<i>Number of total firms</i>	<i>Percentage of NBE firms</i>	<i>Relative Frequency between PBE and NBE firms</i>
1983	6725	397	7122	5.57%	5.90%
1984	6759	430	7189	5.98%	6.36%
1985	6983	585	7568	7.73%	8.38%
1986	7247	666	7913	8.42%	9.19%
1987	7302	692	7994	8.66%	9.48%
1988	7085	748	7833	9.55%	10.56%
1989	6855	812	7667	10.59%	11.85%
1990	6788	903	7691	11.74%	13.30%
1991	6952	907	7859	11.54%	13.05%
1992	7330	921	8251	11.16%	12.56%
1993	8617	838	9455	8.86%	9.72%
1994	9114	883	9997	8.83%	9.69%
1995	9683	1112	10795	10.30%	11.48%
1996	10046	957	11003	8.70%	9.53%
1997	9739	1030	10769	9.56%	10.58%
1998	9580	1472	11052	13.32%	15.37%
1999	9779	1409	11188	12.59%	14.41%
2000	9512	1289	10801	11.93%	13.55%
2000	9512	1289	10801	11.93%	13.55%
2001	8668	1417	10085	14.05%	16.35%
2002	8204	1388	9592	14.47%	16.92%
2003	8156	1304	9460	13.78%	15.99%
2004	8191	1239	9430	13.14%	15.13%

Table 1: Sample Characteristics (continued)

The sample consists of all firms from COMPUSTAT database with non-missing values. Book equity is defined the same as Fama and French (1993): BE=Book Value of Equity + Deferred Taxes + Investment Tax Credit – Book Value of Preferred Stock. PBE firms refer to firms with positive book equity. NBE firms refer to firms with negative book equity. Relative frequency is calculated as number of negative book equity firms divided by number of positive book equity firms.

<i>Data Year</i>	Number of PBE firms	Number of NBE firms	Number of total firms	Percentage of NBE firms	Relative Frequency between PBE and NBE firms
<i>2006</i>	8070	1032	9102	11.34%	12.79%
<i>2007</i>	7944	862	8806	9.79%	10.85%
<i>2008</i>	7494	1017	8511	11.95%	13.57%
<i>2009</i>	7281	1037	8318	12.47%	14.24%
<i>2010</i>	7325	981	8306	11.81%	13.39%
<i>2011</i>	7263	1004	8267	12.14%	13.82%
<i>2012</i>	7413	1070	8483	12.61%	14.43%
<i>2013</i>	6253	697	6950	10.03%	11.15%

Table 2: Reduced Sample Characteristics

The sample consists of all firms from COMPUSTAT database that report negative book equity (NBE) and traded on New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ from 1965 January to December 2013. All accounting data are from the previous December on COMPUSTAT. Firms with missing book equity value are dropped from the sample. We also exclude financial companies (Standard Industrial Classification (SIC) codes 6000-6999), non-US companies (entries in COMPUSTAT with International Standards Organization country code of incorporation (FIC) not equal to USA). All accounting data are winsorized at 1% to reduce the effects of extreme values.

<i>Data Year</i>	<i>Number of PBE firms</i>	<i>Number of NBE firms</i>	<i>Percentage of NBE firms</i>	<i>Percentage of NBE firms with Positive earnings</i>
1961	1343	7	0.52%	28.57%
1962	1497	8	0.53%	62.50%
1963	827	5	0.60%	40.00%
1964	937	5	0.53%	60.00%
1965	1116	7	0.63%	42.86%
1966	1593	11	0.69%	63.64%
1967	1775	9	0.51%	55.56%
1968	1971	8	0.41%	75.00%
1969	2110	10	0.47%	60.00%
1970	2267	17	0.75%	29.41%
1971	2351	28	1.19%	14.29%
1972	2411	25	1.04%	48.00%
1973	2484	21	0.85%	42.86%
1974	2691	33	1.23%	36.36%
1975	2678	36	1.34%	33.33%
1976	2651	40	1.51%	32.50%
1977	2606	42	1.61%	40.48%
1978	2541	39	1.53%	46.15%
1979	2414	32	1.33%	40.63%
1980	2554	43	1.68%	34.88%
1981	2570	45	1.75%	40.00%



Table 2: Reduced Sample Characteristics (continued)

The sample consists of all firms from COMPUSTAT database that report negative book equity (NBE) and traded on New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ from 1965 January to December 2013. All accounting data are from the previous December on COMPUSTAT. Firms with missing book equity value are dropped from the sample. We also exclude financial companies (Standard Industrial Classification (SIC) codes 6000-6999), non-US companies (entries in COMPUSTAT with International Standards Organization country code of incorporation (FIC) not equal to USA). All accounting data are winsorized at 1% to reduce the effects of extreme values.

*Panel A*

<i>Data Year</i>	Number of PBE firms	Number of NBE firms	Percentage of NBE firms	Percentage of NBE firms with Positive earnings
<i>1982</i>	2745	73	2.66%	26.03%
<i>1983</i>	2879	57	1.98%	21.05%
<i>1984</i>	2918	63	2.16%	28.57%
<i>1985</i>	3085	115	3.73%	24.35%
<i>1986</i>	3193	134	4.20%	28.36%
<i>1987</i>	3202	155	4.84%	29.03%
<i>1988</i>	3129	155	4.95%	27.10%
<i>1989</i>	3129	179	5.72%	31.84%
<i>1990</i>	3262	220	6.74%	24.55%
<i>2001</i>	4088	226	5.53%	25.22%
<i>2002</i>	4076	288	7.07%	22.92%
<i>2003</i>	4120	277	6.72%	23.10%
<i>2004</i>	4161	273	6.56%	28.57%
<i>2005</i>	4165	305	7.32%	28.85%
<i>2006</i>	4059	253	6.23%	32.41%
<i>2007</i>	3939	164	4.16%	34.15%
<i>2008</i>	3931	273	6.94%	27.47%
<i>2009</i>	3877	287	7.40%	32.75%
<i>2010</i>	3832	254	6.63%	35.83%
<i>2011</i>	3863	277	7.17%	32.85%
<i>2012</i>	3832	285	7.44%	26.32%
<i>2013</i>	3499	199	5.69%	24.62%

Table 2: Reduced Sample Characteristics (continued)

The sample consists of all firms from COMPUSTAT database that report negative book equity (NBE) and traded on New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ from 1965 January to December 2013. All accounting data are from the previous December on COMPUSTAT. Firms with missing book equity value are dropped from the sample. We also exclude financial companies (Standard Industrial Classification (SIC) codes 6000-6999), non-US companies (entries in COMPUSTAT with International Standards Organization country code of incorporation (FIC) not equal to USA). All accounting data are winsorized at 1% to reduce the effects of extreme values.

Panel B					
Summary For Positive Book Equity Firms			Summary For Negative Book Equity Firms		
Earnings Status	Number of observations	Percentage of total firms	Earnings Status	Number of observations	Percentage of total firms
Positive earnings	123568	78%	Positive earnings	2230	28%
Negative earnings	34777	22%	Negative earnings	5733	72%

  

Panel C					
Summary For Positive Earnings Firms			Summary For Negative Earnings Firms		
Book Equity Status	Number of observations	Percentage of total firms	Book Equity Status	Number of observations	Percentage of total firms
Positive book equity	29967	87%	Positive book equity	128378	97%
Negative book equity	4468	13%	Negative book equity	3495	3%

Table 3: Summary Statistics of Firm Characteristics for Two-Way sorted Portfolios

Each June, portfolios of negative book equity firms are formed from three independent rankings, using 30<sup>th</sup> and 70<sup>th</sup> percentile breakpoints, by BE/ME and O-SCORE developed by Ohlson (1980). O-SCORE is calculated as:  $-1.32 - 0.407 \log(\text{total assets}) + 6.03 (\text{total liabilities}/\text{total assets}) - 1.43 (\text{working capital}/\text{total assets}) + 0.076 (\text{current liabilities}/\text{current assets}) - 1.72 (1 \text{ if total liabilities} > \text{total assets, } 0 \text{ otherwise}) - 2.37 (\text{net income}/\text{total assets}) - 1.83 (\text{funds from operations}/\text{total liabilities}) + 0.285 (1 \text{ if a net loss for the first two years, } 0 \text{ otherwise}) - 0.521 [(\text{net income at year } t - \text{net income at year } t-1)/(\text{absolute value of net income at year } t) + \text{absolute value of (net income at year } t-1)]$ . MLR refers to market leverage ratio and calculated as:  $\text{market leverage ratio} = \frac{\text{long term debt} + \text{debt in current liabilities}}{\text{long term debt} + \text{debt in current liabilities} + \text{year end shares outstanding} \times \text{year end share price}}$  BLR refers to book leverage ratio and calculated as:  $\text{Book leverage ratio} = \frac{\text{long term debt} + \text{debt in current liabilities}}{\text{total asset}}$ . After\_Sum refers number of years survived after firm first report negative book equity. In the table, summary statistics of the characteristic variables, which are calculated as simple average of the means of the time series portfolios for firms in each group, are reported for each sorted portfolio.

O-SCORE	Market to Book Equity								
	L	M	H	L	M	H	L	M	H
	oscore			Net Income			Firm-Year Observations		
L	0.81	1.09	1.24	6.21	-96.96	-283.32	10965	315	655
M	3.42	3.33	3.13	-186.88	-59.33	-244.93	277	121	285
H	13.06	12.65	13.30	-35.11	-61.54	-251.07	561	222	570
	Total Liability/Total Asset			MLR			BLR		
L	1.61	1.26	1.38	0.39	0.61	0.73	0.82	0.80	0.72
M	1.23	1.31	1.33	0.29	0.54	0.76	0.75	0.85	0.79
H	1.93	2.01	2.37	0.15	0.34	0.68	0.87	0.87	1.23
	Afte_Sum			RE					
L	8.19	13.35	13.67	-114.51	-437.53	-235.21			
M	12.69	13.97	13.85	-227.43	-299.00	-489.43			
H	14.02	11.89	13.64	-174.19	-243.47	-340.38			

Table 4 Descriptive Statistics for Negative Book Equity Firms, Health Negative Book Equity Firms and Reference firms.

We construct, for every health negative book equity firm year observation, a reference set of proxy firm-year observations. Specifically, we match for each healthy NBE firms at least three comparable firms in each calendar year by industry (3 digit SIC code) and size (logarithm of sales). We do not put any matching restrictions on leverage so that the reference firms can have negative book equity as well. Size is calculated as natural logarithm of book assets. Size is measured by nature log of firm's book assets. Long term debt coverage measures debt coverage and defined as earnings before interest and tax standardized by total liabilities; Capital expenditure is calculated as capital expenditure over book assets. Profitability calculated as earnings before interest and tax over book assets. Tangibility is defined as fixed assets to book assets. Tax is defined as taxes paid to book assets. Cash is calculated as a ratio of cash holdings to book assets. Dividend is calculates as a ratio of common dividends to book assets. Table below reports various descriptive statistics for negative book equity firm, health negative book equity firm and their reference firms. Statistics are produced by taking equally weighted average within each group first, then the statistics are weighted equally across entire sample period.

Variables	Reference firms	NBE firms	Healthy NBE firms
Total Liability/Total Asset	0.44	1.59	1.61
BLR	0.19	0.80	0.82
MLR	0.18	0.51	0.39
Common shares Outstanding	46.70	49.31	46.09
Size	4.61	4.20	3.98
Long term debt coverage	-0.18	-0.21	0.42
Capital Expenditure	0.07	0.07	0.08
Profitability	0.03	-0.40	-0.90
Research and Development Cost	5.26	9.92	10.95
Share Repurchase	0.01	0.03	0.03
Tangibility	0.29	0.30	0.28
Tax	0.03	0.01	0.01
Cash Holding	0.22	0.17	0.18
Dividend	0.02	0.02	0.03

Table 5 Raw Returns and Market Adjusted Returns for Health NBE firms, Reference Firms and All NBE firms

Table below reports the raw returns and market adjusted returns for each portfolio by calendar year as well as time-series geometric and arithmetic average returns. From 1970 to 2012, each year 3 portfolios are created for health NBE firms, reference firms and all NBE firms respectively for that year. New portfolios are created each year for entire sample period. The raw returns are the equal weighted monthly returns for the portfolio and then averaged over each year. The market adjusted returns are the raw returns subtract the value weighted CRSP returns. Arithmetic and geometric averages are the time-series averages of monthly returns.

Panel 1: Health NBE Firms

Year	Raw Returns				Market Adjusted Returns			
	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)
1970	-0.76	-0.44	8.31	-0.99	-0.67	-0.63	3.08	-1.49
1971	1.45	1.63	6.34	0.78	0.27	0.30	2.45	0.05
1972	0.66	0.73	4.04	-0.05	-0.63	-0.59	2.62	-1.81
1973	-2.83	-2.48	8.63	-2.87	-0.90	-0.82	4.33	-1.51
1974	-1.98	-1.71	7.77	-5.19	0.71	0.75	2.92	0.53
1975	4.10	4.41	8.61	4.33	1.46	1.54	4.24	0.74
1976	2.94	3.16	7.30	1.68	1.00	1.08	4.19	-0.20
1977	0.80	0.87	3.78	1.03	1.08	1.10	2.19	0.69
1978	1.69	2.02	8.12	3.61	1.17	1.23	3.60	2.03
1979	3.10	3.30	6.63	4.59	1.41	1.45	2.87	1.52
1980	3.47	3.84	8.74	4.90	1.19	1.26	3.78	0.96
1981	0.16	0.34	6.27	-0.49	0.52	0.56	3.04	-1.02
1982	2.41	2.64	7.21	-0.15	0.86	0.89	2.29	-0.10
1983	2.91	3.06	5.83	2.98	1.24	1.30	3.71	1.15
1984	-0.47	-0.33	5.60	-0.16	-0.74	-0.71	2.34	-1.02
1985	2.25	2.41	6.09	2.71	-0.08	-0.03	3.39	-1.48
1986	0.97	1.09	5.03	2.48	-0.31	-0.30	2.04	-0.35
1987	0.07	0.86	12.25	2.23	0.26	0.33	3.97	0.20
1988	2.39	2.47	4.18	1.87	1.02	1.05	2.74	0.91

Table 5 Raw Returns and Market Adjusted Returns for Health NBE firms, Reference Firms and All NBE firms (Continued)

Table below reports the raw returns and market adjusted returns for each portfolio by calendar year as well as time-series geometric and arithmetic average returns. From 1970 to 2012, each year 3 portfolios are created for health NBE firms, reference firms and all NBE firms respectively for that year. New portfolios are created each year for entire sample period. The raw returns are the equal weighted monthly returns for the portfolio and then averaged over each year. The market adjusted returns are the raw returns subtract the value weighted CRSP returns. Arithmetic and geometric averages are the time-series averages of monthly returns.

Panel 1: Health NBE Firms

Year	Raw Returns				Market Adjusted Returns			
	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)
1989	2.58	2.68	4.63	3.88	0.46	0.49	2.63	1.24
1990	-2.01	-1.81	6.51	-1.31	-1.44	-1.42	2.24	-1.06
1991	4.70	4.86	6.21	3.87	2.15	2.25	4.83	0.96
1992	1.74	1.87	5.54	1.28	0.97	1.07	4.98	-0.26
1993	2.04	2.09	3.34	2.21	1.18	1.20	1.99	1.36
1994	0.09	0.14	3.25	0.67	0.10	0.11	1.47	-0.15
1995	3.26	3.31	3.33	3.79	0.63	0.65	2.34	1.01
1996	1.94	2.03	4.49	2.85	0.33	0.37	3.18	0.77
1997	2.26	2.38	5.23	1.68	-0.06	0.01	3.93	-0.06
1998	1.35	1.77	9.17	4.29	-0.38	-0.28	4.86	-1.44
1999	3.16	3.28	5.35	2.67	1.23	1.31	4.25	1.95
2000	0.11	0.30	6.31	1.87	1.14	1.19	3.46	0.71
2001	2.09	2.52	9.76	3.51	3.20	3.35	5.91	2.52
2002	-1.15	-0.86	8.06	-1.15	0.88	0.95	3.74	0.03
2003	5.85	5.99	5.68	5.53	3.56	3.61	3.43	3.32
2004	2.31	2.39	4.21	2.04	1.40	1.42	2.19	1.58
2005	1.62	1.72	4.87	2.18	1.16	1.20	3.29	0.68

Table 5 Raw Returns and Market Adjusted Returns for Health NBE firms, Reference Firms and All NBE firms (Continued)

Table below reports the raw returns and market adjusted returns for each portfolio by calendar year as well as time-series geometric and arithmetic average returns. From 1970 to 2012, each year 3 portfolios are created for health NBE firms, reference firms and all NBE firms respectively for that year. New portfolios are created each year for entire sample period. The raw returns are the equal weighted monthly returns for the portfolio and then averaged over each year. The market adjusted returns are the raw returns subtract the value weighted CRSP returns. Arithmetic and geometric averages are the time-series averages of monthly returns.

Panel 1: Health NBE Firms

Year	Raw Returns				Market Adjusted Returns			
	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)
2006	1.93	2.01	4.23	1.74	0.76	0.79	2.68	0.56
2007	0.47	0.55	4.19	1.17	0.04	0.06	1.95	0.85
2008	-5.49	-5.01	9.73	-1.92	-1.53	-1.46	3.93	-0.65
2009	5.79	6.24	10.21	9.42	3.83	3.95	5.29	4.52
2010	2.88	3.15	7.77	4.61	1.62	1.65	2.64	2.18
2011	-0.84	-0.56	7.73	-0.17	-0.76	-0.71	3.09	-0.39
2012	1.56	1.65	4.46	3.32	0.32	0.33	1.72	0.51
Avg.	1.41	1.64		1.89	0.68	0.74		0.48

Table 5 Raw Returns and Market Adjusted Returns for Health NBE firms, Reference Firms and All NBE firms (Continued)

Table below reports the raw returns and market adjusted returns for each portfolio by calendar year as well as time-series geometric and arithmetic average returns. From 1970 to 2012, each year 3 portfolios are created for health NBE firms, reference firms and all NBE firms respectively for that year. New portfolios are created each year for entire sample period. The raw returns are the equal weighted monthly returns for the portfolio and then averaged over each year. The market adjusted returns are the raw returns subtract the value weighted CRSP returns. Arithmetic and geometric averages are the time-series averages of monthly returns.

Panel 2 : Reference Firms								
Year	Raw Returns				Market Adjusted Returns			
	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)
1970	-0.80	-0.49	8.23	-0.95	-0.74	-0.67	3.78	-1.70
1971	1.77	1.95	6.37	1.04	0.57	0.61	2.93	-0.27
1972	0.88	0.95	4.08	-0.09	-0.41	-0.37	2.89	-1.19
1973	-3.20	-2.87	8.31	-3.80	-1.29	-1.21	4.11	-1.84
1974	-2.24	-2.00	7.29	-4.92	0.36	0.46	4.69	0.00
1975	4.72	5.05	9.01	3.79	2.08	2.18	4.87	0.19
1976	3.55	3.75	6.89	2.14	1.61	1.67	3.74	0.06
1977	1.62	1.66	2.94	1.10	1.88	1.89	1.59	1.34
1978	1.95	2.26	7.91	3.93	1.41	1.47	3.49	1.70
1979	3.26	3.42	5.83	4.14	1.55	1.56	1.91	1.31
1980	3.11	3.41	7.76	4.97	0.78	0.82	3.18	1.00
1981	0.55	0.69	5.47	0.37	0.87	0.90	2.63	0.40
1982	2.74	2.89	5.95	1.77	1.12	1.14	2.03	1.21
1983	2.98	3.09	5.04	4.81	1.30	1.34	3.04	1.11
1984	-0.45	-0.35	4.66	-0.82	-0.74	-0.74	1.00	-0.74
1985	2.63	2.73	4.79	3.15	0.26	0.29	2.29	-0.68
1986	0.84	0.93	4.48	2.02	-0.46	-0.45	1.78	-0.79
1987	0.11	0.72	10.69	2.95	0.15	0.19	2.73	0.41
1988	2.31	2.38	3.88	2.75	0.93	0.96	2.59	0.82
1989	1.83	1.87	3.01	1.86	-0.32	-0.31	1.37	-0.30



Table 5 Raw Returns and Market Adjusted Returns for Health NBE firms, Reference Firms and All NBE firms (Continued)

Table below reports the raw returns and market adjusted returns for each portfolio by calendar year as well as time-series geometric and arithmetic average returns. From 1970 to 2012, each year 3 portfolios are created for health NBE firms, reference firms and all NBE firms respectively for that year. New portfolios are created each year for entire sample period. The raw returns are the equal weighted monthly returns for the portfolio and then averaged over each year. The market adjusted returns are the raw returns subtract the value weighted CRSP returns. Arithmetic and geometric averages are the time-series averages of monthly returns.

Panel 2 : Reference Firms								
Year	Raw Returns				Market Adjusted Returns			
	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)
1990	-0.85	-0.69	5.84	-0.15	-0.32	-0.31	1.59	-0.36
1991	3.68	3.78	4.72	3.37	1.14	1.17	2.58	1.17
1992	1.99	2.07	4.29	2.26	1.22	1.27	3.59	0.56
1993	1.96	1.99	2.48	2.52	1.08	1.09	1.21	0.82
1994	0.36	0.40	2.91	0.26	0.37	0.38	1.49	0.23
1995	2.46	2.48	2.51	2.76	-0.18	-0.17	1.56	-0.29
1996	2.05	2.14	4.39	3.55	0.44	0.48	2.82	0.62
1997	2.06	2.17	4.84	1.39	-0.26	-0.21	3.52	-0.21
1998	0.07	0.34	7.37	2.05	-1.72	-1.70	2.02	-1.31
1999	2.48	2.58	4.68	2.45	0.54	0.61	3.78	0.31
2000	0.96	1.10	5.63	1.26	1.95	2.00	3.20	1.78
2001	2.42	2.71	7.88	3.96	3.47	3.53	3.68	3.43
2002	-0.28	-0.08	6.60	0.17	1.68	1.73	3.16	1.73
2003	4.95	5.04	4.45	5.46	2.64	2.66	2.20	2.97
2004	2.24	2.31	3.93	2.65	1.33	1.34	1.93	1.33
2005	1.08	1.14	3.76	1.68	0.61	0.62	1.62	0.77
2006	1.82	1.88	3.58	1.81	0.64	0.66	2.04	0.35

Table 5 Raw Returns and Market Adjusted Returns for Health NBE firms, Reference Firms and All NBE firms (Continued)

Table below reports the raw returns and market adjusted returns for each portfolio by calendar year as well as time-series geometric and arithmetic average returns. From 1970 to 2012, each year 3 portfolios are created for health NBE firms, reference firms and all NBE firms respectively for that year. New portfolios are created each year for entire sample period. The raw returns are the equal weighted monthly returns for the portfolio and then averaged over each year. The market adjusted returns are the raw returns subtract the value weighted CRSP returns. Arithmetic and geometric averages are the time-series averages of monthly returns.

Panel 2 : Reference Firms								
Year	Raw Returns				Market Adjusted Returns			
	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)
2007	0.56	0.61	3.25	1.37	0.10	0.11	1.60	0.40
2008	-4.14	-3.76	8.63	-0.82	-0.25	-0.21	3.00	0.35
2009	5.09	5.43	8.85	6.54	3.07	3.14	3.99	3.04
2010	2.53	2.73	6.56	5.15	1.22	1.23	1.53	1.26
2011	-0.49	-0.31	6.24	-0.66	-0.47	-0.46	1.67	-0.69
2012	1.24	1.32	4.10	2.26	0.00	0.01	1.52	-0.30
Avg.	1.43	1.61		1.90	0.67	0.71		0.47

Table 5 Raw Returns and Market Adjusted Returns for Health NBE firms, Reference Firms and All NBE firms (Continued)

Table below reports the raw returns and market adjusted returns for each portfolio by calendar year as well as time-series geometric and arithmetic average returns. From 1970 to 2012, each year 3 portfolios are created for health NBE firms, reference firms and all NBE firms respectively for that year. New portfolios are created each year for entire sample period. The raw returns are the equal weighted monthly returns for the portfolio and then averaged over each year. The market adjusted returns are the raw returns subtract the value weighted CRSP returns. Arithmetic and geometric averages are the time-series averages of monthly returns.

Panel 3: All NBE Firms								
Year	Raw Returns				Market Adjusted Returns			
	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)
1970	-0.83	-0.53	8.03	-0.60	-0.77	-0.71	3.43	-1.72
1971	1.39	1.57	6.33	0.93	0.19	0.23	2.90	-0.63
1972	0.60	0.67	4.03	-0.60	-0.69	-0.66	2.71	-1.50
1973	-3.01	-2.74	7.56	-3.06	-1.12	-1.07	3.28	-1.77
1974	-2.16	-1.93	7.19	-4.65	0.44	0.53	4.41	0.11
1975	4.80	5.14	9.18	3.89	2.16	2.27	4.99	0.73
1976	3.42	3.61	6.75	1.87	1.47	1.53	3.52	-0.06
1977	1.30	1.35	3.34	1.07	1.57	1.58	1.69	0.99
1978	1.57	1.85	7.56	3.59	1.02	1.06	3.20	1.81
1979	2.79	2.94	5.73	3.76	1.07	1.09	1.82	1.11
1980	3.05	3.31	7.28	4.93	0.69	0.72	2.45	1.24
1981	0.23	0.35	5.18	0.10	0.54	0.56	2.10	0.50
1982	2.34	2.49	5.78	0.77	0.72	0.73	1.55	0.74
1983	2.66	2.78	4.99	3.82	0.98	1.02	3.01	0.75
1984	-0.55	-0.46	4.54	-0.55	-0.86	-0.85	1.17	-0.59
1985	2.41	2.51	4.95	2.47	0.05	0.07	2.24	-0.55
1986	0.91	1.01	4.55	2.54	-0.39	-0.37	1.57	-0.42
1987	-0.18	0.40	10.54	2.65	-0.15	-0.13	2.41	0.43
1988	2.12	2.20	4.03	2.33	0.75	0.78	2.54	1.00
1989	1.84	1.88	2.99	1.95	-0.32	-0.31	1.56	-0.56

Table 5 Raw Returns and Market Adjusted Returns for Health NBE firms, Reference Firms and All NBE firms (Continued)

Table below reports the raw returns and market adjusted returns for each portfolio by calendar year as well as time-series geometric and arithmetic average returns. From 1970 to 2012, each year 3 portfolios are created for health NBE firms, reference firms and all NBE firms respectively for that year. New portfolios are created each year for entire sample period. The raw returns are the equal weighted monthly returns for the portfolio and then averaged over each year. The market adjusted returns are the raw returns subtract the value weighted CRSP returns. Arithmetic and geometric averages are the time-series averages of monthly returns.

Panel 3: All NBE Firms								
Year	Raw Returns				Market Adjusted Returns			
	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)
1990	-1.17	-1.01	5.87	-0.55	-0.64	-0.62	1.80	-1.02
1991	6.46	6.84	9.83	4.06	3.97	4.24	8.20	1.78
1992	1.64	1.77	5.32	2.09	0.87	0.97	4.62	-0.23
1993	2.33	2.41	4.47	1.82	1.46	1.51	3.67	0.74
1994	-0.06	-0.01	3.53	-0.65	-0.05	-0.03	1.96	-0.53
1995	3.13	3.17	3.05	2.80	0.49	0.51	2.24	0.32
1996	1.86	2.01	5.64	3.06	0.28	0.35	3.98	1.15
1997	1.85	2.01	5.97	0.65	-0.45	-0.36	4.37	-0.65
1998	1.16	1.53	8.67	4.39	-0.56	-0.52	3.03	-0.28
1999	4.51	4.66	6.02	3.01	2.61	2.69	4.30	3.56
2000	-0.68	-0.13	11.02	-2.26	0.48	0.77	8.06	-1.43
2001	2.69	3.38	12.50	5.05	3.94	4.21	7.93	4.09
2002	-1.54	-1.16	9.14	-3.23	0.55	0.64	4.45	0.14
2003	6.57	6.72	6.03	5.48	4.28	4.34	3.88	4.17
2004	2.06	2.22	5.82	1.45	1.18	1.25	3.79	0.53
2005	0.84	0.94	4.56	1.66	0.39	0.42	2.43	0.57
2006	1.86	1.95	4.38	1.55	0.70	0.73	2.80	0.90
2007	0.48	0.55	3.82	1.09	0.03	0.05	1.89	0.07
2008	-5.07	-4.65	9.07	-2.68	-1.15	-1.10	3.28	0.08

Table 5 Raw Returns and Market Adjusted Returns for Health NBE firms, Reference Firms and All NBE firms (Continued)

Table below reports the raw returns and market adjusted returns for each portfolio by calendar year as well as time-series geometric and arithmetic average returns. From 1970 to 2012, each year 3 portfolios are created for health NBE firms, reference firms and all NBE firms respectively for that year. New portfolios are created each year for entire sample period. The raw returns are the equal weighted monthly returns for the portfolio and then averaged over each year. The market adjusted returns are the raw returns subtract the value weighted CRSP returns. Arithmetic and geometric averages are the time-series averages of monthly returns.

Panel 3: All NBE Firms								
Year	Raw Returns				Market Adjusted Returns			
	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)	Geometric Annual Returns (%)	Arithmetic Annual Returns (%)	Standard Deviation (%)	Median Annual Returns (%)
2009	6.02	6.35	8.63	7.36	3.98	4.06	4.38	4.23
2010	2.55	2.76	6.84	4.58	1.25	1.26	1.82	1.57
2011	-0.92	-0.71	6.72	-1.38	-0.88	-0.86	2.10	-0.67
2012	1.48	1.58	4.70	2.53	0.25	0.26	2.02	0.02
Avg.	1.43	1.66		1.61	0.70	0.76		0.48

Table 6: Risk Adjusted Return for Health NBE firms, Reference Firms and All NBE firms Using Fama-French 3 Factor Model

We use three Fama-French variables, MP, SMB, and HML, to examine the monthly excessive returns for three portfolios: health negative book equity firms, Reference firms and all negative book equity firms. The regression model is:  $r_{i,t} = \alpha_{i,t} + aMP_{i,t} + bSMB_{i,t} + cHML_{i,t} + \varepsilon_{i,t}$ . Monthly data for three risk factors are obtained from Professor Kenneth French's data library. For each estimated coefficient, t-statistics are reported under the estimated coefficient. Overall average is estimated by run the 3-factor regression on data over the entire sample period.

Panel 1: HealthNBE Firms									
Year	Intercept	MR	SMB	HML	Year	Intercept	MR	SMB	HML
1970	0.09	1.07	0.53	-0.13	1992	-0.95	1.04	1.33	0.71
	0.22	16.59	4.20	-0.72		-2.32	6.46	13.70	5.57
1971	0.12	1.29	0.36	0.38	1993	0.91	1.20	0.67	-0.11
	0.37	13.25	2.55	2.41		2.34	6.88	3.30	-0.89
1972	-0.26	1.32	0.81	0.26	1994	0.23	1.07	0.72	0.07
	-0.69	6.98	6.78	1.84		0.97	12.36	4.37	0.48
1973	1.30	1.10	0.96	0.18	1995	0.56	1.25	1.03	0.20
	3.11	9.03	5.73	0.93		1.05	6.45	6.79	1.07
1974	1.19	1.24	0.55	0.35	1996	0.59	0.91	0.99	0.07
	2.82	9.80	3.00	1.37		1.81	7.04	7.48	0.38
1975	0.31	1.10	0.79	0.28	1997	0.42	0.95	0.96	0.01
	0.74	13.06	5.82	1.94		1.04	9.27	11.36	0.07
1976	-0.55	1.19	1.24	0.05	1998	1.85	0.80	1.17	-0.26
	-1.38	9.09	4.82	0.15		0.95	2.38	1.60	-0.42
1977	-0.62	1.23	0.86	0.54	1999	1.55	0.91	0.86	0.44
	-1.20	10.41	3.59	3.14		3.46	7.37	9.49	3.13
1978	0.60	1.47	0.47	0.87	2000	1.22	0.81	0.20	-0.10
	1.63	10.43	3.45	2.94		2.08	6.06	1.80	-0.55
1979	-0.65	0.90	1.47	-0.20	2001	1.05	1.19	1.21	0.41
	-1.40	6.18	4.92	-1.05		2.29	13.12	10.90	3.90
1980	0.25	1.12	0.88	-0.22	2002	1.11	1.35	0.58	0.29
	0.54	11.12	5.09	-1.54		3.00	19.83	5.29	2.30

Table 6: Risk Adjusted Return for Health NBE firms, Reference Firms and All NBE firms Using Fama-French 3 Factor Model (Continued)

We use three Fama-French variables, MP, SMB, and HML, to examine the monthly excessive returns for three portfolios: health negative book equity firms, Reference firms and all negative book equity firms. The regression model is:  $r_{i,t} = \alpha_{i,t} + aMP_{i,t} + bSMB_{i,t} + cHML_{i,t} + \varepsilon_{i,t}$ . Monthly data for three risk factors are obtained from Professor Kenneth French's data library. For each estimated coefficient, t-statistics are reported under the estimated coefficient. Overall average is estimated by run the 3-factor regression on data over the entire sample period.

Panel 1: Health NBE Firms									
Year	Intercept	MR	SMB	HML	Year	Intercept	MR	SMB	HML
1981	0.30	1.17	1.01	-0.08	2003	0.93	1.13	1.31	0.54
	0.61	7.30	5.60	-0.38		1.77	8.60	6.61	1.83
1982	0.98	1.09	0.29	-0.43	2004	0.96	1.07	0.79	0.08
	1.58	8.78	1.11	-1.49		3.37	6.84	5.27	0.51
1983	0.66	1.18	0.77	-0.21	2005	0.95	1.15	0.70	0.41
	0.90	5.91	3.66	-0.82		1.30	2.38	1.30	0.95
1984	0.49	1.16	1.62	-0.03	2006	0.32	1.16	0.98	0.26
	0.65	7.90	2.27	-0.16		1.06	6.84	8.02	1.72
1985	-0.49	1.23	1.35	-0.14	2007	0.76	1.32	0.70	0.27
	-1.00	7.17	4.53	-0.53		2.84	18.03	4.17	1.27
1986	0.12	1.12	0.90	0.25	2008	-0.64	1.33	0.65	0.13
	0.33	10.05	3.51	1.00		-1.47	20.82	3.79	1.00
1987	0.74	1.25	0.58	0.05	2009	3.40	1.01	0.82	0.40
	2.20	21.95	4.33	0.29		6.36	7.27	5.38	2.27
1988	-0.21	1.19	1.10	0.60	2010	0.79	1.13	0.68	0.23
	-0.49	9.75	7.74	3.03		2.65	18.86	4.71	1.93
1989	0.89	1.47	1.15	0.42	2011	-0.29	1.27	0.80	0.22
	2.21	12.03	5.25	1.34		-1.03	14.42	4.25	1.13
1990	-0.74	0.96	0.69	-0.15	2012	-0.17	1.29	0.78	0.16
	-1.24	9.23	4.12	-0.47		-0.62	15.75	4.44	1.09
1991	-0.15	0.54	1.97	-1.47	Avg.	0.48	1.19	0.75	0.27
	-0.12	2.11	4.15	-1.75	6.96	75.55	33.95	11.63	

Table 6: Risk Adjusted Return for Health NBE firms, Reference Firms and All NBE firms Using Fama-French 3 Factor Model (Continued)

We use three Fama-French variables, MP, SMB, and HML, to examine the monthly excessive returns for three portfolios: health negative book equity firms, Reference firms and all negative book equity firms. The regression model is:  $r_{i,t} = \alpha_{i,t} + aMP_{i,t} + bSMB_{i,t} + cHML_{i,t} + \varepsilon_{i,t}$ . Monthly data for three risk factors are obtained from Professor Kenneth French's data library. For each estimated coefficient, t-statistics are reported under the estimated coefficient. Overall average is estimated by run the 3-factor regression on data over the entire sample period.

Panel 2: Reference firms									
Year	Intercept	MR	SMB	HML	Year	Intercept	MR	SMB	HML
1970	0.13	0.91	0.94	-0.02	1992	0.22	0.91	1.02	0.29
	0.82	37.86	19.96	-0.27		1.63	16.97	31.59	6.89
1971	0.33	0.91	1.06	0.25	1993	0.80	0.94	0.66	0.03
	2.45	21.66	17.60	3.60		5.87	15.31	9.30	0.62
1972	0.29	1.19	0.99	0.19	1994	0.43	0.92	0.67	-0.08
	2.06	16.94	22.43	3.73		4.97	28.39	10.82	-1.33
1973	0.70	0.95	1.13	0.32	1995	0.09	1.02	0.70	0.13
	5.00	23.20	20.28	5.01		0.53	16.52	14.37	2.20
1974	0.26	0.97	1.13	0.15	1996	0.42	1.10	0.97	0.29
	1.93	23.51	18.93	1.84		3.54	23.16	20.03	4.13
1975	0.86	1.02	1.05	0.31	1997	0.41	0.87	0.86	-0.09
	5.65	33.41	21.63	5.86		2.92	24.33	29.14	-1.47
1976	0.03	1.05	0.97	0.36	1998	-0.04	1.05	0.77	0.48
	0.23	24.66	11.59	3.55		-0.18	31.01	10.50	7.77
1977	0.01	0.97	0.91	0.39	1999	1.31	0.95	0.81	0.63
	0.03	24.89	11.56	6.82		8.70	22.74	26.36	13.32
1978	0.47	1.14	0.79	0.35	2000	1.86	0.70	0.22	-0.09
	3.95	25.06	18.07	3.68		9.48	15.55	5.92	-1.58
1979	0.19	0.96	0.95	0.04	2001	2.07	1.03	0.76	0.19
	1.30	21.40	10.18	0.75		13.33	33.69	20.26	5.33
1980	0.41	0.97	0.98	0.00	2002	1.26	1.14	0.59	0.49
	3.10	33.81	20.03	-0.04		10.08	48.96	15.97	11.26



Table 6: Risk Adjusted Return for Health NBE firms, Reference Firms and All NBE firms Using Fama-French 3 Factor Model (Continued)

We use three Fama-French variables, MP, SMB, and HML, to examine the monthly excessive returns for three portfolios: health negative book equity firms, Reference firms and all negative book equity firms. The regression model is:  $r_{i,t} = \alpha_{i,t} + aMP_{i,t} + bSMB_{i,t} + cHML_{i,t} + \varepsilon_{i,t}$ . Monthly data for three risk factors are obtained from Professor Kenneth French's data library. For each estimated coefficient, t-statistics are reported under the estimated coefficient. Overall average is estimated by run the 3-factor regression on data over the entire sample period.

Panel 2: Reference firms									
Year	Intercept	MR	SMB	HML	Year	Intercept	MR	SMB	HML
1981	0.16	0.99	1.09	0.02	2003	0.93	0.88	1.04	0.86
	1.18	21.84	21.30	0.38		4.97	18.69	14.63	8.17
1982	0.91	0.93	0.73	-0.17	2004	0.92	1.02	0.73	0.12
	5.54	28.51	10.41	-2.23		8.04	16.05	12.12	1.98
1983	0.74	0.94	0.94	-0.17	2005	0.28	1.18	0.53	0.51
	4.00	18.71	17.67	-2.64		2.68	17.39	6.96	8.24
1984	-0.10	1.06	0.94	0.01	2006	0.26	1.04	0.82	0.30
	-0.60	34.11	6.23	0.25		2.09	15.31	16.77	4.98
1985	0.35	0.94	1.11	-0.17	2007	0.75	0.97	0.68	0.18
	2.79	21.43	14.49	-2.45		7.12	33.12	10.21	2.14
1986	0.25	0.87	0.53	-0.27	2008	0.06	1.18	0.67	-0.08
	2.26	25.91	6.90	-3.58		0.40	50.06	10.70	-1.73
1987	0.81	1.02	0.86	0.02	2009	2.25	1.18	0.70	-0.06
	7.28	53.86	19.22	0.32		11.93	24.13	13.20	-1.01
1988	0.11	1.04	1.06	0.35	2010	0.59	0.96	0.67	0.05
	0.87	29.33	25.70	6.18		5.79	46.76	13.33	1.18
1989	0.30	0.99	0.63	0.19	2011	-0.13	1.07	0.53	0.21
	2.85	31.02	11.03	2.32		-1.20	31.57	7.29	2.81
1990	0.03	0.84	0.62	-0.29	2012	-0.34	1.17	0.70	0.14
	0.17	25.01	11.46	-2.73		-3.19	36.58	10.15	2.54
1991	0.41	0.90	1.16	0.23	Avg.	0.47	1.03	0.76	0.27
	2.52	25.86	18.10	2.03	27.60	262.80	137.24	46.24	

Table 6: Risk Adjusted Return for Health NBE firms, Reference Firms and All NBE firms Using Fama-French 3 Factor Model (Continued)

We use three Fama-French variables, MP, SMB, and HML, to examine the monthly excessive returns for three portfolios: health negative book equity firms, Reference firms and all negative book equity firms. The regression model is:  $r_{i,t} = \alpha_{i,t} + aMP_{i,t} + bSMB_{i,t} + cHML_{i,t} + \varepsilon_{i,t}$ . Monthly data for three risk factors are obtained from Professor Kenneth French's data library. For each estimated coefficient, t-statistics are reported under the estimated coefficient. Overall average is estimated by run the 3-factor regression on data over the entire sample period.

Panel 3: All NBE Firms									
Year	Intercept	MR	SMB	HML	Year	Intercept	MR	SMB	HML
1970	-0.11	0.93	0.89	0.08	1992	-0.25	0.97	1.29	0.28
	-0.72	39.54	19.16	1.15		-1.33	13.30	29.30	4.81
1971	-0.03	0.89	1.07	0.26	1993	1.33	0.93	1.11	-0.19
	-0.21	22.96	19.17	4.05		1.36	2.10	2.17	-0.62
1972	-0.07	1.14	0.91	0.38	1994	0.06	1.05	0.77	-0.23
	-0.54	16.66	21.20	7.47		0.58	27.93	10.69	-3.51
1973	0.44	0.97	0.91	0.27	1995	1.01	0.97	0.98	0.09
	2.86	21.34	14.70	3.88		3.95	10.30	13.31	1.05
1974	0.41	1.05	0.94	0.33	1996	0.32	1.12	1.12	-0.04
	2.74	23.27	14.41	3.54		1.66	14.72	14.35	-0.38
1975	0.84	1.07	0.90	0.51	1997	0.34	0.94	1.02	-0.31
	5.06	32.15	16.82	8.92		2.06	22.47	29.42	-4.37
1976	-0.04	1.07	0.89	0.35	1998	1.77	0.96	1.25	0.05
	-0.27	22.13	9.43	3.01		4.94	15.45	9.26	0.43
1977	-0.28	1.13	0.93	0.46	1999	1.87	0.83	0.85	-0.05
	-1.49	25.90	10.58	7.22		9.33	14.99	20.92	-0.78
1978	0.09	1.05	0.78	0.23	2000	2.18	0.84	0.38	-0.56
	0.61	18.87	14.60	2.01		8.67	14.59	7.88	-7.35
1979	-0.24	0.95	0.93	0.05	2001	2.67	1.23	1.25	-0.18
	-1.41	17.55	8.35	0.75		6.01	14.00	11.73	-1.78
1980	0.40	0.98	0.77	0.01	2002	1.33	1.46	0.75	-0.07
	2.48	27.92	12.75	0.18		7.97	47.41	15.29	-1.30

Table 6: Risk Adjusted Return for Health NBE firms, Reference Firms and All NBE firms Using Fama-French 3 Factor Model (Continued)

We use three Fama-French variables, MP, SMB, and HML, to examine the monthly excessive returns for three portfolios: health negative book equity firms, Reference firms and all negative book equity firms. The regression model is:  $r_{i,t} = \alpha_{i,t} + aMP_{i,t} + bSMB_{i,t} + cHML_{i,t} + \varepsilon_{i,t}$ . Monthly data for three risk factors are obtained from Professor Kenneth French's data library. For each estimated coefficient, t-statistics are reported under the estimated coefficient. Overall average is estimated by run the 3-factor regression on data over the entire sample period.

Panel 3: All NBE Firms									
Year	Intercept	MR	SMB	HML	Year	Intercept	MR	SMB	HML
1981	0.02	1.05	0.82	0.05	2003	1.55	1.22	1.31	0.19
	0.10	18.46	12.80	0.71		7.15	22.39	15.87	1.55
1982	0.54	0.95	0.55	-0.11	2004	0.41	1.77	0.60	-0.12
	2.60	22.80	6.24	-1.16		0.97	7.56	2.69	-0.53
1983	0.29	1.00	0.88	-0.07	2005	0.35	1.11	0.92	0.21
	1.13	14.33	11.97	-0.83		2.12	10.25	7.55	2.18
1984	-0.20	1.02	1.07	0.05	2006	0.33	1.21	0.97	0.15
	-1.02	26.71	5.75	0.98		2.22	14.51	16.20	2.03
1985	-0.15	1.10	1.11	-0.01	2007	0.56	1.16	0.83	-0.02
	-0.89	18.65	10.87	-0.07		3.99	29.90	9.36	-0.18
1986	0.05	1.01	0.69	0.15	2008	-0.58	1.25	0.71	-0.12
	0.28	19.14	5.75	1.22		-3.22	47.13	10.04	-2.14
1987	0.37	1.07	0.66	0.09	2009	2.89	1.27	0.82	-0.34
	2.57	43.63	11.51	1.30		12.07	20.44	12.10	-4.41
1988	-0.44	1.19	1.03	0.60	2010	0.58	1.01	0.66	0.07
	-2.41	22.74	16.95	7.08		4.95	42.75	11.59	1.57
1989	0.40	0.97	0.71	0.12	2011	-0.83	1.24	0.39	-0.15
	2.60	20.71	8.55	1.03		-6.94	33.34	4.90	-1.81
1990	-0.01	0.88	0.65	-0.09	2012	-0.12	1.30	0.84	-0.09
	-0.03	16.38	7.56	-0.53		-0.97	33.51	10.11	-1.28
1991	3.95	1.31	0.19	0.63	Avg.	0.63	1.11	0.89	0.00
	1.17	1.84	0.14	0.27	10.73	82.86	47.75	-0.11	

Table 7 Fama-Macbeth Monthly Regressions of Health NBE Firms, All NBE Firms and Reference Firms

Table below reports, using Fama and MacBeth (1973) approach, regression results for three portfolios: health negative book equity firms, Reference firms and all negative book equity firms. We first estimate the cross-sectional regression for each month in the sample period and compute the sample mean of the estimated slope coefficients over the entire sample period. To test the significance of the average monthly slope coefficient, we calculate the t statistics using time series variation of all 510 regressions. To obtain the market betas that are going to be used in each monthly cross-sectional regression, we estimate the rolling betas. Specifically, for each regression, market betas are estimated using data from the period preceding each month, the estimation periods are over 30 month before current regression month. In the model, size is measured by nature log of firm's book assets, leverage is measured by total liability over total assets. dEBIT is a dummy variable takes value of 1 if earnings are positive, Debt coverage is defined as earnings before interest and tax standardized by total liabilities; Capital expenditure is calculated as capital expenditure over book assets; profit measures profitability of the firm and calculated as earnings before interest and tax over book assets; RD calculated as ratio of research and development expenses to sales. Tangibility is defined as fixed assets to book assets; tax is defined as taxes paid to book assets.

Health NBE Firms				Reference Firms				All NBE Firms			
Variable	Mean	Std Dev	t Value	Variable	Mean	Std Dev	t Value	Variable	Mean	Std Dev	t Value
<b>Intercept</b>	-2.16	167.25	-0.29	<b>Intercept</b>	-2.53	11.51	-4.96	<b>Intercept</b>	-0.82	17.94	-1.04
<b>beta</b>	4.57	118.05	0.87	<b>beta</b>	0.06	2.57	0.51	<b>beta</b>	-0.15	4.12	-0.83
<b>size</b>	-0.93	13.60	-1.54	<b>size</b>	-0.80	1.49	-12.16	<b>BL</b>	7.22	43.26	3.77
<b>BL</b>	1.36	286.29	0.11	<b>BL</b>	11.75	21.61	12.28	<b>size</b>	-0.74	3.17	-5.25
<b>O_SCORE</b>	-1.15	16.16	-1.61	<b>O_SCORE</b>	-1.22	2.68	-10.29	<b>O_SCORE</b>	-0.79	4.77	-3.72
<b>dEBIT</b>	3.20	68.12	1.06	<b>dEBIT</b>	0.17	4.81	0.82	<b>dEBIT</b>	1.60	11.40	3.18
<b>Debt Coverage</b>	-4.81	279.69	-0.39	<b>Debt Coverage</b>	-1.95	5.85	-7.52	<b>Debt Coverage</b>	-1.23	12.74	-2.18
<b>Capital Expenditure</b>	-1.02	103.81	-0.22	<b>Capital Expenditure</b>	-3.83	23.17	-3.73	<b>Capital Expenditure</b>	2.53	95.08	0.60
<b>profit</b>	-6.59	476.47	-0.31	<b>profit</b>	3.39	26.38	2.90	<b>profit</b>	-0.62	46.40	-0.30
<b>RD</b>	17.47	517.38	0.76	<b>RD</b>	1.47	30.36	1.09	<b>RD</b>	2.50	59.05	0.96
<b>TANGIBLE</b>	2.82	60.48	1.05	<b>TANGIBLE</b>	0.50	7.37	1.53	<b>TANGIBLE</b>	-0.22	14.59	-0.34
<b>TAX</b>	19.87	219.29	2.05	<b>TAX</b>	11.63	55.13	4.76	<b>TAX</b>	15.24	88.69	3.88
<b>CASH</b>	3.36	37.45	2.03	<b>CASH</b>	2.10	14.35	3.31	<b>CASH</b>	1.40	17.78	1.78